

DETERMINANTS OF WORKING CAPITAL REQUIREMENTS: EVIDENCE FROM THE MSME SECTOR

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Abstract *The wheels of every business keep rolling with the fuel of working capital. Working capital facilitates the smooth operations of businesses, contributes towards revenue generation and helps in efficient asset utilisation. In this context, the current study examines the determinants of working capital in Indian micro, small, and medium enterprises (MSME), given the dearth of literature in an Indian context. The analysis was done using financial data for a long period of 13 years, from 2006–07 to 2018–19. Firm size, asset tangibility, leverage, profitability and sales growth were taken as determining variables. Stepwise regression was applied by taking the net working capital to total assets ratio and the cash conversion cycle as proxies for working capital requirements (WCRs). The results revealed that firm size and leverage are significant determinants of working capital for chemical firms in the Indian MSME industry. This study has implications for the managers of chemical MSMEs to forecast their WCR efficiently as per the determinants identified in the study.*

Keywords: *Working Capital Determinants, Working Capital Requirement, MSME, Cash Conversion Cycle*

INTRODUCTION

Surveys indicate that financial managers spend a major portion of their time managing working capital (Weston & Brigham, 1962). Working capital management (WCM) as a function has gained prominence due to its close association with the operations management of a firm as well as its ability to create shareholder value due to its twin aspects of profitability and liquidity (Kantawala & Shroff, 2012). Shroff (2013) submitted that WCM involves managing the dynamic relationship between ever-changing and volatile current assets (CA) and current liabilities (CL). WCM being a major revenue-generating activity is imperative for maintaining a healthy and wealthy business (Goyal, 2018b; Bhalla, 1997). While long-term decisions involving plant and equipment or market strategy may well determine the eventual success of the firm, short-term decisions on working capital determine whether the firm gets to the long term (Block & Hirt, 1992). Thus, short-term financial decisions are equally tactical and important for any enterprise to conduct business productively, consistently, and efficiently (Shroff, 2013). In practice, WCM is among the key challenges in firms where financial executives struggle to identify the basic working capital drivers and the appropriate working capital level (Lamberson, 1995). WCM is critical for the long-term

survival of the business and helps in maintaining sufficient liquidity to pay off current obligations as and when due (Panda, 2012). Thus, understanding the determinants of working capital requirements (WCRs) becomes imperative.

Globally researchers have made several attempts to examine the influence of WCM on firm performance (e.g., Al-Mawsheki, 2022; Anton & Nucu, 2020; Boisjoly et al., 2020; Sawarni et al., 2020; Banos-Caballero et al., 2020; Prasad et al., 2019; Narwal & Jindal, 2018; Ahangar & Shah, 2017; Bhatia & Srivastava, 2016; Majanga, 2015; Waisuzzaman, 2015; Kieschnick et al., 2013; Gill, 2010; Garcia-Teruel & Martinez-Solano, 2007; Rahman & Nasr, 2007; Lazaridis & Tryfonidis, 2006; Padachi, 2006; Deloof, 2003; Shin & Soenen, 1998; Jose et al., 1996 & many more). However, there are limited studies that examine factors determining WCR. Researchers (Dash, 2020; Zariyawati et al., 2016; Kaur & Kaur, 2014; Salawu & Alao, 2014; Abbadi & Abbadi, 2013; Wasiuzzaman & Arumugam, 2013; Lotfinia et al., 2012; Mansoori & Muhammad, 2012; Valipour et al., 2012; Bellouma, 2011; Baños-Caballero et al., 2010; Hill et al., 2010; Nazir & Afza, 2009; Narender et al., 2008; Chiou et al., 2006) have examined determinants of WCR in a different country as well as industry contexts. However, except for the studies of Bellouma (2011); Baños-Caballero et al. (2010), all others have given attention to the determinants of WCR

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of large firms or listed firms, which belong to any sector but micro, small, and medium enterprises (MSME). Further, the results of these studies cannot be generalised to MSMEs on account of the comparative resource constraints experienced by MSMEs as well as their less formalised systems when compared with those of large companies in the established sectors. This necessitates a study to distinctly understand the determinants of WCR in MSMEs. The prime objective of this study is to identify the factors influencing the WCR of chemical manufacturing MSMEs operational in India. This is because an industrial firm has higher levels of stocks, and receivables, necessitating a larger volume of WCRs. Also, studies by Goyal (2018a; 2018b); Shroff (2018); and Kantawala and Shroff (2012) have documented that service sector firms hold a very low proportion of inventories when compared with manufacturing firms due to the nature of their businesses. Padachi et al. (2012) also noted that WCM decisions are comparatively more significant for manufacturing firms than service firms. In particular, the objective is to examine the influence of financial aspects like profitability, leverage, asset tangibility, firm size and growth on the WCR of Indian MSMEs. Due to the paucity of research focused on determining working capital for Indian MSMEs with a longitudinal perspective, this study attempts to bridge this gap in the literature and provide evidence on the WCR determinants of the chemical Indian MSMEs. The study is significant from various perspectives. First, the study documents the factors influencing the WCR of Indian chemical MSMEs in the absence of any evidence in the existing body of knowledge. Second, the Indian MSME sector is the backbone of the national economic structure and has unremittingly acted as the bulwark of the Indian economy. Jutla et al. (2002) have noted that small and medium enterprises (SMEs) are among the most active mediators of growth, accounting for around 80% of worldwide fiscal growth. Sharma (2011) affirms that SMEs play an important role in inclusive growth in emerging

economies as well. Indian MSMEs are the forerunners in the Indian growth story, with a contribution of 29% to Indian gross domestic product (GDP), a 45% contribution to exports and employment generation of INR 11.10 crore. They contribute around 33.4% of India's manufacturing output, with 6.11% of the manufacturing GDP and 24.63% of the services' GDP. In this context, the study will help managers of MSME make informed working capital decisions, which will lead to improved working capital efficiency and WCM.

The following section briefly accounts for earlier studies. This is followed by a discussion of the variables and hypotheses of the study, whereby the proxies used for WCRs and determinants in earlier studies are discussed. Accordingly, the hypotheses of the present study are framed. This is followed by research design, data analysis and the presentation of results. In the final section, conclusions and suggestions are presented.

REVIEW OF RELATED LITERATURE

The literature on determinants of working capital is still developing, and there is very limited evidence with respect to MSMEs. WCM aims to ensure that firms continue their operations with sufficient cash flows, thereby satisfying their maturing short-term obligations and upcoming operational expenses (Zariyawati et al., 2016). WCM is thus a critical factor for the survival and growth of firms as it influences the two sides of a coin—profitability and liquidity (Kantawala & Shroff, 2012; Gill et al., 2010; Falope & Ajilore, 2009; Deloof, 2003). Hence, it is important to devise an efficient working capital policy to strike a balance between liquidity and profitability while at the same time ensuring survival in the short run and the long run. And to devise an efficient working capital strategy, managers must know the determinants of working capital (Zariyawati et al., 2016). A brief account of earlier literature is presented in Table 1.

Table 1: Summary of Studies on Determinants of Working Capital

Author	Country	Economy	Sample-Size	Nature of Firms	Period	Proxy for WCR	Proxy for Determinants	Results
Chiou et al. (2006)	Taiwan	Developing	19180 firm/quarter data	Large	35 quarters	WCR/TA and NLB/TA	Leverage; Growth rate; Profitability; Size; Age; Industry dummies; Operating Cashflows (OCF)	Leverage and OCF determine WCR.
Narender et al. (2008)	India	Developing	50 cement firms	Large	10 years	WCR/TA and NLB/TA	Leverage; Growth rate; Profitability; Size; Age; Industry dummies; OCF	Firm size and OCF positively determine WCR; Growth and Business cycle negatively impact WCR.

Author	Country	Economy	Sample-Size	Nature of Firms	Period	Proxy for WCR	Proxy for Determinants	Results
Nazir and Afza (2009)	Pakistan	Developing	132 non-financial firms	Large	9 years	WCR/TA	Operating Cycle; OCF; Real GDP Growth rate; Growth; Profitability; Firm Value; Leverage; Size; Industry dummy	Operating Cycle; Profitability; Firm Value and Leverage significantly determine WCR.
Baños-Caballero et al. (2010)	Spain	Developed	4076 firms across manufacturing and service	SMEs	5 years	CCC	Leverage; OCF; Growth; Profitability; Size; Age; Tangibility; Industry dummy; Lagged CCC	OCF, Age, and lagged CCC have significant positive relationships with WCR, whereas leverage, growth opportunities, asset tangibility, and profitability have a significant negative impact on their CCC.
Hill et al. (2010)	U.S.	Developed	3343 firms	Large	10 years	Net Operating Cycle	Growth; Gross Profit Margin; Sales Volatility; Lagged OCF; Market to book ratio (M/B); Size; Market share; Financial distress;	OCF and size significantly positively determine WCR, whereas financial distress, sales volatility, M/B ratio, and, sales growth significantly negatively impact their WC needs.
Bellouma (2011)	Tunisia	Developing	386 firms	SME	8 years	NLB and WCR	Operating expense; Capital Investment; Financial Expense; Size; Leverage	NLB and WCR have respectively positive and negative relationships with capital investment
Lotfinia et al. (2012)	Teheran	Developing	80 listed firms	Large	5 years	NLB	Leverage; Firm Size; Firm Value	Firm size positively determines NLB whereas leverage negatively influences NLB.
Valipour et al. (2012)	Teheran	Developing	83 listed firms	Large	10 years	CCC	Profitability; OCF; Leverage; Size; Sales growth; Current and Quick Ratios	Profitability, OCF, and sale growth significantly negatively determined WCR with Leverage having positive influence.
Mansoori and Muhammad (2012)	Singapore	Developing	94 listed firms	Large	8 years	CCC	Size; Leverage; Growth; OCF; Profitability; Capital Expenditure; GDP Growth Rate	Firm size, OCF, Capital expenditures, Growth, and GDP negatively determine WCR. Profitable firms have longer CCC.
Abbadi and Abbadi (2013)	Palestine	Developing	11 listed firms	Large	7 years	WCR	CCC; OCF; Size; Profitability; Leverage; GDP Growth; Borrowing cost	CCC, Profitability, and OCF were significant positive determinants while leverage and firm size were significant negative determinants of WCR.

Author	Country	Economy	Sample-Size	Nature of Firms	Period	Proxy for WCR	Proxy for Determinants	Results
Wasiuzzaman and Arumugam (2013)	Malaysia	Developing	192 listed firms	Large	8 years	NWC	Leverage; Growth; Asymmetric Information; Access to capital market; Asset tangibility; Age; Size; Revenue volatility; Profitability; OCF; Board Size; Board Independence; Economic Condition	Younger & smaller firms with low levels of asymmetric information, high sales growth, low tangibility, high OCF, low leverage, and less volatile revenues are likely to have the highest working capital investments. Board independence and size, do not influence the working capital investment of firms.
Salawu and Alao (2014)	Nigeria	Developing	60 listed firms	Large	9 years	NLB	Sales growth; Size; GDP; Leverage; Profitability; Net Trade Cycle	Sales growth, Size, GDP, and Leverage significantly determined working capital.
Kaur and Kaur (2014)	India	Developing	4 automobile firms	Large	10 years	NWC/TA	Profitability; Leverage; CCC; OCF; Size; CR; QR; Asset tangibility;	The tangibility (-) and current ratio (+) were significant determinants of WCR.
Zariyawati et al. (2016)	Malaysia	Developing	129 listed firms	Large and small firms	5 years	CCC	Leverage; Capital Expenditure; OCF; Growth; Profitability; Executive compensation; GDP growth rate; inflation rate	Only OCF significantly negatively influenced WCR.
Dash (2020)	India	Developing	13 listed sugar firms	Large	10 years	CR, Inventory Cycle, Receivables Cycle, CCC, TATR, FATR, ITR; RTR; PTR	Leverage; Asset tangibility; Growth; Profitability; Size	Significant positive size and leverage effects and a significant negative asset-tangibility effect on working capital in the Indian sugar industry

From Table 1, it is noted that mainstream research has been conducted in the context of developing economies, taking samples from large firms with very limited studies determining WCR for MSME. In the majority of the studies, firm size, leverage and operating cashflows (OCF) were found to be significantly influencing the WCR. Further, it is observed that different factors determine working capital for firms in different countries.

Study Variables and Hypotheses Development

The following paragraphs discuss the study variables and develop hypotheses for the study. The definition of variables is presented in Table 2.

Dependent Variable: Working Capital Requirement

Net working capital to total assets ratio (NWC/TA; NWCTAR), cash conversion cycle (CCC), WCR and net liquid balance (NLB) are different proxies used for working capital in various studies. CCC has been popularly used as the dependent variable to quantify WCRs (e.g., Dash, 2020; Zariyawati et al., 2016; Mongrut et al., 2014; Mansoori & Muhammad, 2012; Valipour et al., 2012; Banos-Caballero et al., 2010). CCC denotes the time, measured in days that the company takes to convert its investments in inventory, receivables and other resources into cash flows from sales. Thus, the working capital of every business remains blocked for this period, which indicates the requirements of working capital. The CCC combines the working capital components related to the operational processes, thereby reflecting the

purchasing, production and sales processes (Hawawini et al., 1986).

NWCTAR is yet another popularly used proxy for WCR in past studies (e.g., Kaur & Kaur, 2014; Abbadi & Abbadi, 2013; Bellouma, 2011; Nazir & Afza, 2009; Narender et al., 2008; Chioi et al., 2006). NWCTAR refers to the amount of resources that a firm needs to effectively cover its expenses and operating costs. NWCTAR as a proxy for WCR takes into consideration all the components of working capital, that is, inventory—receivables—payables, and cash management. This premise is reinforced by Hawawini et al. (1986), who documented that NWCTAR is a better measure when compared with the traditional indicators of liquidity for measuring WCR. Thus, in the present study, both the NWC/TA and CCC are used as proxies for WCRs.

Leverage

Chiou et al. (2006), using the pecking order hypothesis (POH), explained that a firm would try to finance its long-term investments with internal financing so that both, issue costs and monitoring by shareholders is reduced. Hence, a firm with higher debt has lower internal funding, leading to lower available funds for daily operations. So, organisations are vigilant about working capital when they have high debt ratios (Wasiuzzaman & Arumugam, 2013). External financing being costlier than internal financing (due to higher premiums) signals that firms with a high debt ratio focus on their WCM to avoid raising additional capital, which otherwise can be used for more gainful outlay prospects (Nazir & Afza, 2009). The studies by Salawu and Alao (2014); Wasiuzzaman and Arumugam (2013); Abbadi and Abbadi (2013); Lotfinia et al. (2012); Banos Caballero et al. (2010); Chiou et al. (2006); Nazir and Afza (2009) confirmed this indirect relationship across different markets with exception the of Dash (2020); and Valipour et al. (2012), who reported a positive leverage effect. Zariyawati et al. (2016); Mansoori and Muhammad (2012); and Narender et al. (2008) found no significant impact on WCR. Hence, a significant negative relationship is expected to exist between the working capital investment of a firm and its leverage (LEV), which is measured by taking the ratio of total debt to total assets. The hypothesis formulated was:

H1: Leverage significantly influences WCR.

Growth

As the organisation expects progression in sales, it will intensify its investments in inventory and short-term investments. Thus, sales growth results in a working capital increase (Wasiuzzaman & Arumugam, 2013). Mansoori &

Muhammad 2012; Wasiuzzaman and Arumugam, 2013; Salawu and Alao (2014) validated a positive relationship between sales growth and WCR. However, studies by Valipour, et al. (2012); Banos Caballero et al. (2010); Hill et al. (2010); Narender et al. (2008) reported a negative influence of sales growth on WCR. Dash (2020); and Zariyawati et al. (2016) documented no significant impact of sales growth on WCR. The sales growth variable has been used as a proxy for growth of the current study. The hypothesis formulated was:

H2: Growth significantly influences WCR.

Profitability

Chiou et al. (2006) concluded that firm profitability influences WCR. Return on assets (ROA) indicates how profitable a firm is with reference to its total investment in assets. Jose et al. (1996) argued that ROA as a measure of profitability is preferable to return on equity (ROE) to focus more on operating efficiency by avoiding the capital structure. In this study, return on assets (ROA) is taken as a proxy measure for profitability, as used in earlier works by Zariyawati et al. (2016); Salawu and Alao (2014); Valipour et al. (2012); and Chiou et al. (2006). Mixed results were observed on the influence of ROA on WCR.

Abbadi and Abbadi (2013); Mansoori and Muhammad (2012); Nazir and Afza (2009) reported a positive influence of profitability on WCR. This is because money-spinning firms are better equipped to generate internal resources, which are used to facilitate more credit to customers, and hence higher working capital investment. However, Banos Caballero et al. (2010); Valipour et al. (2012) reported a negative relationship between profitability and WCR. It is reasoned that since money-spinning firms can easily obtain funding, they do not require high investments in working capital. Additionally, MSMEs usually have limitations in obtaining external funding. Hence, the negative influence. The studies by Dash (2020); Zariyawati et al. (2016); and Narender et al. (2008) found no significant impact of profitability on WCR. Thus, the following hypothesis was formulated:

H3: Profitability significantly influences WCR.

Firm Size

Firm size can be measured by taking the total asset base as well as the sales base. Mansoori and Muhammad (2012); Gill (2010); Nazir and Afza (2009) measured firm size by taking the total assets base, whereas Mongrut et al. (2014); Salawu and Alao (2014); Valipour et al. (2012) used the sales base. In

line with the previous literature, this study used two measures for firm size—the natural logarithm of total assets and the natural logarithm of total sales as a proxy for firm size. Dash (2020); Salawu and Alao (2014); Lotfinia et al. (2012); Banos Caballero et al. (2010); Hill et al. (2010); and, Chiou et al. (2006) found a positive size effect on WCR. Abbadi and Abbadi (2013); Mansoori and Muhammad (2012); Valipour et al. (2012); Narender et al. (2008) documented a negative size effect on WCR. Mansoori and Muhammad (2012) reasoned that large firms with better access to the capital market can obtain funds easily and at a lower cost, enabling them to have more investment in working capital to support anticipated sales. However, MSMEs in India can be micro, small, and medium, which significantly differ from each other in terms of size. Micro-firms have more financial constraints than medium-sized firms, and external financing is not easily available to these firms. Thus, the negative size effect on WCR. Zariyawati et al. (2016); Bellouma (2011); Nazir and Afza (2009) reported no significant relationship size effect on WCR. Thus, the following hypothesis was formulated:

H4: Firm size significantly influences WCR.

Tangibility

The literature shows that the investment in tangible fixed assets as a proportion of a firm's total asset base can determine WCR (Dash, 2020; Kaur & Kaur, 2014; Wasiuzzaman & Arumugam, 2013; Baños-Caballero et al., 2010). Fazzari and Petersen (1993) reported negative tangibility effects on WCR. They argued that for a financially constrained firm, higher investment in tangible fixed assets would automatically reduce funds available for daily operations. Under the circumstances, organisations are forced to follow an aggressive working capital policy. This premise is reinforced by Dash (2020); Kaur and Kaur (2014); Wasiuzzaman and Arumugam (2013); Baños-Caballero et al. (2010); Kieschnick et al. (2006) as they all reported a negative tangibility effect on WCR. Thus, the following hypothesis was formulated:

H5: Asset tangibility significantly influences WCR.

Table 2: Definition of Variables Used in the Study

Nature of Variable	Variable	Proxy Used	Definition
Dependent Variable	Working Capital Requirement	CCC	
		NWC/TA	(Inventories + Cash and cash equivalents + account receivable + marketable securities) – (short-term loans + account payable) / total assets.
Independent Variable	Firm size	Sales	Log of net sales
		Total Assets	Log of total assets
	Asset tangibility	FATAR	Net fixed assets/ Total assets
	Leverage	TDTAR	Total debt/Total assets
	Growth	Sales Growth	Current year sales - previous year's sales/Previous year's sales

Research Design

For the current study, the major source of data was secondary data which was populated using “PROWESS”—the database maintained by the Centre for Monitoring Indian Economy (CMIE). The selection of the Prowess database was driven by the lack of availability of other all-inclusive databases for Indian MSMEs. The period of study selected is from 2006–07 to 2018–19.

The MSME Development Act (MSMED Act), 2006, provides a definition of MSMEs, which is considered for the current study. The MSME sector has various industries under its purview. For the current study, the firms listed on the Bombay Stock Exchange that are part of the MSME sector and are functioning as firms in the chemical industry have been considered. As the Prowess database is an all-inclusive database of all Indian companies and not exclusively for MSMEs, a query was administered to identify MSMEs. The firms meeting the following criteria were selected for the

sample:

- The sample firm must belong only to the chemical sector of MSME.
- The data for the firm must be available from 2006–07 to 2018–19.
- Firms must have an investment in plant and machinery of up to ₹10 crores.

Thus, a total of 22 firms were populated. After eliminating one company for which data for the entire period of study was not available, the final sample comprised 21 companies.

The statistical tools applied for analysis include, arithmetic mean (referred to as mean now on), median, maximum, minimum and standard deviation (SD). To examine the simultaneous impact of all the explanatory variables discussed in the introduction section on the two individual measures of WCR, that is, CCC and NWCTAR, using the stepwise regression technique, which is an extension of the simple regression technique, was used. In stepwise

regression, instead of a single explanatory variable, several explanatory variables can be used to predict the value of a dependent variable. As observed by Levine et al., “The central characteristic of the stepwise regression process is that an explanatory variable that has entered into the model at an early stage may subsequently be removed after other explanatory variables are considered. In stepwise regression, variables are added or deleted from the regression model at each step of the model-building process. The stepwise procedure stops with identification of a best fitting model, when, no additional variables can be added to or deleted from the last model fitted”. This technique is considered to be better than the multiple regression model for two reasons: i) It retains only those independent variables in the model which are significantly related to the dependent variable and ii) It eliminates those independent variables which are highly correlated based on the Variance Inflation Factor (VIF) statistics and gives the best-fit model. Hence, there is no need to separately examine the multi-collinearity through Pearson’s correlation matrix as the regression model already considers this factor in the process of model building.

Statistical Package for Social Sciences (SPSS), a statistical software, has been used to conduct the analysis. The interpretations are made based on theoretical constructs and literature review findings after the output is received, and the result of regression is determined.

The standard model is as follows:

$$Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \dots + \beta_n X_n + ut \quad 1$$

Where,

Y = the value of the Dependent variable (Y), which is being predicted.

α = constant term of the model – intercept.

$\beta_1, \beta_2, \beta_3, \beta_4, \beta_5, \dots, \beta_n$ are the Beta coefficients of independent variables.

$X_1, X_2, X_3, X_4, X_5, \dots, X_n$ is the value of the independent variable, which predicts or estimates the value of Y.

ut. = the unexplained variation also termed as the error term which indicates the error in predicting the value of Y, given the value of X.

Therefore, the model applicable to the study is,

$$WCR = \alpha + \beta_1 \text{Size} + \beta_2 \text{Growth} + \beta_3 \text{Tangibility} + \beta_4 \text{Leverage} + \beta_5 \text{Profitability} + ut \quad 2$$

As there are two proxies for dependent variables, the following two models are considered and two measures for firm size are considered, following four regressions are run in SPSS:

$$CCC = \alpha + \beta_1 \text{LnS} + \beta_2 \text{SalesGrowth} + \beta_3 \text{FATAR} + \beta_4 \text{TDTAR} + \beta_5 \text{ROA} + ut \quad 3$$

$$CCC = \alpha + \beta_1 \text{LnTA} + \beta_2 \text{SalesGrowth} + \beta_3 \text{FATAR} + \beta_4 \text{TDTAR} + \beta_5 \text{ROA} + ut \quad 4$$

$$NWCTAR = \alpha + \beta_1 \text{LnS} + \beta_2 \text{SalesGrowth} + \beta_3 \text{FATAR} + \beta_4 \text{TDTAR} + \beta_5 \text{ROA} + ut \quad 5$$

$$NWCTAR = \alpha + \beta_1 \text{LnTA} + \beta_2 \text{SalesGrowth} + \beta_3 \text{FATAR} + \beta_4 \text{TDTAR} + \beta_5 \text{ROA} + ut \quad 6$$

RESULTS AND DISCUSSION

This section presents and discusses the results of statistical analysis. The descriptive statistics are discussed first, followed by the results of stepwise regression analysis.

Descriptive Statistics

Table 3 presents the mean, median, maximum, minimum and SD for the dependent and independent variables examined in this study. A summary of descriptive statistics presented in Table 3 shows that during the study period of 2006-07 to 2018-19, the average profitability of SMEs was 13.88%, ranging from a maximum of 18.10% to a minimum of 11.52%. In addition, it was observed that MSMEs in the sample followed a moderate approach to leverage. Firms in the sample had, on average, 49% debt of their total assets. Similarly, in terms of sales growth, the sales of MSMEs in the sample grew by 16.60% on average. The average investment in tangible fixed assets for the sample was only 35% of their total assets, indicating that the firms in the MSME chemical industry followed a conservative approach toward current asset investments. The average CCC of the chemical MSMEs is 10 days indicating an efficient and aggressive working capital policy pursued by their managers.

Table 3: Descriptive Statistics

Measure	Proxy	Mean	Median	Minimum	Maximum	SD
WCR	CCC	9.78	5.60	0.84	20	8.21
WCR	NWCTAR	0.165	0.125	0.05	0.36	0.098
Growth	SG	16.60%	14.22%	0.001	0.58	0.146

Measure	Proxy	Mean	Median	Minimum	Maximum	SD
Firm Size	LnS	2.89	2.91	2.53	3.12	0.20
Firm Size	LnTA	3.03	3.06	2.64	3.36	0.23
Tangibility	FATAR	0.35	0.35	0.31	0.39	0.02
Leverage	TDTAR	0.49	0.49	0.39	0.53	0.04
Profitability	ROA	13.88%	13.66%	11.52%	18.10%	0.02

CCC is winsorised at 20% and 80% limits to reduce variation.

Stepwise Regression Analysis

Four models were run in SPSS to examine the determinants of WCR for the selected sample. The results of these models are presented in Table 4. From the results of stepwise linear regression analysis, it is observed that sales growth, profitability and tangibility do not significantly impact the WCRs of the chemical MSME industry, whether measured in terms of CCC or NWCTAR for the selected study period. Hence, the alternate hypotheses H₂, H₃, and H₅

are rejected. For sales growth, similar results were reported by Dash (2020) and Zariyawati et al. (2016). Further, Dash (2020); Zariyawati et al. (2016); and Narender et al. (2008) also found no significant impact of profitability on WCR, and hence the study supports their findings. The earlier studies have reported a negative impact of asset tangibility on WCR (Dash, 2020; Kaur & Kaur, 2014; Wasiuzzaman & Arumugam, 2013; Baños-Caballero et al., 2010; Kieschnick et al., 2006). However, this study reports no significant relationship between asset tangibility and WCR.

Table 4: Results of Stepwise Linear Regression

Independent Variable	R ²	Adj. R ²	Intercept	Slope	T-Statistic	P-Value	F-Statistic	VIF Statistics
Dependent Variable - CCC with LnS as Firm Size								
LnS	0.628	0.595	-84.53	32.63	4.313	0.001	18.605* (0.001)	1.000
Dependent Variable - CCC with LnTA as Firm Size								
LnTA	0.691	0.663	-79.112	29.324	4.963	0.000	24.629* (0.000)	1.000
Dependent Variable - NWCTAR with LnS as Firm Size								
LnS	0.885	0.849	2.181	-0.567	-7.422*	0.000	38.842*	1.906
TDTAR				-0.777	-2.349**	0.041	(0.000)	1.906
Dependent Variable - NWCTAR with LnS as Firm Size								
LnTA	0.882	0.859	2.346	-0.538	-7.711*	0.000	37.518*	2.310
TDTAR				-1.132	-3.211*	0.009	(0.000)	2.310

* Results significant at 1% level of significance.

** Results significant at 5% level of significance.

A significant negative impact is observed for firm size measured either in terms of sales or total assets on NWCTAR—the proxy for WCR. This necessarily indicates that with an increase in total assets investments and sales, the businesses prefer to source this increase through internally generated funds in the form of profits and try to reduce the WCRs and manage the same more efficiently to increase profitability. This is also in line with the pecking order hypothesis. This negative relationship is in line with the studies of Abbadi and Abbadi (2013); Mansoori and Muhammad (2012); Valipour et al. (2012); Narender et al.

(2008) who documented the negative effect of firm size on WCR. This is due to the financial constraints of MSMEs and thus the negative influence of firm size on WCR.

However, when CCC is taken as a proxy for firm size, it has a significant positive relationship. The results support the findings of earlier studies by Dash (2020); Salawu and Alao (2014); Lotfinia et al. (2012); Banos Caballero et al. (2010); Hill et al. (2010); and, Chiou et al. (2006). These dual results for firm size are justified as NWCTAR indicates the financing side of working capital whereas CCC measures the investment side of WCR.

Further, a significant negative relationship is also observed for leverage when NWCTAR is taken as a proxy for WCR. The significant negative relationship for leverage is consistent with the POH and in line with the results of earlier studies Salawu and Alao (2014); Wasiuzzaman and Arumugam (2013); Abbadi and Abbadi (2013); Lotfinia et al. (2012); Banos Caballero et al. (2010); Chiou et al. (2006); Nazir and Afza (2009) across different markets.

CONCLUSIONS

The significance of WCM is well-established in the literature, which gives rise to the critical issue of determining WCRs for efficiently managing the working capital of the business. It is interesting to note here that the determinants of WCR are different for different industries, as already discussed in the review of related literature section. In the aforesaid context, taking samples from the chemical MSME sector, this study attempted to identify determinants of WCR. The study used growth, firm size, profitability, leverage, and tangibility as firm-specific factors that can affect WCR. The study finds that only leverage and firm size significantly impact WCR. It is concluded that profitability, sales growth and asset tangibility do not have a significant impact on the WCR of firms in the MSME chemical sector. When WCR is measured by the proxy CCC, it is concluded that the WCR of Indian Chemical MSME is positively influenced by firm size as represented by both sales and total asset investments. However, when WCR is measured from the financing side using NWCTAR, the results show a negative relationship with firm size. Results also indicate a negative leverage effect on the WCR of the Indian Chemical MSME when measured as working capital financing in terms of NWCTAR. The negative impact necessarily indicates that with a rising debt-to-total assets ratio, firms pay more attention to efficient management of working capital, thus avoiding tied up capital in accounts receivable and inventories. So, lower WCR are exhibited by companies with high leverage. The findings are useful to the managers of chemical firms in the MSME sector and they can use the firm's size as a compass to guide their WCR decisions.

As the present study focused on the chemical MSME sector, its findings cannot be generalised. Also, the present study considered only firm-specific determinants, which is another limitation. Future studies can include as many firm-specific (internal factors like OCF, CR, QR, etc.) and non-firm-specific (external factors like GDP growth, phase of the economic cycle, industry dummies, etc.) characteristics as evident in the literature to get comprehensive results. Methodologically, future studies can experiment with structural equation modeling, panel data regression or data envelopment analysis to see if the results are better using a

different statistical technique.

REFERENCES

- Abbadi, S. M., & Abbadi, R. T. (2013). The determinants of working capital requirements in Palestinian industrial corporations. *International Journal of Economics & Finance*, 5(1), 65-75.
- Ahangar, N., & Shah, F. (2017). Working capital management, firm performance and financial constraints: Empirical evidence from India. *Asia-Pacific Journal of Business Administration*, 9(3), 206-219. doi:https://doi.org/10.1108/APJBA-06-2017-0057.
- Addin Al-Mawsheki, R. M. S. (2022). Effect of working capital policies on firms' financial performance. *Cogent Economics & Finance*, 10(1).
- Anton, S. G., & Afloarei Nucu, A. E. (2020). The impact of working capital management on firm profitability: Empirical evidence from the Polish listed firms. *Journal of Risk and Financial Management*, 14(1).
- Baños-Caballero, S., Garcia-Teruel, P. J., & Martinez-Solano, P. (2010). Working capital management in SMEs. *Accounting & Finance*, 50(3), 511-527.
- Baños-Caballero, S., García-Teruel, P. J., & Martínez-Solano, P. (2020). Net operating working capital and firm value: A cross-country analysis. *BRQ Business Research Quarterly*, 23(3), 234-251.
- Bellouma, M. (2011). Effects of capital investment on working capital management: Evidence on Tunisian export small and medium enterprises (SMEs). *African Journal of Business Management*, 5(30), 12133.
- Bhalla, V. K. (1997). *Modern working capital management*. New Delhi: Anmol Publications Pvt Ltd.
- Bhatia, S., & Srivastava, A. (2016). Working capital management and firm performance in emerging economies: Evidence from India. *Management and Labour Studies*, 41(2), 71-87.
- Boisjoly, R. P., Conine Jr, T. E., & McDonald IV, M. B. (2020). Working capital management: Financial and valuation impacts. *Journal of Business Research*, 108, 1-8.
- Block, S. B., & Hirt, G. A. (1992). *Foundations of financial management* (p. 138). Mass, Boston: Richard D. Irwin Inc.
- Chiou, J. R., Cheng, L., & Wu, H. W. (2006). The determinants of working capital management. *Journal of American Academy of Business*, 10(1), 149-155.
- Deloof, M. (2003). Does working capital management affect the profitability of Belgian firms? *Journal of Business Finance and Accounting*, 30(3&4), 573-587.
- Dash, M. (2020). Determinants of working capital in

- the Indian Sugar Industry. *Journal of Commerce and Accounting Research*, 9(2), 41-49.
- Falope, O. I., & Ajilore, O. T. (2009). Working capital management and corporate profitability: Evidence from panel data analysis of selected quoted companies in Nigeria. *Research Journal of Business Management*, 3(3), 73-84.
- Fazzari, S. M., & Petersen, B. C. (1993). Working capital and fixed investment: New evidence on financing constraints. *The RAND Journal of Economics*, 24(3), 328-342.
- García-Teruel, P. J., & Martínez-Solano, P. (2007). Effects of working capital management on SME profitability. *International Journal of Managerial Finance*, 3(2), 164-177.
- Gill, A., Biger, N., & Mathur, N. (2010). The relationship between working capital management and profitability: Evidence from the United States. *Business and Economics Journal*, 1(10), 1-9.
- Goyal, S. S. (2018a). A study on some important aspects of working capital management in selected Indian industries. *Finance India*, 32(1), 215-225.
- Goyal, S. S. (2018b). Working capital policy of Indian service industry. *Pacific Business Review International*, 10(8), 104-118.
- Hawawini, G., Viallet, C., & Vora, A. (1986). Industry influence on corporate working capital decisions. *Sloan Management Review*, 27(4), 15-24.
- Hill, M. D., Kelly, G. W., & Highfield, M. J. (2010). Net operating working capital behavior: A first look. *Financial Management*, 39(2). doi:<http://dx.doi.org/10.1111/j.1755-053X.2010.01092.x>
- Jose, M., Lancaster, C., & Stevens, J. (1996). Corporate returns and cash conversion cycles. *Journal of Economics & Finance*, 20(3), 33-46.
- Kantawala, A. S. and Shroff, S. J. (2012). A study on working capital management of Indian hotel industry. *Management Trends*, 9(1), 69-74.
- Kaur, N., & Kaur, J. (2014). Determinants of working capital requirements of automobile industry in India: A study of passenger vehicles segment. *Indian Journal of Accounting*, 46(2), 117-126.
- Kieschnick, R., Laplante, M., & Moussawi, R. (2013). Working capital management and shareholders' wealth. *Review of Finance*, 17(5), 1827-1852.
- Kieschnick, R., Laplante, M., & Moussawi, R. (2006). Corporate working capital management: Determinants and consequences. Working Paper, University of Texas, Dallas. Retrieved from www.researchgate.net/profile/Robert_Kieschnick/publication/242506805_Corporate_working_capital_management_Determinants_and_Consequences/links/54c8f3c30cf238bb7d0ea5c5.pdf
- Levine, D. M., Krehbiel, T. C., & Berenson, M. L. (2003). *Business statistics - A first course* (3rd ed.). New Delhi: Pearson Education.
- Lamberson, M. (1995). Changes in working capital of small firms about changes in economic activity. *Mid-American Journal of Business*, 10(2), 45-50.
- Lazaridis, I., & Tryfonidis, D. (2006). Relationship between working capital management and profitability of listed companies in the Athens stock exchange. *Journal of Financial Management and Analysis*, 19(1), 26-35.
- Lotfinia, E., Mousavi, Z., & Jari, A. (2012). The relationship between working capital management and firm characteristics: Evidence from Tehran stock exchange (TSE). *International Journal of Business and Social Science*, 3(14), 296-301.
- Majanga, B. (2015). Cash conversion cycle and firm profitability in Malawi manufacturing sector. *Journal of Commerce and Accounting Research*, 4(3), 1-7.
- Mansoori, E., & Muhammad, D. D. J. (2012). Determinants of working capital management: Case of Singapore firms. *Research Journal of Finance and Accounting*, 3(11), 15-23.
- Mongrut, S., Fuenzalida O'Shee, D., Cubillas Zavaleta, C., & Cubillas Zavaleta, J. (2014). Determinants of working capital management in Latin American companies. *Innovar*, 24(51), 5-18.
- Narwal, K. P., & Jindal, S. (2018). Working capital management impact on corporate profitability relation with corporate governance: Evidence from the Indian manufacturing sector. *Journal of Commerce and Accounting Research*, 7(3), 8-12.
- Narender, V., Menon, S., & Shwetha, V. (2008). Factors determining working capital management in the cement industry. *South Asian Journal of Management*, 15(4), 64-78.
- Nazir, M. S., & Afza, T. (2009). Working capital requirements and the determining factors in Pakistan. *IUP Journal of Applied Finance*, 15(4), 28-38.
- 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.
- Padachi, K., Howorth, C., & Narasimhan, M. S. (2012). Working capital financing preferences: The case of Mauritian manufacturing small and medium-sized enterprises (SMEs). *Asian Academy of Management Journal of Accounting and Finance*, 8(1), 125-157.
- Panda, A. (2012). The status of working capital and its rela-

- tionship with sales: An empirical investigation of Andhra Pradesh Paper Mills Ltd (India). *International Journal of Commerce and Management*, 22(1), 36-52.
- Prasad, P., Sivasankaran, N., Paul, S., & Kannadhasan, M. (2019). Measuring impact of working capital efficiency on financial performance of a firm: An alternative approach. *Journal of Indian Business Research*. doi:<https://doi.org/10.1108/JIBR-02-2018-0056>
- Raheman, A. & Nasr, M. (2007). Working capital management and profitability - Case of Pakistani firm. *International Review of Business Research Papers*, 3(1), 279-300.
- Saarani, A. N., & Shahadan, F. (2012). The determinant factors of working capital requirements for enterprise 50 (E50) firms in Malaysia: Analysis using structural equation modeling. *Scottish Journal of Arts, Social Sciences and Scientific Studies*, 5(2), 52-66.
- Salawu, R. O., & Alao, J. A. (2014). Determinants of working capital management: Case of Nigerian manufacturing firms. *Journal of Economics and Sustainable Development*, 5(14), 49-56.
- Sawarni, K. S., Narayanasamy, S., & Ayyalusamy, K. (2020). Working capital management, firm performance and nature of business: An empirical evidence from India. *International Journal of Productivity and Performance Management*, 70(1), 179-200.
- Shin, H., & Soenen, L. (1998). Efficiency of working capital management and corporate profitability, *Financial Practice and Education*, 8, 37-45.
- Shroff, S. (2018). A study on working capital strategies of Indian ITes Industry. *Indian Accounting Review*, 22(2), 55-75.
- Shroff, S. J. (2013). An empirical study of working capital policy, risk and leverage. *Pakistan Business Review*, 14(4).
- Valipour, H., Moradi, J., & Farsi, F. D. (2012). The impact of company characteristics on working capital management. *Journal of Applied Finance and Banking*, 2(1), 105-25.
- Wasiuzzaman, S. (2015). Working capital and firm value in an emerging market. *International Journal of Managerial Finance*, 11(1), 60-79.
- Wasiuzzaman, S., & Arumugam, V. C. (2013). Determinants of working capital investment: A study of Malaysian public listed firms. *Australasian Accounting Business and Finance Journal*, 7(2), 63-83.
- Weston J. F., & Brigham E. F. (1962). *Managerial finance* (p. 123). New York: Holt Rine, Hart & Winston.
- Zariyawati, M. A., Annuar, M. N., & Pui-San, N. (2016). Working capital management determinants of small and large firms in Malaysia. *International Journal of Economics & Management*, 10(2), 365-377.