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Cash Holdings of Small and Big Firms: Corporate Governance and Financial Constraints—Evidence from an Emerging Market

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ABSTRACT

Small firms often follow the financial behavior of large firms to sustain operations and mitigate risks during periods of uncertainty. This study examines the relationship between corporate cash holdings of small and large firms, while assessing the impact of corporate governance and financial constraints among 200 non-financial companies listed on the Pakistan Stock Exchange (PSX) from 2013 to 2018. Financial constraints (FC) are measured using the Altman Z-score, and corporate governance (CG) is evaluated through Board Size, Board Independence, Board Meetings, Institutional Shareholding, and Executive Shareholding. The control variables include Non-Cash Assets, Operating Cash Flow, Capital Expenditure, Net Working Capital, Sales Growth, Leverage, and Firm Size, while Cash Holdings serve as the dependent variable. Using a deductive and quantitative approach with panel data analysis (Fixed Effect Model) in EViews 9, the study finds that small and large firms exhibit a positive and significant correlation in cash-holding behavior. Financial constraints show a significant positive relationship with cash holdings, indicating that constrained firms retain more liquidity as a precautionary measure. Among corporate governance proxies, only Executive Shareholding significantly influences cash holdings, while others are insignificant. Furthermore, all control variables, except Capital Expenditure, significantly affect firms' cash-holding levels. These findings contribute to understanding the cash management behavior of firms in emerging markets, emphasizing the combined role of governance mechanisms and financial constraints in shaping corporate liquidity decisions.

Keywords: Cash Holdings; Financial Constraint; Corporate Governance; Non-Financial Firm

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1. Introduction

There are many reasons for corporations to hold cash, one of which is to reduce transaction costs and avoid the loss of underinvestment due to a shortage of funds[1]. Researchers have documented that high liquid funds are frequently associated with small returns on investment[2]. Corporate cash holdings have been explained by free cash flow, pecking order, and trade-off theories. Corporations set their higher levels of cash by following the trade-off theory[3]. Corporate cash holdings also have some advantages, such as decreasing the possibility of financial distress, tackling financial constraints, permitting the pursuance of investment policies, and reducing costs arising externally[4]. Cash may always be considered a prime part of a corporation's total assets. Financial experts have expressed and discussed liquid assets and investments in various forms[5], suggesting that firms holding large amounts of liquid funds indicate the importance of such assets.

Shareholders often express concern due to large liquid asset holdings. According to Keynesian belief, corporations preserve liquid funds for precautionary, speculative, and transactional motives[6]. Previous literature discovered that corporate cash-holding decisions are determined by firm-specific traits such as leverage, creditor rights, shareholder rights, investment, firm size, and market-to-book value ratio[5, 7]. Each of these elements exists independently of peer firm actions. The importance of peer firm behavior in influencing cash-holding decisions has been largely ignored in the literature. Given these factors, corporate cash holdings have attracted growing attention from both business participants and academic researchers. In the presence of good corporate governance, shareholders may permit management to hold larger cash assets when they perceive better protection[8]. The U.S. corporations with weaker governance structures tend to hold more liquid funds[8].

Financial constraints arise due to asymmetric information, making external financing more expensive than internal resources. Financial requirements are particularly binding for small firms, limiting their growth due to restricted internal funding[9]. External governance mechanisms—such as government, regulatory authorities, judiciary, politicians, creditor rights, and shareholder rights—affect corporate management[2]. Internal controls are exercised by CEOs, boards of directors, independent directors, auditors, and chairpersons[10]. However, researchers specify that external governance in developing markets is weaker than in developed markets[11].

Financially constrained organizations with larger cash holdings are more likely to use cash to increase investment in positive NPV projects, where marginal investment is more significant to constrained firms than unconstrained ones[12]. Firms with financial limitations face distress risk, governance issues, bankruptcy, and default risks. Corporations with lower investment opportunities show higher cash flow sensitivity, and this sensitivity decreases when investment opportunities are high[13]. Positive cash flow negatively impacts the sensitivity of cash, whereas negative cash flow has a positive impact. Working capital has a lesser effect on corporate cash-holding levels, while fixed assets and cash flow sensitivity have favorable effects[14].

Empirical findings suggest that the optimal cash-holding ratio contributes to organizational profitability, where cash holdings within 9.93% can enhance firm performance[15]. Firms with larger boards or independent directors are likely to retain more cash[16]. Internal capital markets can reduce cash holdings, particularly for private enterprises and intra-financial activities, while non-operating transactions play a significant role in minimizing cash reserves[17]. The effect of shareholder protection on cash holdings diminishes under financial constraints, especially during global financial crises[18]. Internal information quality has a significant negative impact on cash-holding decisions[19]. Firms facing financial constraints tend to retain cash reserves as a hedge against geopolitical risk[20]. Additionally, banks in BRICS countries hold more cash than those in G7 countries.

Corporate governance, CEO characteristics, and market context play pivotal roles in shaping firms' cash holdings and investment decisions. Evidence from both emerging and developed markets demonstrates that board structure, gender diversity, and network centrality influence liquidity and performance, whereas weak governance or CEO duality increases agency risks[21–23]. CEO traits—including gender, education, age, and tenure—also affect cash management, highlighting leadership's role in mitigating agency conflicts[24, 25]. Cash-holding behavior is further shaped by financial constraints, institutional ownership, political connections, and market development[25]. Constrained or politi-

cally connected firms tend to hold more cash, while strong institutional oversight and lower financing costs reduce excess reserves [26–29]. Overall, these findings underscore the intertwined effects of governance, leadership, and market conditions on corporate liquidity decisions.

Prior research has explored corporate governance and cash holdings across different sectors and economies. However, this study focuses on the diversity and correlation of cash holdings among small and large non-financial firms listed on the Pakistan Stock Exchange, considering their corporate governance structures and financial constraints. The relationship between corporate governance and corporate cash holdings is crucial—if governance codes are effectively implemented, managers are expected to fulfill stewardship obligations toward optimal cash levels.

Holding adequate cash can enable management to seize short-term earnings opportunities; however, excessive cash without justification may discourage external investors. The cash-holding levels of small firms are often influenced by larger firms due to government uncertainty in developing markets. This study investigates corporate cash holdings as both precautionary motives and agency problems in small and large firms. Prior literature has established that cash retention serves investment purposes while also guarding against potential misuse by executives pursuing private benefits. High cash holdings are not commonly observed in developed economies. Shariah compliance also significantly affects cash-holding decisions, with Shariah-compliant firms tending to hold more cash and adjust toward target cash ratios faster than their non-compliant peers [30]. International evidence supports the notion that public firms in developed nations maintain substantial cash assets, consistent with precautionary motives.

Miller and Orr developed a trade-off model specifically for firms in order to maximize cash flows by balancing the costs of running out of cash and non-interest-bearing cash [29]. Opler et al. suggest that when the marginal shortage of cash and the marginal advantage of liquid funds are balanced, the firm may hold cash. Opler et al. extended the theory of trade-off by including a balance of information related to the rising cost of external resources and the agency cost of external financing. Opler et al. also specify that if a firm is constrained due to lack of cash, it should meet its cash requirements by collecting the following: an investment market that has a balance of information, eliminating existing assets at a lower cost, reducing profits and investments, arranging existing financial agreements, applying for debt financing, or taking some collective action [7]. The theory of trade-off suggests that with higher levels of cash holding, firms increase their value by considering marginal costs and marginal benefits [4]. Furthermore, firms may save overall costs by keeping large liquid assets. Managers reduce external financing and hold cash, which they may invest in nonprofit ventures, potentially reducing shareholder wealth [11].

Shareholders always prefer balanced cash flow because increased cash flow may not favor them, as agency conflict can arise between shareholders and managers. Managers, on the other hand, may want to increase free cash flow and hold large amounts of cash for overinvestment or personal use [25]. Pecking order theory describes that financing costs increase due to asymmetric information. In nations with weak shareholder rights, the effect of the market-to-book ratio on cash is less pronounced, showing that cash is not only maintained to protect future assets but also due to managerial discretion. Financially constrained firms have significantly larger cash holdings, and cash in constrained organizations is more sensitive to cash flow. Controlling business size, cash flows, and stock returns also influences firm performance and helps meet financial constraints [25].

Governance data indicate that high takeover protection and governance quality are associated with firm size while board characteristics influence corporate cash holding, with weak governance structures increasing agency risk [22, 23]. Observational studies show that financial underdevelopment disproportionately affects firms in emerging markets. Corporate governance is a fundamental structure that is used to gauge returns and improve reporting accuracy [6, 9]. Boards responding to investors' issues reduce managerial misconduct, and firms with strong board governance access outside capital markets more efficiently and smaller boards also improve disclosure quality [7–10, 26].

Cash holdings are particularly relevant for financially constrained firms. Governance and financial constraints serve as substitutes in corporate cash management. Firms with significant real options hold excess cash. Board governance norms can substitute for financial limitations [30–33]. Innovative or R&D-intensive firms hold more cash [33–35], especially when overseen by overconfident CEOs. Firms may

rely on internal and external financing, but in the presence of market imperfections, they may prefer one over another [35]. Bank relationships influence cash holdings, with concentrated ties causing liquidity delays for smaller firms [32]. Cash flow sensitivity in Chinese firms shows that positive cash flow negatively affects cash holdings, whereas negative cash flow has a positive effect [17]. Peer effects are significant in manufacturing firms, influencing cash-to-asset ratios [22]. Cash holdings are influenced by shareholder protection, particularly in financially constrained firms [18].

Board independence negatively influences cash holdings, whereas larger board size positively influences them. Strong governance reduces excess cash allocated to internal investment and competitive expansion [26]. CEO characteristics affect cash holdings, with capable CEOs reducing financial constraints [36]. Environmental uncertainty increases cash holdings, mitigated by competent CEOs [31]. Financial distress, institutional ownership, firm size, profitability, and board independence are positively associated with cash holdings. Internal information quality negatively affects cash holding decisions. Geopolitical uncertainty encourages cash retention, especially for financially constrained firms [17, 18].

Corporate governance mechanisms significantly influence firms' cash-holding behavior by mitigating agency conflicts [37–40]. Block holder ownership and board network centrality reduce cash reserves, reflecting stronger oversight [41, 42]. Strong external governance offsets weak internal governance, limiting wasteful cash use [43, 44]. Financial constraints and CEO characteristics also play key roles [45–49]. Politically connected firms hold more cash due to weaker oversight and higher agency risk. Firms in developed markets hold more cash due to higher cash flows, R&D, and returns, whereas emerging markets firms hold less. Few studies examine these factors simultaneously in emerging markets, motivating the current research on Pakistani non-financial firms.

H1. *There is a significant correlation between small and big firms in terms of cash holdings.*

H2. *There is a statistically significant link between financial constraints and cash holdings.*

H3. *There is a significant link between corporate governance and corporate cash holdings.*

H4. *The cash determinants have significantly connected to corporate cash holdings.*

2. Materials and Methods

In this research study, we used a convenience sampling technique to choose 200 a sample data set of Non-financial companies registered in Pakistan Stock Exchange (PSX) during 2013–2018. Panel data obtained from the websites of non-financial companies in the list of PSX. OLS estimation and correlations have been used in this study and firms numbers assigned ranging from 01 to 200 both small and large. Small and large firms were categorized based on firm size, measured by the natural logarithm of total assets, where firms below the sample median were classified as small and those above the median as large.

In this study, both qualitative and quantitative variables were employed to provide a comprehensive understanding of the determinants of corporate cash holdings (**Table 1**). The qualitative variables primarily represent aspects of corporate governance—such as board structure and ownership characteristics—which capture managerial and institutional influences that are not directly measurable in monetary terms. In contrast, the quantitative variables, including financial constraints, firm size, and financial ratios, reflect measurable firm level financial attributes. The integration of both types allows for a balanced assessment of how governance mechanisms and financial conditions jointly influence corporate cash holding behavior.

Table 1. Variables and Description.

Variables	Description
Dependent Variables	
Corporate cash holding CCH	Corporate Cash holding is derived from cash & cash equivalent dividing by its total assets (TA).
Independent Variables	
Financial Constraints FC	Altman's Z score, $Z = 1.2x_1 + 1.4x_2 + 3.3x_3 + 0.6x_4 + 0.999x_5$
Corporate Governance CG	Board Size, Board Independence, Board Meetings, Institutional Share, and Executive Share,

Table 1. *Cont.*

Variables	Description
Control Variables	
	Non Cash Assets, Operating Cash Flow, Capital Expenditure, Net Working Capital, Sales Growth, Leverage and Firms Size

Note: $Z = 1.2x_1 + 1.4x_2 + 3.3x_3 + 0.6x_4 + 0.999x_5$; Where: X_1: Cash Ratio minus Account payables; X_2: Retained Earnings (RE) ÷ total assets (TA); X_3: EBIT ÷ total assets (TA); X_4: Equity Book-Value (BV) ÷ Debts Book-Value; X_5: Total Sales ÷ Total Assets (TA).

In First model we look the effect of corporate cash holdings (CCH) on the Total Assets (TA). As in the current study, we defined extra cash as cash that isn't required for activities, investment or speculation. To control precautionary and exchange processes in holding cash, we used the OLS technique for Dittmar and Smith [2], who characterize extra cash as (counting firms fixed and arbitrary impacts) in the following multi-regression model. The general regression model to locate the corporate cash holding is given below:

$$\begin{aligned}\textbf{Ln (Cash}_{it}\textbf{ / NCA}_{it}\textbf{)} &= \beta_0 + \beta_1\textbf{NCA}_{it} \\ &+ \beta_2\textbf{(Operating Cash-Flow}_{it}\textbf{ / NCA}_{it}\textbf{)} \\ &+ \beta_3\textbf{(Net Working Capital}_{it}\textbf{ / NCA}_{it}\textbf{)} \\ &+ \beta_4\textbf{(Capital Expenditure}_{it}\textbf{ / NCA}_{it}\textbf{)} \\ &+ \textbf{(Firm Fixed and Random Effects)} + \varepsilon_{it},\end{aligned}$$

Where, Ln is the natural log of the variable, Cash/NCA is cash ratio to Non-Cash Assets (NCA) and all the predictors are also scaled by Non-Cash Assets while model represents the relationship between independent, control and dependent variable. The multiple regression equation used for the current study is as follows:

$$\begin{aligned}\textbf{Ln (Cash}_{it}\textbf{ / NCA}_{it}\textbf{)} &= \beta 0 + \beta 1\textbf{Ln(Z-Score}_{it}\textbf{)} \\ &+ \beta 2\textbf{Ln(CG}_{it}\textbf{)} + \beta 3\textbf{Ln(NCA}_{it}\textbf{)} \\ &+ \beta 4\textbf{Ln(Operating Cash Flow}_{it}\textbf{)} \\ &+ \beta 5\textbf{Ln(Net Working Capital}_{it}\textbf{)} \\ &+ \beta 6\textbf{Ln(Capital Expenditure}_{it}\textbf{)} \\ &+ \beta 7\textbf{Ln(Sales growth}_{it}\textbf{)} + \beta 8\textbf{Ln(Leverage}_{it}\textbf{)} \\ &+ \beta 9\textbf{Ln(Firm Size}_{it}\textbf{)} + \beta 10\textbf{Ln(Firm Age}_{it}\textbf{)} + \varepsilon_{it}\end{aligned}$$

The intercept is β0, and the co-efficient are β1, β2, β3, β4, β5, β6, β7, β8, β9, and β10. Cash/NCA is cash ratio to non-cash assets NCA, Z-Score is the financial constraints, CG is the corporate governance, Non cash assets, Operating Cash-Flow, Net-Working Capital, Capital Expenditures, Sales growth, Leverages, Firm Size, are control variables, ε is error term and from (1–5). We distribute the sample into two categories based on total assets: small and big firms, in order to investigate the correlation of cash holding.

While potential endogeneity between cash holdings and firm characteristics, such as firm size or performance, may exist, the study mitigates this concern the use of a fixed effect model, which controls for unobserved time-invariant firm-specific heterogeneity. By including both firm-level control variables (e.g., non-cash assets, operating cash flow, leverage) and governance variables, the model accounts for major observable determinants of cash holdings, reducing omitted variable bias. Furthermore, the use of panel data over six years allows for capturing temporal variations and dynamic behavior in firms' liquidity management. Although more advanced techniques such as GMM or instrumental variables could further address endogeneity, the current specification provides reliable and consistent estimates, particularly for identifying the relative impact of financial constraints, governance, and control variables on cash holdings.

3. Results

The mean of the CCH is −0.9848, and the median is −0.853, which clarifies that the mean is more noteworthy than the median because both are on the same side. The mean of the FC is 0.724, and the median is 0.801, which clarifies that the mean is smaller than the median. In these outcomes, the standard deviation of CCH is 0.6531. With typical information, the greater part of the perceptions spread within 6.6 standard deviations on each side of the mean. According to Ray, the skewness value should be in the range of (−5 and +5). **Table 2** presents the descriptive data.

Table 2. Descriptive Statistics.

	CCH	FC	BZ	BI	BM	CEOD	IS	ES	NCA	OCF	CE	NWC	SG	LEV	FS
Mean	−0.9848	0.724	0.760	0.202	1.614	0.0645	0.679	0.0872	14.769	8.8803	5.5582	8.2731	3.692	−0.7777	6.7341
Median	−0.8534	0.801	0.000	0.000	1.610	0.0000	0.000	0.0000	14.750	11.635	0.000	11.565	4.605	−0.6050	6.6900
Maximum	−0.0004	5.242	3.044	2.200	3.330	1.0000	3.760	2.7100	19.630	19.040	18.760	19.680	6.870	0.3000	18.210

Table 2. *Cont.*

	CCH	FC	BZ	BI	BM	CEOD	IS	ES	NCA	OCF	CE	NWC	SG	LEV	FS
Minimum	−7.0986	−4.408	0.000	0.000	0.690	0.0000	0.000	0.0000	3.9100	0.0000	0.0000	0.0000	−3.460	−5.7600	4.5700
Std. Dev.	0.6531	0.851	1.022	0.436	0.317	0.2457	0.985	0.4140	1.9791	6.2229	6.3400	6.6245	1.901	0.6162	0.7988
Skewness	−2.9335	−0.992	0.635	2.159	1.665	3.5452	1.205	4.7981	−1.3212	−0.5646	0.4344	−0.3377	−1.410	−2.6298	3.0373
Kurtosis	18.669	9.484	1.486	6.989	6.746	13.568	3.120	24.829	8.7457	1.6236	1.4598	1.3245	3.180	14.849	45.010
Observations	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199	1199

The Pearson correlation (**Table 3**) between cash holdings and FC is 0.242, at a significance level of 0.01 (2-tailed), which shows that there is a moderate positive relationship between these variables. The Pearson correlation between FC and BZ is about 0.076, at a significance level of 0.01 (2-tailed), indicating a solid positive relationship between these variables. Pearson correlations among FC, BM, and ES show an insignificant relationship between these variables. The relationship between these variables is negative, which displays no relationship. The Pearson correlation between cash holdings and BZ is insignificant. The Pearson correlation among cash holdings and BI, BM, and IS is positive yet insignificant. Pearson correlations among cash holdings and ES show a negative and insignificant relationship between these variables.

Correlations Link of Cash Holdings of Small and Big Firms

The Pearson correlation between cash holdings of Big Firms and Small Firms is about 0.103 at a significance level of 0.05 (2-tailed), which shows that these two factors have a significant link (**Table 4**). If big firms raise their cash holdings, small companies grow their cash holdings as well. As a conclusion, we can argue that the cash holdings level of small firms in Pakistan is influenced by the cash holdings level of big firms in the industry. To evaluate whether a fixed or random effect model was used, the Hausman test was performed (**Tables 5** and **6**).

Table 3. Pearson Correlations.

		CCH	FC	BZ	BI	BM	CEOD	IS	ES	NCA	OCF	CE	NWC	SG	Lev	FS
Corporate Cash Holdings	Pearson Correlation	1														
Financial Constraints	Pearson Correlation	0.242**	1													
Board Size	Pearson Correlation	0.055	0.076**	1												
Board Independence	Pearson Correlation	0.029	0.018	0.175**	1											
Board Meetings	Pearson Correlation	0.028	−0.03	0.124**	0.169**	1										
CEO Duality	Pearson Correlation	−0.067*	0.003	−0.072*	−0.04	−0.060*	1									
Institutional Share	Pearson Correlation	0.032	0.04	0.064*	0.102**	0.03	0.036	1								
Executive Share	Pearson Correlation	−0.03	−0.03	−0.01	0.015	0.008	0.013	−0.03	1							
Non Cash Assets	Pearson Correlation	−0.04	−0.02	0.215**	0.189**	0.166**	−0.078**	0.096**	0.034	1						
Operating Cash Flow	Pearson Correlation	0.131**	0.284**	0.156**	0.121**	0.069*	−0.075**	0.082**	−0.02	0.364**	1					
Capital Expenditure	Pearson Correlation	0.028	0.160**	0.091**	0.061*	0.129**	−0.059*	0.083**	0.036	0.314**	0.111**	1				
Net Working Capital	Pearson Correlation	0.405**	0.533**	0.095**	0.033	0.011	−0.077**	0.100**	−0.105**	0.161**	0.199**	0.216**	1			
Sales Growth	Pearson Correlation	0.261**	0.064*	0.009	0.035	0.025	−0.110**	−0	−0.04	0.263**	0.125**	0.107**	0.117**	1		
Leverage	Pearson Correlation	0.026	−0.653**	−0.01	0.002	−0	0.021	−0.04	0.013	−0.04	−0.156**	−0.216**	−0.442**	−0.061*	1	
Firms Size	Pearson Correlation	0.178**	0.081**	0.227**	0.200**	0.177**	−0.067*	0.088**	0.039	0.847**	0.366**	0.307**	0.291**	0.249**	−0.085**	1
	N	1200	1200	1200	1200	1200	1186	1200	1200	1200	1200	1200	1200	1200	1200	1200

Note: **: Correlation is significant at the 0.01 level (2-tailed); *: Correlation is significant at the 0.05 level (2-tailed).

Table 4. Correlations—Corporate Cash Holdings of Small and Large Firms.

	Cash Holdings of Big Firms (N = 463)	Cash Holdings of Small Firms (N = 709)
	Pearson Correlation	Pearson Correlation
Cash holdings of Big Firms	1	0.103*
Cash holdings of Small Firms	–	1

Note: *: Correlation is significant at the 0.05 level (2-tailed).

Table 5. Hausman Test.

Test Cross-Section Random Effects			
Summary of test	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Random Cross-section	201.695383	14	0.0000

Here the H0 is rejected ($p < 0.05$). So fixed effect model has been recommended.

Table 6. Fixed Effect Model.

Variable	Coefficient	Std. Error	*t*-Statistic	Prob.
C	2.570046	0.320950	8.007609	0.0000
FC	0.048582	0.017982	2.701767	0.0070
BZ	−0.031972	0.185948	−0.171943	0.8635
BI	0.043108	0.029760	1.448520	0.1479
BM	0.010587	0.034588	0.306103	0.7596
CEOD	0.002147	0.052118	0.041203	0.9671
IS	−0.021991	0.015457	−1.422663	0.1552
ES	0.075591	0.036817	2.053192	0.0404
NCA	−0.267292	0.018240	−14.65438	0.0000
OCF	−0.007971	0.001224	−6.511890	0.0000
CE	0.005152	0.002704	1.905185	0.0571
NWC	0.010425	0.001695	6.149265	0.0000
SG	0.011840	0.003467	3.415428	0.0007
LEV	0.134207	0.030463	4.405564	0.0000
FZ	0.056598	0.018236	3.103685	0.0020
Effects Specification				
Cross-section Fixed (dummy variables)				
R^2	0.942277	Mean dependent var		−0.984784
Adjusted R^2	0.928046	S.D. dependent var		0.653108
S.E. of regression	0.175192	Akaike info criterion		−0.470077
Sum squared resid	24.40020	Schwarz criterion		0.502952
Log likelihood	430.1584	Hannan-Quinn criter.		−0.100114
F-statistic	66.21259	Durbin-Watson stat		1.830503
Prob (F-statistic)	0.000000			

Financial constraints have a significantly positive relationship with corporate cash holdings, which is supported by Musso et al. and Lee et al.[31, 32]. In terms of corporate governance, only the executive share percentage is significant, while all other proxies are insignificant for non-financial firms. However, these findings are inconsistent with Aktas et al.[37]. Except for capital expenditures and cash holdings, all control variables show a significant association. Future corporate cash holdings of non-financial firms are anticipated using financial constraint levels, executive share, and other major market and industry control variables. Management can properly manage financial constraints for better utilization of cash holdings and higher investment returns achieved through optimal use of cash holdings via effective links between corporate governance and cash holdings.

To address potential bias in the output of results arising from variable selection, the study carefully incorporated theoretically and empirically justified variables that influence corporate cash holdings. The inclusion of both governance and financial variables minimizes omitted variable bias and ensures a holistic model specification. The fixed effect model was chosen after the Hausman test ($p < 0.05$) confirmed its suitability, effectively controlling for unobserved firm-specific heterogeneity that might otherwise bias the estimates. Furthermore, all explanatory variables were examined for multi-collinearity, and the results indicated acceptable variance inflation factors (VIFs). The high explanatory power ($R^2 = 0.94$) and statistically significant F-statistic confirm the model's robustness. Therefore, the estimated coefficients are interpreted with confidence, suggesting that the results are reliable and free from major specification bias. **Table 7** summarizes the results of hypothesis testing, highlighting which hypotheses were supported or rejected based on our empirical analysis.

Although the study does not explicitly perform alternative model specifications or sensitivity analyses, the robustness of the results supported by several factors. First, the fixed effect model accounts for unobserved, time-invariant heterogeneity across firms, reducing potential bias from omit-

ted variables. Second, the inclusion of a comprehensive set of control variables—covering financial, operational, and governance characteristics—ensures that the main determinants of cash holdings adequately captured. Third, the high explanatory power of the model ($R^2 = 0.94$) and statistically significant F-statistic confirm the overall fit and reliability of the estimates. These considerations provide confidence in the validity of the findings, although future research could further strengthen credibility by implementing sensitivity tests or alternative econometric specifications.

Table 7. Hypothesis Testing Summary.

S.No.	Hypothesis	Accepted/Rejected
H1.	*There is a significant correlation between small and big firms in terms of cash holdings.*	Accepted *($p < 0.05$)*
H2.	*There is a statistically significant link between financial constraints and cash holdings.*	Accepted *($p < 0.05$)*
H3.	*There is a significant link between corporate governance and corporate cash holdings.*	Partially Accepted *(Only Executive Share is significant at $p = 0.0404$; other CG variables are insignificant)*
H4.	*The cash determinants significantly connected to corporate cash holdings.*	Accepted *(Most control variables are significant at $p < 0.05$)*

4. Discussion

The fixed effect model results reveal that financial constraints (FC) exert a positive and significant influence on corporate cash holdings ($\beta = 0.0486$, $p = 0.007$), implying that financially constrained firms tend to accumulate more cash reserves [2]. This finding aligns with Pecking Order Theory, which postulates that firms facing limited access to external financing rely on internal funds to mitigate uncertainty [3, 4]. Economically, the estimated coefficient indicates that a one-unit increase in financial constraint score enhances cash holdings by approximately 4.9%, reflecting a meaningful effect for firms in capital-constrained markets like Pakistan. The result also supports the argument of Yung and Nafar [5] that firms with restricted financial flexibility hoard cash to hedge against liquidity shocks. This tendency is particularly relevant for small and medium-sized firms in emerging economies, where credit markets are less developed, making cash retention a key financial survival strategy.

Regarding corporate governance (CG), only Executive Shareholding (ES) shows a statistically significant and positive effect on cash holdings ($\beta = 0.0756$, $p = 0.0404$) [7]. This suggests that firms with higher executive ownership tend to retain more liquidity, possibly due to managerial discretion and self-insurance motives. From an agency theory perspective [8, 9], this finding may imply that when executives hold substantial shares, they prefer maintaining higher cash reserves to safeguard firm operations and mitigate personal wealth risk. However, it may also indicate potential agency conflicts where managerial control leads to over-retention of cash rather than efficient investment. The insignificance of other governance proxies—board size, independence, and institutional ownership—implies that governance mechanisms in Pakistan's corporate environment are weakly effective in monitoring liquidity decisions [10, 11], which resonates with evidence in Asian markets with underdeveloped governance frameworks.

The results for control variables reinforce the Trade-off Theory of cash holdings. Non-Cash Assets (NCA), Operating Cash Flow (OCF), and Leverage (LEV) exhibit strong and significant relationships, confirming that firms optimize liquidity by balancing opportunity costs and precautionary motives [12, 13]. Specifically, NCA and OCF display negative coefficients ($\beta = -0.267$ and -0.008, respectively), implying that firms with greater tangible assets or stronger internal cash flow capacity hold less cash, as they can easily liquidate or fund investments through operating inflows. In contrast, leverage ($\beta = 0.134$, $p = 0.000$) positively affects cash holdings, suggesting that firms with higher debt prefer to maintain larger liquidity buffers to reduce bankruptcy risk. The magnitude of these coefficients, particularly NCA and LEV, indicates economically meaningful effects — with a 1% rise in leverage leading to over a 0.13% increase in cash holdings, underscoring the risk-hedging behavior prevalent in financially vulnerable firms. The studies by Shah et al. [50–52] examine the links between corporate ownership

structures, financial risks, and cash holdings, as well as the impact of accounting profitability on future share prices in Pakistani non-financial and investment firms.

The significance of Net Working Capital (NWC) (β = 0.0104, p = 0.000), Sales Growth (SG) (β = 0.0118, p = 0.0007), and Firm Size (FZ) (β = 0.0566, p = 0.002) further extends the discussion. The positive coefficients of NWC and SG suggest that firms experiencing greater operational liquidity and growth opportunities prefer to hold more cash to support short-term funding and expansion needs. The positive and significant effect of firm size indicates that large firms, despite having easier access to external finance, still maintain substantial cash holdings to preserve financial flexibility and stability in volatile environments [1]. These findings are consistent with Musso and Schiavo [31], who highlight that both growth-oriented and large firms in emerging markets maintain cash buffers to counterbalance uncertainty and exploit future investment opportunities.

Interestingly, Capital Expenditure (CE) is marginally insignificant (p = 0.0571), implying that investment spending does not strongly influence cash levels in the sampled firms. This could reflect either limited investment opportunities during the period (2013–2018) or the tendency of firms to finance capital outlays through debt rather than cash depletion. The high R^2 value (0.942) and significant F-statistic confirm the robustness of the model, suggesting that the included variables explain a substantial proportion of the variation in firms' cash holdings. The Durbin–Watson statistic (1.83) also indicates minimal autocorrelation, supporting model validity.

Overall, the findings reveal that both financial constraints and selective governance mechanisms — particularly executive shareholding—play critical roles in shaping corporate cash-holding behavior in Pakistan's non-financial sector. Economically, these relationships are strong enough to influence firms' liquidity management and investment capacity. The results suggest that policymakers should focus on improving corporate governance standards and credit market accessibility to reduce excessive cash hoarding and encourage productive reinvestment. For practitioners, the study highlights that cash management decisions are not purely mechanical but strategically driven by internal control structures and external financing limitations—insights that can help align managerial liquidity behavior with shareholder interests.

5. Conclusions

This study analyzed the correlation of cash holdings of small and large firms, their financial constraint, and corporate governance of listed 200 non-financial sector organizations on their corporate cash holding during the sample period of 2013–2018. The Financial Constraint (FC) measures with Z-score, Corporate Governance (CG) with Board Size (BZ), Board Independence (BI), Board Meetings (BM), Institutional Share (IS), Executive Share (ES) and control variables are Non Cash Assets (NCA), Operating Cash Flow (OCF), Capital Expenditure (CE), Net Working Capital (NWC), Sales Growth (SG), Leverage (LEV) and Firms Size (SZ) in this study and Corporate Cash Holdings (CCH) as a depended variable. A deductive and quantitative methodology has been utilized in this study, and a six-year panel data set has been gathered from the financial reports through the official sites. This study depends on a convenience sampling technique by choosing all 200 listed non-financial firms in PSX. Corporate cash holdings of small and large firms have indicated positive and significant correlations. The financial constraint FC has a significantly positive relationship with corporate cash holding CCH. In corporate governance, the CG only the executive share ES percentage has a significant effect, while all other proxies are insignificant to the corporate cash holding CCH of non-financial firms. Except for capital expenditures to corporate cash holding of Non-financial firms in Pakistan, all of the study's control variables are significant.

Hence, it shows that the future corporate cash holdings CCH of non-financial firms in Pakistan can only be predicted with the help of financial constraints FC level, executive share ES and other significant control variables of the firm in the market and industry. Management of the firm can properly manage its financial constraints in the industry for the better utilization of its corporate cash holdings. Higher investment returns can only be possible with the best use of CCH by designing the best links between corporate governance CG and corporate cash holdings CCH. The results support helping firm managers create techniques for cash holding effectively. Massive holdings of cash need to be dedicated to a couple of days to the preparation for the

upcoming appointment, restricting the prospective utilization of cash. So it's an appropriate possibility for these companies to really have a severe debate about the utilization that is best for the cash, such as the chance for shifting it back again to the investors.

Despite the fact that the volume of funds reaches record quantities, we are perhaps not at accurate documentation relative to the size of the economy, which tends to be still quite high. Cash additionally provides flexibility to take advantage of lucky breaks. There are a few reasons discouraging holding cash, such as a lack of sensible investment possibilities. Management should identify these issues and acquire optimal skills in the market, or outsource to overcome these issues. Management can use transaction cost and precautionary demand theories, which explain the balance variation in cash holding because it is very significant to avail the spontaneous investment opportunities in the financial market.

The board of the firm can properly deal with its financial constraints in the industry for the better usage of its corporate cash holdings. Higher investment returns must be possible with the best utilization of CCH by designing the best connections between corporate governance CG and corporate cash holding CCH. Cash is invested in high-return investment projects to earn more for future economic growth and potential development in the industry. Diminishing barriers to inter-financial markets, establishing linkages among intermediaries and corporate firms, and improving the functions of the capital market for lessening the power of financial constraints. As needs be, firms may handily get assets from outside capital markets to utilize their cash reserves for investment purposes instead of keeping them.

Research proves that corporate cash holding ought to be decidedly identified with policy and firms' risk and, to a lesser degree, venture. A better and more flexible cash policy can open new horizons of earnings for non-financial firms in Pakistan. Future research studies can be conducted to consider other variables, such as social factors, that affect the corporate cash holding of non-financial firms.

Author Contributions

R. contributed to the conceptualization, literature review, and data collection of the study. W.U.S. supervised the research, performed the formal analysis, and drafted the manuscript. All authors have read and agreed to the published version of the manuscript.

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Conflicts of Interest

The authors declare no conflict of interest.

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