International Journal of Advanced Social Studies
ISSN: 3006-1776 (Print), 3006-1784 (Online)

Research Article

Influence of WCM Policies on Firm Liquidity: The Moderating Role of Pyramidal Structure

Article History
Received: December 24, 2025
Revised: March 19, 2026
Accepted: March 24, 2026
Published: March 30, 2026

Muhammad Sikander Iqbal
College of Management Sciences, Karachi Institute of Economics and Technology, Karachi, Pakistan

*Corresponding Email: siqbal3000@gmail.com
https://doi.org/10.70843/ijass.2026.06119

Abstract

The study explores how WCM (working capital management) decisions influence a firm's liquidity, simultaneously analyzing the moderating role of pyramidal structure. The dataset has been drawn from 385 listed companies operating in non-financial sectors with the highest market capitalization listed on the Stock Exchanges of India, Malaysia, Singapore, and Pakistan. The time period covered is from 2015 to 2019. For empirical analysis, robust regression was used. It was found that firm liquidity was significantly affected by WCM policies. The pyramidal structure does affect the firm's liquidity. Results also substantiate the moderating impact exhibited by the pyramidal structure on the relationship between WCM and liquidity. The work adds value to the current literature by substantiating the impact of pyramidal structure on the relationship between WCM and firm liquidity in Asian economies.

Keywords: Working capital management (WCM), Liquidity, Pyramidal structure, Cash conversion cycle (CCC), Quick ratio.

Introduction

Working capital management (WCM) decisions are crucial for preserving a firm's liquidity. Ensuring the availability of sufficient liquidity is an essential part of the job of a finance manager. Ever-increasing levels of globalization and competition have put a lot of pressure on firm liquidity. Effective working capital management (WCM) can be used to ensure firm liquidity (Shah et al., 2025; Deloof, 2003). This requires pursuing prudent policies irrespective of the size and/ or nature of the firm. The firm may suffer due to improper liquidity management that can lead to unintended consequences. This may include not meeting customers' orders promptly, delays in payments to suppliers, or carrying too much or too little inventory for production (Lijuan et al., 2023). Due to these, the firm may suffer financially and could even face bankruptcy. It is one of the important themes or topics covered in corporate finance, mainly dealing with how firms can manage their investment in current assets and current liabilities (Ben-Caleb, 2009).

A survey of the current literature reveals that the ownership and management structure of most firms is dominated by families (Azizi et al., 2021). For a variety of reasons, including access to the capital market, there is a propensity among firms to get themselves listed on the Stock Exchanges. They choose indirect ownership through investment by their affiliated businesses, endeavors, and linked parties in order to accomplish this goal while retaining control over the company. It is therefore important to investigate how WCM policies would affect the liquidity. Agency theory suggests that there is a potential for a conflict of interest between the principal (owners) and the agent (management). This served as the impetus for this study, which aimed to examine the moderating effect of pyramidal structure on liquidity and the topic of WCM and liquidity of firms in businesses.

Background of Study

Past research has indicated that WCM policies do influence firm liquidity (Alvarez et al., 2021; Otekunrin et al., 2021). Several businesses have failed due to poor policy formulation and/ or poor planning and control of WCM components (Ben-Caleb, 2009). Researchers, academicians, and policymakers are taking a keen interest in studying various aspects of WCM policies and their possible impact on firm liquidity in a regional setting. It is argued that countries lacking adequate investor rights protection are more likely to experience the adverse effects of ownership concentration (Demsetz & Lehn, 1985). The current study is grounded in the context of four Asian economies, viz, Pakistan, India, Malaysia, and Singapore, to evaluate the connection between WCM and firm liquidity, along with the moderating role, if any, by the pyramidal structure.

Problem Statement

Senior management, especially CEOs, is concerned with meeting firm obligations, especially in the short run, as they are under tremendous pressure to deliver superior results. These results help firms in avoiding bankruptcy in the short run while ensuring the firm's success in the longer term (Dwommor & Nasiru, 2017). Generally, it is stated that the WCM policies have a profound impact in the short term on firm results (Talonpoika et al., 2016).

In the literature, both positive and negative roles played by different factors in managing various aspects of business have been reported (Ramírez et al., 2020). Yet none of the previous research sheds light on how the pyramidal structure influences the relationship between WCM and the liquidity of the firm. Also, the moderating influence of pyramidal structure on the connection between WCM and liquidity has not been researched. Studying how working capital management and pyramidal structure impact liquidity provides an important insight because, according to agency theory, there would be a conflict of interest due to the presence of ownership layers. Dawson's (2014) approach has been used to test the moderating effect of pyramidal structure on the relationship between WCM policies and liquidity.

Research Questions

There are three main questions of this research study.

1. What is the effect of WCM on liquidity?
2. What is the impact of the pyramidal structure on liquidity?
3. Is there any moderating effect of the pyramidal structure on the relationship between WCM and liquidity?

Objectives of the Study

Based on the above-mentioned research questions, this study has the following three objectives.

To ascertain the relationship between WCM and liquidity.

To ascertain the relationship of the pyramidal structure to liquidity.

To ascertain any moderating role of the pyramidal structure on the relationship between WCM and liquidity.

Gaps and Contribution

The research aimed to find the association between WCM and liquidity. It also explained how the pyramidal structure affects the firm's liquidity. It also attempted to find whether or not there is any moderating effect of the pyramidal structure on the relationship between WCM and liquidity. To answer these, a dataset from four regional economies was collected. A total of 385 companies from nonfinancial sectors, based on their market capitalization, were used for five years period from 2015 to 2019.

Compared with previous studies, the present study has several unique contributions to the prevailing literature. One, to my best knowledge, there are no past studies that examine the relationship between WCM and liquidity by drawing samples from four different Asian economies. Therefore, it can be considered a

unique contribution of this study that the relationship between WCM and liquidity was examined based on samples from four Asian economies.

Second, the study aimed to find whether or not a relationship between pyramidal structure and liquidity exists. The results indicate that the pyramidal structure has a significant impact on a firm's liquidity.

Third, the empirical work explored the moderating effect of pyramidal structure on the relationship between WCM and liquidity. Based on the results, it can be asserted that the pyramidal structure moderates the association between WCM and liquidity.

Scope and Delimitation

The study has some limitations, mainly due to the nature of the dataset. One, the dataset is based on listed companies only, as the financial results of unlisted firms are not available freely. Second, the limited time frame of the study is due to time constraints. Third, the sample is taken from four Asian economies only. The reason for selecting four economies is to broaden the economic insights with firms operating with different rules and regulations within a regional setting. Pakistan and India were selected due to the similarity in the nature of business and culture. Malaysia was selected due to better development than Pakistan. Singapore was considered a more developed country in the Asian region. Fourth, it is possible that there could be some variable that has not been considered.

Literature Review

Agency Theory

Conflict of interest may arise when individuals with disparate goals and interests collaborate. The agency theory deals with it and the costs associated with it. It discusses ways to manage this conflict while pursuing organizational goals and objectives (Ma & Shleifer, 2025). Except for a single-member company where the owner makes all the decisions, nearly all other ownership structures have to deal with it in one form or another.

The agency conflict may arise between hired managers and outside shareholders or between owners with a dominant stake in the company and outside minority shareholders. Various research studies have been conducted to study the effect of agency relationships on the performance of firms in different industries (Chrisman et al., 2018; Panda & Leepsa, 2017). Due to the pyramidal structure, the decision-making at the board level is influenced by the presence of nominee directors.

WCM and Firm Liquidity

Working capital could be delineated as the excess of current assets (cash or readily convertible to cash resources) over the current liabilities for which cash will soon be required (Filbeck & Krueger, 2005). The practices followed by firms in managing their working capital needs are generally termed working capital policies. The firm needs to finance its operating current assets using a variety of financial sources, including but not limited to trade credits (Octavianus & Badjuri, 2026). According to Brigham and Ehrhardt (2014), firms can manage their working capital in different ways. First, to follow a self-liquidating or maturity-matching approach, in which the maturity of assets and liabilities is matched. Under this approach, all non-current assets plus the permanent portion of current assets are financed by long-term capital (comprising both long-term debt and equity, whereas short-term current assets are financed by temporary funds. Second, choose an aggressive approach, whereby some of the permanent assets are financed by short-term debts. Third, a conservative approach in which firms use permanent capital to meet the seasonal working capital needs. While sufficient and timely availability of cash is very important for any firm to meet its obligations, holding too much cash and not investing it might not add any value to the firm, but rather can lower its value.

Agency theory suggests that if managers are appropriately monitored, the firm's performance could improve. It is, therefore, important to manage working capital in a manner that ensures sufficient liquidity. Various studies have been carried out to establish relationships between WCM and liquidity, but the results are not conclusive (Abuzayed, 2012; Gill et al., 2010; Padachi, 2006). In the literature, both positive and negative effects

of WCM on firm liquidity have been documented. The negative relationship between WCM and liquidity has been documented by Deloof (2003) and Enqvist et al. (2014). Whereas, a positive association has been reported by Wuryani (2015), Sharma and Kumar (2011), and Mathuva (2010). Hoang (2015) studied the relationship for listed firms in Vietnam for six years from 2009 to 2014. His findings indicate that managers can improve the firm's profitability if the cash conversion cycle, net trade cycle, and their components are reduced to an optimal level.

A firm can follow a "relaxed" credit policy, giving liberal credit to all eligible customers. This will result in increased sales and presumably higher profitability. The con side of this policy is higher receivables, the potential for higher bad debts, and reduced liquidity. Based on the above discussion, the following hypotheses have been postulated:

H1: WCM significantly affects the firms' liquidity.

Pyramidal Structure and the Firm's Liquidity

The majority of closely held corporations employ indirect control by building a portfolio of companies through investments in related industries. Value creation is achieved by efficient allocation of resources to the most profitable projects (Datta et al., 2009). There are varied reasons for having a pyramidal structure in Chinese businesses (Iqbal & Ullah, 2025). State enterprises use pyramidal structures to avoid interference by the government. Private sector control firms with less cash by using pyramids, thereby creating an internal capital market (Qin et al., 2025; Fan et al., 2005).

Since external sources of funds are costlier than internal sources, firms with limited availability of funds will allocate these resources to maximize shareholders' wealth (Newstyle & Nwdighoha, 2025). A pyramidal structure is used by ultimate shareholders to build their empire, especially in countries with weaker law enforcement and underdeveloped economies (La Porta et al., 1999; Claessens et al., 2000). The pyramidal structure is also used as a means for risk mitigation through diversification. The length of pyramidal layers can be used to make riskier projects away from the top of the pyramid. This is a popular method everywhere because it provides the benefits of controlling rights with limited responsibility (Attig et al., 2003). It is also argued that obtaining external finance becomes more convenient with a pyramidal structure (Bianco & Casavola, 1999). Since the presence of a pyramidal structure might affect WCM policies and practices followed by firms, their liquidity would be affected. To study the effect of the presence of a pyramidal structure, the following hypotheses have been postulated:

H2: The presence of a pyramidal structure significantly affects the firms' liquidity.

H3: The pyramidal structure moderates the relationship between WCM and firms' liquidity.

Conceptual Framework

The conceptual framework below presents a visual depiction of variables for the study. Working capital management (WCM) is the independent or explanatory variable. The firm's liquidity is the dependent variable. The pyramidal structure is the moderating variable whose influence on the relationship between WCM and liquidity has been studied.

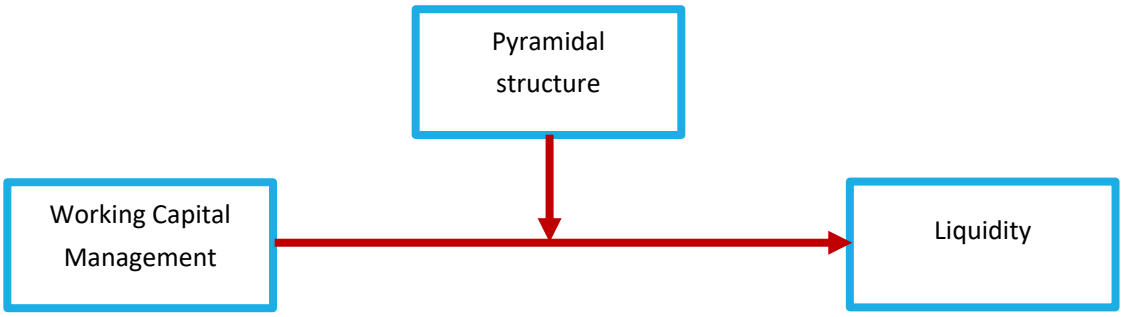

Figure 1. Conceptual Framework

Research Methodology

The existing models used to measure firm performance could be classified into two broad categories: qualitative and quantitative (Edvinsson & Malone, 1997). Quantitative models are generally used to measure, compare, and evaluate the results across a wide spectrum of countries, industries, and firms. Moreover, as the quantitative models use secondary data generally extracted from published audited reports, the reliability of results is sufficiently high. A quantitative approach has been used for this empirical work to study the influence of WCM on a firm's liquidity and the moderating role of pyramidal structure on the connection between WCM and liquidity.

The impact of WCM has been studied using three main types of methodology. These can be classified as empirical, conceptual, and survey-based (Kayani et al., 2019). The most common approach is empirical studies in which regression and correlation are used (Tingbani, 2015).

Data and Sample

For this investigation, a data set comprising 385 firms from four different economies of Asia, viz., India, Malaysia, Singapore, and Pakistan, has been used. Five-year data of 75 firms listed on the Bombay Stock Exchange (BSE), 80 firms listed on the Malaysian Stock Exchange (Bursa Malaysia), 80 firms listed on the Singapore Stock Exchange, and 150 firms listed on the Pakistan Stock Exchange (PSX) from 2015 to 2019 have provided 1,925 firm-year observations. The data set was extracted manually from annual financial statements due to the non-availability or access to financial data repositories. Companies for which continuous five-year data were not available were excluded.

Measurement of Variables

The explanatory variable used in the study was working capital management (WCM). It is measured through its proxies' cash conversion cycle (CCC) and the amount of working capital in dollars (WCD). The CCC is computed as the sum of days' sales outstanding (DSO) and Days in Inventory (DII) minus days' payments outstanding (DPO). The use of CCC as a proxy for WCM is based on similar previous studies and has been computed in a similar manner that is consistent with the literature (Aktas et al., 2015).

Firm liquidity is the dependent variable. To measure a firm's liquidity, the quick ratio (QR) has been used (Eriotis et al., 2007; Mohanty & Mehrotra, 2018). QR is obtained by dividing the current assets minus inventories by the current liabilities. The rationale for using QR is to eliminate the effect of inventories that may or may not be readily convertible into cash.

Pyramidal structure (LAY) is the moderating variable for this study. The pyramidal structure, LAY, represents the number of layers that exist between the firm and the ultimate shareholders (Fan et al., 2005; Zhu, 2006). A dummy variable is used to measure it, with a value equal to 1 if layers are present and 0 otherwise. LAY has been used as a variable by Fan et al. (2005) and Bradford et al. (2013).

Control variables are used to limit the potential biases that may arise because some variables are not considered or omitted. A perusal of past literature indicated the use of leverage, size of the firm, current ratio, sales growth, etc., to limit the possible distortion in results (Aktas et al., 2015). Leverage (LEV), obtained by dividing total debt by total assets, and the size of the firm (SIZE), obtained by taking the natural log of total assets, are the two control variables used in this study as per the literature (Hoang, 2015; Altaf & Shah, 2017). The main reason for such variation is larger firms' expertise/ ability in areas of research, product development, technology, and marketing (Li & Rama, 2015).

Table 1 summarizes the formula used in the literature to calculate the values of the dependent, independent, moderating, and control variables.

Table 1. Measurement of variables.

Variable	Acronym	Formula	Reference
Cash conversion cycle	CCC	Sum of days sales outstanding (DSO) and Days in Inventory (DII) minus Days payments outstanding (DPO). CCC = DSO+DII-DPO	Sharma and Kumar (2011); Aktas et al. (2015).
Days sales outstanding	DSO	Accounts receivable/ (Credit sales/365)	As above
Days in inventory	DII	Inventory/ (Cost of goods sold/ 365)	As above
Days payable outstanding	DPO	Accounts payable/ (Cost of goods sold/ 365)	As above
Quick ratio	QR	(Current assets – Inventory) / Current liabilities	Mohanty and Mehrotra (2018).
Pyramidal structure	LAY	Dummy variable, if the shareholding of associated or related companies is then 1, else 0.	Bradford et al. (2013).
Size of the firm	SIZE	LN (Total assets)	Altaf and Shah (2017); Hoang (2015)
Leverage	LEV	Total debt / Total assets	As above.

Regression Models - Baseline

The following regression models were used to test the relationship between WCM and liquidity, and the moderating effect of LAY on the relationship between WCM and liquidity.

If the coefficients of CCC and WCD are significant, it will confirm our hypothesis, H1, pertaining to the relationship between WCM and liquidity. The sign of the coefficient will determine the nature of the relation, i.e., positive or negative.

$QR = \beta_1 + \beta_2 CCC + \beta_3 Size + \beta_4 LEV + u$ ..... (1)

$QR = \beta_1 + \beta_2 WCD + \beta_3 Size + \beta_4 LEV + u$ ..... (2)

To test the second hypothesis, H2, related to the direct effect of the pyramidal structure, the following model has been used:

$QR = \beta_1 + \beta_2 LAY + \beta_3 Size + \beta_4 LEV + u$ ..... (3)

Regression Models - Interaction

To test the hypothesis, H3, the moderating effect of pyramidal structure (LAY), on the relationship between WCM and firm liquidity, the following models have been used:

$QR = \beta_1 + \beta_2 CCC + \beta_3 LAY + \beta_4 CCC*LAY + \beta_5 Size + \beta_6 LEV + u$ ..... (4)

$QR = \beta_1 + \beta_2 WCD + \beta_3 LAY + \beta_4 WCD*LAY + \beta_5 Size + \beta_6 LEV + u$ ..... (5)

The moderating effect would be confirmed if the coefficients of the interaction term, viz, CCC*LAY and WCD*LAY, are statistically significant. The sign of the coefficient determines the nature of this relationship.

Regression Method

To take care of outliers in the dataset, the data were winsorized at the 1st and 99th percentiles. The Shapiro-Wilk test was then used to check the normality of the dataset. To select and decide an appropriate method for regression analysis, initially, a panel regression with fixed effects and random effects was run. The Hausman specification test was then performed to assess which of the two methods is suitable (Zulfikar, 2019). Based on the outcome, a fixed effects model was selected. Since the dataset is non-normal, robust regression was used (Adams et al., 2019). The use of robust regression is further justified because the dataset contains companies from four different countries and several different sectors. Stata 17 was used for data analysis.

Results and Discussions

Descriptive Statistics

Table 2 furnishes the descriptive statistics pertinent to the dependent variable (QR), followed by the explanatory variables (CCC & WCD), moderating variables (LAY), and control variables (SIZE & LEV) of the study.

Table 2. Descriptive statistics.

	Mean	SD	Min	Max	SWilk Test
QR	1.539	1.505	0.102	9.136	0.0000***
CCC	20.281	306.393	-2284.768	807.322	0.0000***
WCD	161.626	767.07	-2446.434	4471.475	0.0000***
LAY	.883	.322	0.000	1	0.0000***
SIZE	5.28	2.632	0.064	10.459	0.0000***
LEV	.466	.252	0.062	1.722	0.0000***

The mean value of the quick ratio (QR) is 1.539 with a standard deviation of 1.505, indicating the liquidity levels for most firms are reasonably good. The minimum and maximum values of QR are 0.102 and 9.136, respectively. Mohanty and Mehrotra (2018) in their study have found QR having an average of 1.32, standard deviation of 0.19, minimum 1.18 & maximum 1.71.

The mean value of CCC is 20.281 with a standard deviation of 306.393. Sharma and Kumar (2011) have reported the mean value of CCC as 449.0988 with a standard deviation of 1830.095 days. The mean value of WCD is 161.626 dollars with a standard deviation of 767.07 dollars. It means that on average, firms have a working capital of USD 161.626 million in a wide range of max USD 4471.475 million to min USD -2446.434 million.

LAY, a dummy variable, indicated the presence of indirect ownership in firms has a mean value of 0.883 and a standard deviation of 0.322. The minimum is 0, showing the absence of layers or indirect ownership, and the maximum is 1, showing the presence of associated firms.

The first control variable used in this study is SIZE, which has a mean of 5.28 and a standard deviation of 2.632. Hoang (2015) has reported a mean value of 20.77 with a standard deviation of 1.1233. The second control variable used in this study is LEV. It has a mean of 0.466 with a standard deviation of 0.252. Hoang (2015) has reported a mean of 0.316 with a standard deviation of 0.208.

The table also lists the results of the Shapiro-Wilk test. As all p-values are statistically significant, it is concluded that the dataset is non-normal.

Pearson Correlations

Table 3 presents the Pearson correlation matrix. The Quick Ratio (QR) exhibits a positive and statistically significant correlation with the Cash Conversion Cycle (CCC) ($r = 0.051$, $p < 0.05$). On the other hand, it has a much stronger positive relationship with Working Capital (WCD) ($r = 0.262$, $p < 0.01$). This suggests that higher short-term liquidity availability is associated with longer cash cycles and larger working capital

positions, and vice versa.

Table 3. Pearson correlations.

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) QR	1.000					
(2) CCC	0.051**	1.000				
(3) WCD	0.262***	0.049**	1.000			
(4) LAY	0.004	-0.031	0.059***	1.000		
(5) SIZE	-0.021	-0.167***	0.257***	0.087***	1.000	
(6) LEV	-0.485***	-0.048**	-0.115***	-0.042*	-0.052**	1.000

*** p<0.01, ** p<0.05, * p<0.1

Conversely, QR displays a powerful, highly significant negative correlation with Leverage (LEV) (r = -0.485, p < 0.01). It means that highly levered firms tend to maintain significantly lower liquidity shields. This aligns well with the trade-off and pecking order theories, where debt service reduces the availability of idle cash.

Firm Size (SIZE) exhibits a highly significant negative association with the Cash Conversion Cycle (CCC) (r = -0.167, p < 0.01). It means that larger firms are generally more skillful in managing their operating cycles. This could be due to their superior bargaining power with customers and suppliers. On the other hand, SIZE is positively correlated with WCD (r = 0.257, p < 0.01) and LAY (r = 0.087, p < 0.01). This reflects larger structural capacities in certain asset components.

Leverage (LEV) is negatively correlated across the board with all variables in the matrix. Notably, its negative relationships with WCD (r = -0.115, p < 0.01) and SIZE (r = -0.052, p < 0.05) specify that highly indebted firms operate under tougher working capital constraints.

Regression Results

First panel data regression model was run, and the Hausman test was used to decide between fixed-effects and random-effects. The results are presented below in Table 4.

Table 4. Hausman (1978) Specification Test – Baseline Model.

Test	Null Hypothesis	Test Statistic	p-value	Decision
Hausman Test	Difference in coefficients is not systematic (RE is appropriate)	Chi-square = 28.53	0.0000	Accept Ho. And conclude that Fixed Effects is appropriate.

As the dataset violates the regression assumptions, robust regression has been used in this study to minimize the effect of an outlier or influential observation. This could be due to the fact that the dataset contains companies from four different countries and several different sectors.

Baseline Models

Regression results of baseline models 1 to 3 appear in Table 5. In Model 1, the coefficient for CCC (β= 0.000, p > 0.1) indicates that the cash conversion cycle has an insignificant association with firm liquidity, QR. This implies that changes in the Cash Conversion Cycle (CCC) do not have a meaningful or measurable impact on the dependent variable (QR).

For control variables, both SIZE (β = -0.276, p < 0.01) and LEV (β= -2.115, p < 0.01) are negative and highly significant at the 1% level. It means larger firms and/ or more levered firms tend to have lower liquidity (QR). The R-squared for the model is 0.107, meaning 10.7 percent of the change in QR can be explained by this model.

Table 5. Baseline regression Results.

VARIABLES	Model 1 QR	Model 2 QR	Model 3 QR
CCC	0.000		
	(0.000)		
WCD		0.001***	
		(0.000)	
LAY			-0.158*
			(0.092)
SIZE	-0.276***	-0.327***	-0.280***
	(0.104)	(0.105)	(0.105)
LEV	-2.115***	-2.041***	-2.148***
	(0.354)	(0.350)	(0.362)
Year dummy	Included	Included	Included
Constant	3.967***	4.077***	4.146***
	(0.551)	(0.580)	(0.571)
Observations	1,925	1,925	1,925
R-squared	0.107	0.153	0.103
Number of firms	385	385	385

Robust standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

In Model 2, the coefficient for WCD (β= 0.001, p <0.01) is highly significant though small, indicating that increasing it will have a positive impact on firm liquidity. For every 1-dollar increase in Working Capital (WCD), the dependent variable (QR) increases by 0.001 units. While the effect size is small, it is highly reliable. Both the control variables showed consistent behavior with Model 1. The SIZE (β = -0.327, < 0.01) and LEV (β = -2.041, p < 0.01) remained negative and highly significant at the 1% level. The R-squared for the model is 0.153, meaning 15.3 percent of the change in QR can be explained by this model.

On the other hand, in Model 3, the coefficient for LAY (β= -0.158, p <0.1) is negative and significant at 10%. It means that firms with a pyramidal structure will have a negative effect on the firm's liquidity. Both the control variables, SIZE (β = -0.280, p< 0.01) and LEV (β =

-2.148, p < 0.01), remained negative and highly significant at the 1% level. The R-squared for the model is 0.103, meaning 10.3 percent of the change in QR can be explained by this model.

The empirical specification included year fixed effects, which control for macroeconomic shocks as well as time-varying unobserved heterogeneity.

Overall Trends &Takeaways

The control variables remained consistent across all three models. Firm Size (SIZE) and Leverage (LEV) remained incredibly stable. Regarding SIZE, larger firms consistently have lower quick ratios (QR), which is common in corporate finance. Larger firms often have better access to capital and do not need to hold as much

highly liquid cash/ assets. Higher debt heavily compresses the quick ratio (QR). A 1-unit increase in leverage drops the ratio by over 2 units across the board.

Explanatory Power (R-squared): The R-squared values range from 10.3% to 15.3%. In panel data involving corporate financial metrics, these levels are quite normal, though it means a large portion of the variance in corporate liquidity is driven by factors not included in these models.

Interaction Models

Table 6 reports the results of the moderating effect of pyramidal structure, LAY, on the relationship between cash conversion cycle (CCC) and firm liquidity (QR). In Model 4, the direct effect of CCC, the coefficient (β = 0.002, $p < 0.01$), is positive and highly significant at 1 percent. This indicates that, on its own, a longer cash conversion cycle is associated with a slightly higher Quick Ratio. Whereas the direct effect of LAY, the coefficient (β = -0.129, $p > 0.1$), is negative and statistically insignificant. This means the presence of a pyramidal structure does not have a direct, independent impact on firm liquidity.

The moderating term, CCCLAY, has a coefficient (β = -0.001, $p < 0.001$), which is negative and highly significant at 1%. The negative coefficient means that a pyramidal structure dampens or weakens the positive relationship between the cash conversion cycle and firm liquidity. The presence of pyramidal layers diminishes the positive effect of CCC on QR.

Table 6. Moderating effect of pyramidal structure on firm liquidity.

	Model 4	Model 5
VARIABLES	QR	QR
CCC	0.002***	
	(0.000)	
WCD		0.001*
		(0.000)
LAY	-0.129	-0.151
	(0.120)	(0.094)
CCCLAY	-0.001***	
	(0.000)	
WCDLAY		-0.000
		(0.000)
SIZE	-0.272***	-0.331***
	(0.104)	(0.104)
LEV	-2.111***	-2.051***
	(0.355)	(0.350)
Year dummy	Included	Included

Constant	4.052***	4.242***
	(0.572)	(0.583)
Observations	1,925	1,925
R-squared	0.116	0.157
Number of firms	385	385

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

In Model 5, WCD has a coefficient (β = 0.001, p< 0.1), which has a positive and weakly significant effect. It means WCD has a positive effect on liquidity, though its effect is very small. Whereas the interaction term WCDLAY has a coefficient (β = -0.000, p > 0.1), indicating there is no significant moderation by LAY on the association between WCD and firm liquidity.

The control variable, SIZE, has a coefficient (β = -0.272, p < 0.01) in Model 4. In Model 5, it has a coefficient (β = -0.331, p < 0.01). It indicates that larger firms tend to have lower quick ratios. This could be because they have better access to external financing and do not need to hold as much cash. The second control variable, Leverage (LEV), has a strong negative and highly significant coefficient (β = -2.111, p< 0.01) and (β = -2.051, p < 0.01) in the two models, respectively. These numbers indicate that highly leveraged firms have significantly lower liquidity, which is expected since cash is used to service debt.

Model Fitness: The value of R-squared in Model 4 is 0.116, and in Model 5 it is 0.157. It means roughly 11.6 percent variance in liquidity can be explained by the interaction between CCC and LAY. On the other hand, approximately 15.7 percent variation in liquidity can be explained by the interaction between WCD and LAY.

Year dummies were included in the empirical specification to control for macroeconomic shocks as well as time-varying unobserved heterogeneity.

In summary, it could be established that a pyramidal structure has a significant moderating effect only when liquidity is measured via the Cash Conversion Cycle (Model 4). Specifically, it acts as a negative moderator, reducing the impact of operational cash cycles on overall firm liquidity. However, it does not play a significant moderating role when looking at Working Capital in dollars (Model 5).

Further Analysis

As a robustness measure, the regression analysis was further carried out using Driscoll–Kraay standard errors in fixed-effects models for baseline and interaction. The results are reported in Table 7 for baseline models and Table 8 for interaction models. These results confirm our results.

Key Takeaways from Table 7: The core predictors, WCD, exert a positive, statistically significant effect (p < 0.01) on the dependent variable, whereas CCC and LAY do not exert statistically significant effects in their respective models.

The control variables, SIZE (p< 0.05) and LEV (p <0.01), both maintain robust, negative coefficients in all three models, suggesting a very stable relationship with the dependent variable, irrespective of which primary predictor is included.

From Table 8, the following can be inferred. Both cash conversion cycle (CCC) and working capital (WCD) have a positive and highly significant impact on Quick Ratio (QR), although the sizes of the coefficients are very small. The pyramidal structure (LAY) significantly reduces liquidity on its own in Model 4. The interaction term, CCCLAY, is negative and significant, indicating a negative moderation by pyramidal structure on CCC. However, the interaction with working capital, WCDLAY, is not statistically significant.

Table 7. Baseline regression results - Driscoll–Kraay standard errors.

VARIABLES	Model 1 QR	Model 2 QR	Model 3 QR
CCC	0.000		
	(0.000)		
WCD		0.001***	
		(0.000)	
LAY			-0.158
			(0.095)
SIZE	-0.276**	-0.327**	-0.280**
	(0.079)	(0.076)	(0.081)
LEV	-2.115***	-2.041***	-2.148***
	(0.172)	(0.210)	(0.189)
Year dummies	Included	Included	Included
Constant	3.967***	4.077***	4.146***
	(0.474)	(0.478)	(0.420)
Observations	1,925	1,925	1,925
Number of groups	385	385	385

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table 8. Moderating effect of pyramidal structure on firm liquidity - Driscoll–Kraay standard errors.

VARIABLES	Model 4 QR	Model 5 QR
CCC	0.002***	
	(0.000)	
WCD		0.001***
		(0.000)
LAY	-0.129***	-0.151
	(0.015)	(0.100)
CCCLAY	-0.001**	
	(0.000)	
WCDLAY		-0.000

		(0.000)
SIZE	-0.272**	-0.331**
	(0.082)	(0.075)
LEV	-2.111***	-2.051***
	(0.168)	(0.200)
Year dummies	Included	Included
Constant	4.052***	4.242***
	(0.486)	(0.390)
Observations	1,925	1,925
Number of groups	385	385

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Conclusions

In this study, an effort was made to empirically find the relationship between the management of working capital (WCM) and liquidity. The sample consisted of 385 companies in nonfinancial sectors with the highest market capitalization. Out of 385 companies, 75 are listed on the Bombay Stock Exchange (BSE); 80 companies are listed on the Malaysian Stock Exchange (Bursa Malaysia); 80 companies are listed on the Singapore Stock Exchange (SGX), and 150 companies are listed on the Pakistan Stock Exchange (PSX). Furthermore, investigations were carried out for the moderating role of pyramidal structure (LAY) on the relationship between WCM and liquidity. To minimize the effects of outliers, the dataset was winsorized at the 1st and 99th percentiles. A robust regression technique was employed for the regression models. Two sets of regression models were developed: (i) baseline models dealing with the relationship of explanatory variables with the dependent variables, and (ii) interaction models to study the moderating effect of family ownership and pyramidal structure on the relationship between WCM and firm performance and liquidity.

Implications

There are several research studies about the effect of working capital on the firms' liquidity, but none have studied it with the moderating effect of pyramidal structure, i.e., indirect control over the firm, especially for listed companies. Also, none of the studies have been conducted by drawing a sample from several countries to study the WCM impact on liquidity. Since firms are opting for complex ownership structures, both in number and size, their mode of financing and retaining control through investment by associated companies is gaining traction. It is therefore imperative that their impact on the firms' liquidity be studied from different aspects.

This empirical work could be used in expanding the current body of finance literature to help managers understand the peculiar nature of the management of working capital in different businesses. It also helps in understanding why indirect controls are prevalent among large conglomerates dominating the business and economy. Results of the study could help policymakers in firms, financial institutions, and government for-profit planning and forecasting, devising appropriate policies, and controlling the day-to-day management of current assets and liabilities. This, in turn, would result in overall socio-economic development.

Limitations of the Study

The study has some limitations too: (i) the dataset comprises listed companies only, (ii) the time frame of the study is five years only, and (iii) the sample is taken from four Asian economies with different rules and regulations for companies.

Nevertheless, the study can be expanded to include more variables such as corporate governance, research innovation, R&D expenditure, etc., as well as more countries, companies, and duration, for accounting data. Also, a comparative study with developed economies could be undertaken.

References

Abuzayed, B. (2012). Working capital management and firms' performance in emerging markets: The case of Jordan. International Journal of Managerial Finance, 8(2), 155–179.

Adams, J., Hayunga, D., Mansi, S., Reeb, D., & Verardi, V. (2019). Identifying and treating outliers in finance. Financial Management, 48(2), 345-384.

Aktas, N., Croci, E., & Petmezas, D. (2015). Is working capital management value-enhancing? Evidence from firm performance and investments. Journal of Corporate Finance, 30, 98-113.

Altaf, N., & Shah, F. (2017). Working capital management, firm performance, and financial constraints. Asia-Pacific Journal of Business Administration, 9(3), 206-219

Alvarez, T., Sensini, L., & Vazquez, M. (2021). Working capital management and profitability: Evidence from an emergent economy. International Journal of Advances in Management and Economics, 11(1), 32-39.

Attig, N., Gadhoum, Y., & Lang, L. H. (2003). Bid-ask spread, asymmetric information, and ultimate ownership. Available at SSRN: http://dx.doi.org/10.2139/ssrn.332020.

Azizi, M., Bidgoli, M. S., & Taheri, A. (2021). The effect of ownership and management structure on family businesses' performance. Cogent Business & Management, 8(1), 1872888

Ben-Caleb, E. (2009). Working capital management and profitability of listed companies in Nigeria. Nigeria Research Journal of Accountancy, 1(1), 44-57.

Bianco, M., & Casavola, P. (1999). Italian corporate governance: Effects on financial structure and firm performance. European Economic Review, 43(4-6), 1057-1069.

Bradford, W., Chen, C., & Zhu, S. (2013). Cash dividend policy, corporate pyramids, and ownership structure: Evidence from China. International Review of Economics & Finance, 27, 445-464.

Brigham, E., & Ehrhardt, M. (2014). Financial Management: Theory and Practice. Cengage Learning.

Chrisman, J. J., Chua, J. H., Le Breton-Miller, I., Miller, D., & Steier, L. P. (2018). Governance mechanisms and family firms. Entrepreneurship Theory and Practice, 42(2), 171-186.

Claessens, S., Djankov, S., & Lang, L. H. (2000). The separation of ownership and control in East Asian corporations. Journal of Financial Economics, 58(1-2), 81-112.

Datta, S., D'Mello, R., & Iskandar-Datta, M. (2009). Executive compensation and internal capital market efficiency. Journal of Financial Intermediation, 18(2), 242-258.

Dawson, J. F. (2014). Moderation in Management Research: What, Why, When, and How. Journal of Business and Psychology, 29(1), 1-19.

Deloof, M. (2003). Does working capital management affect the profitability of Belgian firms? Journal of Business Finance & Accounting, 30(3-4), 573-588.

Demsetz, H., & Lehn, K. (1985). The structure of corporate ownership: Causes and consequences. Journal of Political Economy, 93(6), 1155-1177.

Dwommor, J. Y., & Nasiru, I. (2017). Do firms manage working capital for survival or for success? An empirical evidence from literature review. The International Journal of Business & Management, 5(4), 173-183.

Edvinsson, L., Malone, M.S. (1997). Intellectual Capital: Realizing Your Company's True Value by Finding Its Hidden Brainpower. New York.

Enqvist, J., Graham, M. and Nikkinen, J. (2014). The impact of working capital management on firm profitability in different business cycles: Evidence from Finland, Research in International Business

and Finance, 32, 36–49.

Eriotis, N., Vasiliou, D., & Ventoura-Neokosmidi, Z. (2007). How firm characteristics affect capital structure: an empirical study. Managerial Finance, 33(5), 321-331.

Fan, J. P., Wong, T. J., & Zhang, T. (2005). The emergence of corporate pyramids in China. Available at SSRN 686582.

Filbeck, G., & Krueger, T. M. (2005). An analysis of working capital management results across industries. Mid-American Journal *of Business*, *20*(2), 11-20.

Gill, A., Biger, N. and Mathur, N. (2010), The relationship between working capital management and profitability: Evidence from the United States, Business and Economics Journal, 10(1), 1–9.

Hoang, T. V. (2015). Impact of working capital management on firm profitability: the case of listed manufacturing firms on the Ho Chi Minh Stock Exchange. Asian Economic and Financial Review, 5(5), 779.

Iqbal, M. S., & Ullah, M. A. (2025). Impact of Tax Aggressiveness, Earnings Quality, and Pyramidal Structure on Firm Risk-Taking: The Moderating Role of Family Ownership. Journal of Social & Organizational Matters, 4(2), 506-525.

Kayani, U. N., De Silva, T. A., & Gan, C. (2019). A systematic literature review on working capital management–an identification of new avenues. Qualitative Research in Financial Markets, *11*(3), 352-366.

La Porta, R., López-de-Silanes, F., & Shleifer, A. (1999). Corporate ownership around the world. The Journal of Finance, 54(2), 471-517.

Li, Y., & Rama, M. (2015). Firm dynamics, productivity growth, and job creation in developing countries: The role of micro-and small enterprises. The World Bank Research Observer, 30(1), 3-38.

Lijuan, C., Bhaumik, A., Xinfeng, W., & Jingwen, W. (2023). The Effects of Inventory Management on Business Efficiency. International Journal for Multidisciplinary Research, 5(4), 1-17.

Ma, Y., & Shleifer, A. (2025). The Invention of Corporate Governance. Journal of Financial Economics, 104115.

Mathuva, D. (2010), The influence of working capital management components on corporate profitability: A survey on Kenyan listed firms. Research Journal of Business Management, 4(1), 1–11.

Mohanty, B., & Mehrotra, S. (2018). Relationship between liquidity and profitability: An exploratory study of SMEs in India. Emerging Economy Studies, 4(2), 169-181.

Newstyle, D. & Nwdighoha, L. E. P. (2025). Financial Strategies and Financial Performance of Listed Consumer Goods Manufacturing Firms in Nigeria. BW Academic Journal, 2, 135-155.

Octavianus, Y. P., & Badjuri, A. (2026). The Impact of Working Capital Efficiency, Cash Conversion Cycle, and Current Ratio on Profitability with Firm Size as a Moderating Variable. Majapahit Journal of Islamic Finance and Management, 6(1), 1133-1146.

Otekunrin, A. O., Nwanji, T. I., Fagboro, G. D., Olowookere, J. K., & Adenike, O. (2021). Does working capital management impact an enterprise's profitability? Evidence from selected Nigerian firms. Problems and Perspectives in Management, 19(1), 477-486.

Padachi, K. (2006). Trends in working capital management and its impact on firms' performance: an analysis of Mauritian small manufacturing firms. International Review of Business Research Papers, 2(2), 45-58.

Panda, B., & Leepsa, N. M. (2017). Agency theory: Review of theory and evidence on problems and perspectives. Indian Journal of Corporate Governance, 10(1), 74-95.

Qin, S., Wang, C., & Liu, Q. (2025). Board Reform of Controlling Shareholders and Soft Budget Constraints in State-Owned Enterprises: Evidence from A Parent Board Reform in China. Applied Economics, 1-18.

Ramírez, Y., Dieguez-Soto, J., & Manzaneque, M. (2020). How does intellectual capital efficiency affect firm performance? The moderating role of family management. International Journal of Productivity and

Performance Management, 70(2), 297-324.

Shah, H. H., Akram, A., & Ikram, M. (2025). Liquidity Or Lethargy? Investigating The Impact of Working Capital Management on Firm Value in Emerging Markets. Journal of Business and Management Research, 4(3), 115-129.

Sharma, A. K., & Kumar, S. (2011). Effect of working capital management on firm profitability: Empirical Evidence from India. Global Business Review, 12(1), 159-173.

Talonpoika, A. M., Kärri, T., Pirttilä, M., & Monto, S. (2016). Defined strategies for financial working capital management. International Journal of Managerial Finance, 12(3), 277-294.

Tingbani, I. (2015). Working capital management and profitability of UK firms: a contingency theory approach (Doctoral dissertation, Bournemouth University). https://eprints.bournemouth.ac.uk/21785/.

Wuryani, E. (2015). Analysis of working capital on company profitability. Australian Journal of Basic and Applied Sciences, 9(7), 86-88.

Zhu, S. (2006). The characteristics of ultimate shareholders and the informativeness of accounting earnings. China Accounting and Finance Review, 3, 1-30.

Zulfikar, R. (2019). Estimation model and selection method of panel data regression: an overview of common effect, fixed effect, and random effect models. JEMA: Jurnal Ilmiah Bidang Akuntansi, 9(2), 1-10.