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Impact of working capital management on profitability of Indian manufacturing companies

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Abstract

This study aims to analyze the relationship between Working Capital Management and the profitability of firms listed on the Bombay Stock Exchange in the Indian manufacturing sector. The study implied the generalized two-step methods of moments (GMM) techniques proposed by Arellano and Bond. The sample consists of financial data of BSE-listed companies from 2012 to 2021. The empirical result of the study suggested that the coefficient of CCC and ICP is positive and significant. In contrast, the coefficient of RCP and APP is negative with Tobin's Q. In the case of ROCE, the coefficient of CCC, ICP, RCP, and APP of positive and significant with Return on Capital Employed. Unlike previous studies that showed a linear relationship between WCM and firm profitability, this study discovered an inverse relationship. This study offers new evidence for an inverted U-shaped relationship between working capital investment and corporate profitability in India. In addition, this work employs GMM to control any endogeneity issues.

Keywords: Working capital management, manufacturing sector, Bombay stock exchange, Two-step generalized methods of moments

1. Introduction

"Working Capital Management" (WCM) refers to the choices an organization makes about its short-term investments and financing, which can affect a corporation's liquidity. The terms "current assets" and "current liabilities" are included in the definition of components of working Capital (Mahato and Jagannathan, 2016; Naskar and Guha, 2016; Singh *et al.*, 2017; Boruah, 2020; Yadav and Singh, 2020) [46, 21, 58]. Current assets include things like cash, accounts receivable, and inventories. Current liabilities include things like accounts payable (AP) and already-incurred expenses. If a company can match the maturities of its investments and financing, its current liabilities will serve as the primary source of financing for its current assets (Bagchi *et al.*, 2012; Singhania *et al.*, 2014; Aravind, 2016; Sharma and Kaur, 2016) [19, 17, 13, 75]. In addition, working Capital is an essential component for the day-to-day operations of businesses; the transaction, precautionary, and speculative uses of working Capital are the three main motives for holding onto working Capital (Afrifa, 2013; Gill and Biger, 2013; Ahmed *et al.*, 2019; Awodiran, 2019; Kumpamool and Chanchart, 2022) [30, 6, 17, 45, 30]. WCM has received much less attention from people working in corporate finance compared to long-term assets and liabilities, although being just as important as current assets and liabilities (Amin and Islam, 2014; Mukhoma, 2014; Huma and Shah, 2015; Muturi *et al.*, 2015; Serrasqueiro, 2015) [12, 9, 55]. Therefore, WCM is essential to the existence of a company since enterprise risk becoming illiquid if they ineffectively manage their working Capital.

When determining which Working Capital (WC) rules should be implemented, managers often have a significant say in the matter. In addition, according to agency theory, there is a potential for a conflict of interest between managers and shareholders which may lead to managers selecting policies that are not in the best interest of shareholders to increase their wealth (Otekinrin *et al.*, 2021; Diwei *et al.*, 2022; Shukla *et al.*, 2022) [64, 27, 81]. Because of this, managers may use the robustness of accounting standards to participate in opportunistic income management by modifying their financial statements. This is because managers and shareholders may not have the same interests.

This may be the result of misalignment between managers and shareholders. This is because accounting standards tend to be stable (Tutino and Pompili, 2018; Coutinho *et al.*, 2019) ^[89].

On the other hand, contend that earnings management does not include taking advantage of opportunities. This conduct may only sometimes be useful, but it does not damage the company's worth. Studies on workplace regulations are uncommon, even though ineffective administration of workers' compensation creates financial pain and that the survival of a business is more vital than its revenues. Nazir and Afza (2009) ^[59], Sharma and Kumar (2011) ^[74] and Alvarez *et al.* (2021) ^[11] despite the fact that their results deal with current challenges, they assess these policies in the perspective of corporate profitability.

WCM components including inventory, accounts receivable, accounts payable, and cash balance affect firms' profitability (Soda *et al.*, 2022) ^[82]. Therefore, numerous empirical investigations have demonstrated that working capital management has an effect on profitability, such as "Mathuva (2010) ^[49], Gill *et al.* (2010) ^[31], Afeef (2011) ^[2], Mumtaz *et al.* (2011) ^[52], Napompech (2012) ^[57], Arunkumar and Radharamanan (2013) ^[15], Gul *et al.* (2013) ^[32], Azeez *et al.* (2016) ^[16], Bagh *et al.* (2016) ^[18]. The Research suggest that WCM boosts business profitability "Abuzayed, 2012 ^[1]; Dencic-Mihajlov, 2012 ^[26]; Mansoori and Muhammad, 2012 ^[47]; Ramana *et al.*, 2013 ^[69]; Kumar *et al.*, 2015; Jindal *et al.*, 2017 ^[39]; Altaf and Shah 2018 ^[9]; Paul and Matra, 2018 ^[65]; Bavaliya and Mehta, 2019 ^[20]". Many empirical studies (Nobanee *et al.*, 2011; Marttonen *et al.*, 2013; Taghipour *et al.*, 2020) ^[60, 48, 86] have reported a direct relationship between profitability and WCM.

There are five ways India may develop a robust manufacturing sector and realize its manufacturing potential, according to a recent World Economic Forum research. The analysis claims that India has the potential to significantly alter supply chains and, by 2030, might have an annual economic impact of more than \$500 billion on the world economy. According to a report from Geneva, Switzerland, on August 2, 2021, India is in a special position because of its domestic demand, demography, and government initiatives to support manufacturing.

2. Review of Literature

Working Capital has been studied from two perspectives in the literature on WCM: the static view and the operating cycle concept (Hossin and Begum, 2020) ^[34]. Position, activity, and leverage measurements are some of the different dimensions utilised to understand working Capital (Kasiran *et al.*, 2016) ^[41]. The static aspect considers the positional measures of the concept and as such is also referred to as position measurement. WC is measured as the difference between CA and CL, also known as NWC or the firm's current ratio. The focus here is on the amount of the company's current assets and current liabilities. The operating cycle concept, on the other hand, is based upon performance evaluation and as such, the management efficiency of the operating portion of working Capital is examined as a Cash Conversion Cycle (Morshed, 2020) ^[51], Weighted Cash Conversion Cycle (Munene and Tibbs, 2018) ^[53], also Net Trade Cycle (Mekonnen, 2011) ^[50] or the Modified Cash Conversion Cycle (Nadeem *et al.*, 2020) ^[56]. The latter concept is also called as performance measurement as it measures the operating capital

management efficiency using many differed approaches. Leverage measurement of WC is based upon the financing portion of WC namely long-term financing against short-term financing (Hossin and Begum, 2020) ^[34]. The researchers reviewed the literature on the linkage between the length of WCM and the profitability of a business. The majority of research results show a statistically significant association between WCM and corporate profitability (Ahmed and Khan, 2017; Yusuf, 2019; Hossain, 2020) ^[7, 93, 35]. In addition, Hossain (2020) ^[35] found that there is a significant negative relationship between the CCC and APP on the profitability of a manufacturing company (ROA, ROE). This finding showed that when an organization has financial limits, WCM competes with investment fixed assets for the firm's fund.

The CCC has been utilised in the majority of the empirical Research that have been conducted to evaluate the effectiveness of a company's WCM (Sharma and Kaur, 2016; Ahmed and Khan, 2017; Munene and Tibbs, 2018; Soukhakian and Khodakarami, 2019; Yusuf, 2019; Morshed, 2020; Hossain, 2020; Garg and Meent, 2022) ^[75, 51, 53, 93, 7, 35, 29]. A CCC measures how long it takes for raw material expenditures to be recouped after sales of finished products are realized. Prior literature has stated that CCC correlates positively or negatively with firm profitability. Accordingly, it has been suggested that a longer CCC may boost profits by increasing sales, which would be possible given that the longer CCC would be in effect for a longer period (Morshed, 2020) ^[51], give consumers additional time to consider the differences between the various offerings (Yusuf, 2019) ^[93], reduce the information asymmetry between the buyer and seller (Hossin and Begum, 2020) ^[34], prevent production interruptions (Kasiran *et al.*, 2016) ^[41], and strengthens long-term supplier/ customer relationships (Nadeem *et al.*, 2020) ^[56]. In line with the findings of the researches mentioned above, a number of empirical investigations have demonstrated that CCC has a favorable effect on the profitability of businesses "Abuzayed, 2012 ^[1]; Dencic-Mihajlov, 2012 ^[26]; Mansoori and Muhammad, 2012 ^[47]; Ramana *et al.*, 2013 ^[69]; Kumar *et al.*, 2015; Jindal *et al.*, 2017 ^[39]; Altaf and Shah 2018 ^[9]; Paul and Matra, 2018 ^[65]; Bavaliya and Mehta, 2019 ^[20]; Prasad *et al.*, 2019; Prasad *et al.*, 2019; Taghipour *et al.*, 2020 ^[86]; Otekurunri *et al.*, 2021 ^[64]; Diwei *et al.*, 2022 ^[27]; Shukla *et al.*, 2022" ^[81]. Numerous studies support the literature above by showing negative effects of CCC on firm profitability (Sharma and Kaur, 2016; Ahmed and Khan, 2017; Munene and Tibbs, 2018; Soukhakian and Khodakarami, 2019; Yusuf, 2019; Hossain, 2020) ^[75, 53, 7, 93, 35]. As a result, a firm is left with receivables after a sale and before cash could actually be realized. Essentially, accounts receivable are the receivables that are converted into cash or collected from customers within a certain timeframe or accounts collection period (Munir, 2019) ^[54]. Opportunity costs and bad debt may hamper a company's ability to raise sales as a result of an increase in its account receivables. Accounts receivables have a negative relationship with firm profitability (Ukaegbu, 2014) ^[90]. There is evidence that ARP has a negative impact on firm profitability (Sharma and Kumar, 2011; Amin and Islam, 2014; Yazdanfar and Ohuman, 2014; Tutino and Pompili, 2018; Alvarez *et al.*, 2021) ^[74, 9, 12, 89, 92, 11]. The stock that is purchased with the intention of reselling it at a later time for a profit is referred to as the inventory. The inventory of a manufacturing company

accounts for around 20-30% of the company's entire investment and is the enterprise's highest cost (Ahmed and Khan, 2017; Yusuf, 2019; Hossain, 2020) [7, 93, 35]. Inventories are an important factor in determining an organization's sales and profitability (Sardo and Serrasqueiro, 2021; Tarkom, 2021; Jabbouri *et al.*, 2022; Sawarni *et al.*, 2022) [71, 88, 40, 72]. Therefore, a conservative inventory management policy negatively affects profitability (Afrifa and Padachi, 2016; Jindal *et al.*, 2017; Singh *et al.*, 2017; Bavaliya and Mehta, 2019) [3, 20, 39]. Therefore, the relationship between ICP and firm profitability will not be linear as a result of a firm balancing costs and benefits. Accounts Payable Period during which a company is responsible for paying its accounts payable to one of its major sources of short-term external finance (Arshad and Gondal, 2013) [14]. This ratio measures how long it takes a company to pay back its suppliers after the goods are supplied or, in other words, how many days it takes from when the goods were supplied to when they were paid for. Accounts Payable Period (APP) and profitability have either been found to be positively or negatively correlated in prior literature. Accounts Payable Period is positively related to firm profitability, which is supported by several studies "Abuzayed, 2012 [1]; Singhania *et al.*, 2014 [17]. Numerous studies have found a negative relationship between Accounts Payable Period and firms profitability "Nobanee *et al.*, 2011 [60]; Sharma and Kumar, 2011 [74]; Ponsian *et al.*, 2014 [66]; Ahmed and Khan, 2017 [7]; Jakpar *et al.*, 2017 [38]; Bavaliya and Mehta, 2019 [20]; Munir, 2019 [54]; Kasahun, 2020 [42]; Kisanyanya; 2020 [43]; Taghipour *et al.*, 2020 [86]". This study indicate the coefficient of CCC and ICP is positive and significant. In contrast, the coefficient of RCP and APP is negative with Tobin's Q. In the case of ROCE,

the coefficient of CCC, ICP, RCP, and APP of positive and significant with Return on Capital Employed and previous study made negative and positive impact of WCM and firm performance.

In brief, academic literature around the world suggests that WCM impacts a firm's profitability. The majority of Research that has been conducted to determine the direction of the relationship concludes that there is a negative relationship between Working Capital Management and firm profitability.

3. Research Methodology

3.1 Sample of the study

The final sample included 269 Bombay Stock Exchange-listed companies from 2012 to 2021, with 2,690 firm-year observations. Data were gathered from the Prowess IQ database. Financial institutions and businesses with insufficient observations for our most important variables are excluded from the first sample.

3.2 Variables of the study

The study has been quantified Working Capital Management (WCM) using components of working Capital as the independent variables and the most considered variable in the existing literature i.e., Tobin's Q and Return on Capital Employed (ROCE) have been taken as the proxies of profitability of a firm as dependent variables. In addition, control variables are also taken as independent variables to reduce the potential bias that may arise on account of omitted variables. Table 1 presents the details of the variables, such as the computation of the Variable, the measurement, and supporting literature for the variables used.

Table 1: Variables Definition

Variable	Acronym	Definition	Measurement	Related Literature
Tobin's Q	Tobin's Q	Market Value of Equity + Book Value of Debt/Book Value of Assets	Ratio	Nguyen <i>et al.</i> , 2020 [61]; Alodat <i>et al.</i> , 2021 [8]; Farhan <i>et al.</i> , 2021 [28]; Syaharani and Chalid, 2021 [85]; Chancharat and Kumpamool, 2022 [45]; Hutomo <i>et al.</i> , 2022 [36]; Ighoroje and Umeora, 2022 [37]; Sun and Chen, 2022 [84]
Return on Capital Employed	ROCE	(Profit Before Interest & Tax/Capital employed)*100	Ratio	Afrifa and Padachi, 2016 [3]; Jindal <i>et al.</i> , 2017 [39]; Bavaliya and Mehta, 2019 [20]
Cash Conversion Cycle	CCC	Receivable Collection Period + Inventory Conversion Period - Accounts Payable Period	Days	Ahangar, 2021 [5]; Farhan <i>et al.</i> 2021 [28]; Sardo and Serrasqueiro, 2021 [74]; Tarkom, 2021 [88]; Jabbouri <i>et al.</i> , 2022 [40]; Sawarni <i>et al.</i> , 2022 [72]
Inventory Conversion Period	ICP	(Inventory/Cost of Goods Sold)*365	Days	Awodiran, 2019 [17]; Ahmed <i>et al.</i> 2019 [6]; Otekunrin <i>et al.</i> , 2021 [64]; Diwei <i>et al.</i> , 2022 [27]; Shukla <i>et al.</i> , 2022 [81]
Receivable Collection Period	RCP	(Average Debtors/Sales)* 365	Days	Sharma and Kumar, 2011 [74]; Amin and Islam, 2014 [12]; Yazdanfar and Ohuman, 2014 [92]; Tutino and Pompili, 2018 [89]; Alvarez <i>et al.</i> , 2021 [11]
Accounts Payable Period	APP	(Average Creditors/Cost of Goods Sold)*365	Days	Muturi <i>et al.</i> 2015 [55]; Tanveer <i>et al.</i> , 2016 [87]; Naskar and Guha, 2017 [58]
Debtors Turnover Ratio	DTR	Cost of Sales/Average Inventories	Ratio	Sharma and Kaur, 2016 [75]; Paul and Mitra, 2018 [65]
Inventors Turnover Ratio	ITR	Sales/Sundry Debtors	Ratio	Arshad and Gondal, 2013 [14]; Azeez <i>et al.</i> , 2016 [16]; Bavaliya and Mehta, 2019 [20]; Hossia and Begum, 2020 [34]
Capital Assets to Total Asset	CATA	Current Assets/Total Assets	Days	Agyemang <i>et al.</i> , 2019 [4]; Garg and Meentu, 2022 [29]
Working Capital Turnover Ratio	WCTR	Current Assets/Sales	Days	Arshad and Gondal, 2013 [14]; Bulin <i>et al.</i> , 2016 [23]; Garg and Meentu, 2022 [29]
Firm Size	FS	Natural log to total assets	Small and Large	Nguyen <i>et al.</i> , 2020 [61]; Alodat <i>et al.</i> , 2021 [8]; Syaharani and

				Chalid, 2021 ^[85] ; Diwei <i>et al.</i> , 2022 ^[27] ; Garg and Meentu, 2022 ^[29] ; Shukla <i>et al.</i> , 2022 ^[81] ; Sinha and Vodwal, 2022
Sales Growth	SG	(Current Sales-Previous Year Sales)/Previous Year Sales	Days	Korkmaz and Yaman, 2019 ^[44] ; Simon <i>et al.</i> , 2019 ^[76] ; Taghipour <i>et al.</i> , 2020 ^[86] ; Nwude <i>et al.</i> , 2021 ^[62]
Debt to Equity Ratio	DER	External Equities or Debt/Equity Capital	Ratio	Nwude <i>et al.</i> , 2021 ^[62] , Garg and Meentu, 2022 ^[29]
Current Ratio	CR	Current Assets/Current Liabilities	Ratio	Mukhoma, 2014; Jindal <i>et al.</i> , 2017 ^[39] ; Naskar and Guha, 2017 ^[58] ; Altaf and Shah, 2018 ^[9] ; Garg and Meentu, 2022 ^[29]
Quick Ratio	QR	Quick Assets/Current Liabilities	Ratio	Naskar and Guha, 2017 ^[58] ; Garg and Meentu, 2022 ^[29]
Cash Flow	CF	Earnings Before Interest and Tax + Depreciation to Total Assets	Ratio	Alshattarat <i>et al.</i> , 2010
Leverage	LEV	Total Debt/Total Liabilities	Ratio	Ponsian <i>et al.</i> , 2014 ^[66] ; Azeez <i>et al.</i> , 2016 ^[16] ; Prempeh and Peprah-Amankona, 2019 ^[68]

4. Baseline Specifications and Estimation Approach

4.1 Baseline Specification

According to the literature in Section 2, there are a priori grounds for supposing that there may be a non-monotonic relationship between WCM and company profitability. The purpose of the current study is to compare the positive and negative effects of working capital management on business

profitability (Singh *et al.*, 2017, and Sharma and Kumar, 2011) ^[74]. Additionally, other general firm characteristics including firm size, sales growth, debt to equity ratio, current ratio, cash flow, leverage, and quick ratio are employed as control variables to lessen any potential bias that may result from omitted factors. Therefore, we estimate the following models:

$$Tobin,s Q = \beta_0 + \beta_1 CCC_{i,t} + \beta_2 DTR_{i,t} + \beta_3 ITR_{i,t} + \beta_4 CATR_{i,t} + \beta_5 WCTR_{i,t} + \beta_6 FS_{i,t} + \beta_7 SG_{i,t} + \beta_8 DER_{i,t} + \beta_9 CR_{i,t} + \beta_{10} CF_{i,t} + \beta_{11} LEV_{i,t} + \beta_{12} QR_{i,t} + \gamma_t + \delta_i + \epsilon_{i,t} \tag{1}$$

$$Tobin's Q = \beta_0 + \beta_1 ICP_{i,t} + \beta_2 DTR_{i,t} + \beta_3 ITR_{i,t} + \beta_4 CATR_{i,t} + \beta_5 WCTR_{i,t} + \beta_6 FS_{i,t} + \beta_7 SG_{i,t} + \beta_8 DER_{i,t} + \beta_9 CR_{i,t} + \beta_{10} CF_{i,t} + \beta_{11} LEV_{i,t} + \beta_{12} QR_{i,t} + \gamma_t + \delta_i + \epsilon_{i,t} \tag{2}$$

$$Tobin's Q = \beta_0 + \beta_1 RCP_{i,t} + \beta_2 DTR_{i,t} + \beta_3 ITR_{i,t} + \beta_4 CATR_{i,t} + \beta_5 WCTR_{i,t} + \beta_6 FS_{i,t} + \beta_7 SG_{i,t} + \beta_8 DER_{i,t} + \beta_9 CR_{i,t} + \beta_{10} CF_{i,t} + \beta_{11} LEV_{i,t} + \beta_{12} QR_{i,t} + \gamma_t + \delta_i + \epsilon_{i,t} \tag{3}$$

$$Tobin's Q = \beta_0 + \beta_1 APP_{i,t} + \beta_2 DTR_{i,t} + \beta_3 ITR_{i,t} + \beta_4 CATR_{i,t} + \beta_5 WCTR_{i,t} + \beta_6 FS_{i,t} + \beta_7 SG_{i,t} + \beta_8 DER_{i,t} + \beta_9 CR_{i,t} + \beta_{10} CF_{i,t} + \beta_{11} LEV_{i,t} + \beta_{12} QR_{i,t} + \gamma_t + \delta_i + \epsilon_{i,t} \tag{4}$$

$$ROCE = \beta_0 + \beta_1 CCC_{i,t} + \beta_2 DTR_{i,t} + \beta_3 ITR_{i,t} + \beta_4 CATR_{i,t} + \beta_5 WCTR_{i,t} + \beta_6 FS_{i,t} + \beta_7 SG_{i,t} + \beta_8 DER_{i,t} + \beta_9 CR_{i,t} + \beta_{10} CF_{i,t} + \beta_{11} LEV_{i,t} + \beta_{12} QR_{i,t} + \gamma_t + \delta_i + \epsilon_{i,t} \tag{5}$$

$$ROCE = \beta_0 + \beta_1 ICP_{i,t} + \beta_2 DTR_{i,t} + \beta_3 ITR_{i,t} + \beta_4 CATR_{i,t} + \beta_5 WCTR_{i,t} + \beta_6 FS_{i,t} + \beta_7 SG_{i,t} + \beta_8 DER_{i,t} + \beta_9 CR_{i,t} + \beta_{10} CF_{i,t} + \beta_{11} LEV_{i,t} + \beta_{12} QR_{i,t} + \gamma_t + \delta_i + \epsilon_{i,t} \tag{6}$$

$$ROCE = \beta_0 + \beta_1 RCP_{i,t} + \beta_2 DTR_{i,t} + \beta_3 ITR_{i,t} + \beta_4 CATR_{i,t} + \beta_5 WCTR_{i,t} + \beta_6 FS_{i,t} + \beta_7 SG_{i,t} + \beta_8 DER_{i,t} + \beta_9 CR_{i,t} + \beta_{10} CF_{i,t} + \beta_{11} LEV_{i,t} + \beta_{12} QR_{i,t} + \gamma_t + \delta_i + \epsilon_{i,t} \tag{7}$$

$$ROCE = \beta_0 + \beta_1 APP_{i,t} + \beta_2 DTR_{i,t} + \beta_3 ITR_{i,t} + \beta_4 CATR_{i,t} + \beta_5 WCTR_{i,t} + \beta_6 FS_{i,t} + \beta_7 SG_{i,t} + \beta_8 DER_{i,t} + \beta_9 CR_{i,t} + \beta_{10} CF_{i,t} + \beta_{11} LEV_{i,t} + \beta_{12} QR_{i,t} + \gamma_t + \delta_i + \epsilon_{i,t} \tag{8}$$

All the variables in above-mentioned equations are defined in Table I. In addition, the Variable γ_t is a time dummy variable, δ_i is the firm's unobservable individual effects, and $\epsilon_{i,t}$ is the random disturbance.

control of unobservable heterogeneity (Altaf and Shah, 2018; Chancharat and Kumpamool, 2022; Hutomo *et al.*, 2022) ^[45, 9, 36]. Secondly, it provides more information, increases variability, efficiency, and reduces the likelihood of collinearity across variables (Hossin, 2020) ^[34]. In addition, Research on corporate finance reveals that the most pressing issues in finance concern the validity and

4.2 Estimation Approach: Panel data approach is used to test the aforementioned models since it first aids in the

reliability of conclusions generated from studies of financial connections. Therefore, a dynamic approach must examine a regression of firm profitability on working capital management.

As a consequence, we circumvent the endogeneity issue by using the instrumental variable estimating method. To avoid the endogeneity issue, this study particularly uses the two-step Generalised Method of Moments (GMM) estimator suggested by Arellano and Bond. E-Views 10 was used for the analysis for the current research project.

Empirical results

An initial descriptive statistical analysis of the data is performed. In addition to the arithmetic mean for each variable, Table 2 also includes the standard deviation, minimum and maximum values, and the total number of observations. This Research included all the manufacturing sector companies in the BSE over 10 years from 2012 to 2021. The dependent variables, namely Tobin's Q and ROCE has mean of 2.841 and 4.834 respectively than their standard deviation values which refers to the fact that there is less variability around the mean. The mean values of CCC, RCP, APP, ICP, DTR, ITR, CATA and WCTR are

106.405, 66.268, 56.230, 96.366, 11.512, 82.634, 0.485 and 0.524 respectively. Their standard deviation is 86.677, 51.689, 37.402, 70.392, 29.429, 428.922, 0.172 and 0.339 respectively over the sample period with minimum values of -175.933, 0.390, 0.000, 1.773, 0.556, 0.619, 0.036 and 0.025 and maximum values of 964.246, 645.055, 459.476, 1023.616, 935.415, 1125.330, 0.954 and 10.170 respectively indicate the range of the variables. For the firm size (FS), sales growth (SG), debt equity ratio (DER), current ratio (CR), cash flow (CF), leverage (LEV) and quick ratio (QR) and the mean values are 2.827, 0.060, 1.296, 1.317, 0.121, 0.801 and 0.711, their standard deviation of 0.847, 0.317, 6.117, 0.722, 0.072, 0.537 and 0.497 respectively, meaning that there is less variability around the mean. Regarding component of working capital management in Indian manufacturing companies, the mean value of the Receivable Collection Period (RCP) is approximately 66 days, the mean value of the Accounts Payable Period (APP) is approximately 56 days and the firms convert their inventory into cash in approximately 96 days. Thus, the Cash Conversion Cycle of the Indian manufacturing industry is 106 days (96+66-56).

Table 2: Descriptive Statistics

Variable	Mean	Median	Max.	Min.	SD	Obs.
Tobin's Q	2.841	8.493	14.980	0.978	6.844	2690
ROCE	4.834	4.536	93.972	-166.271	10.222	2690
CCC	106.405	93.586	964.246	-175.933	86.677	2690
RCP	66.268	56.143	645.055	0.390	51.689	2690
APP	56.230	48.912	459.476	0.000	37.402	2690
ICP	96.366	84.910	1023.616	1.773	70.392	2690
DTR	11.512	6.501	935.415	0.566	29.429	2690
ITR	82.634	20.592	11225.330	0.619	428.992	2690
CATA	0.485	0.478	0.954	0.036	0.172	2690
WCTR	0.524	0.476	10.170	0.025	0.339	2690
FS	2.827	2.757	5.988	1.175	0.847	2690
SG	0.060	0.050	11.285	-0.777	0.317	2690
DER	1.296	0.730	286.563	0.000	6.117	2690
CR	1.317	1.161	10.066	0.105	0.722	2690
CF	0.121	0.117	0.952	-0.168	0.072	2690
LEV	0.801	0.734	6.897	0.001	0.537	2690
QR	0.711	0.606	6.041	0.019	0.497	2690

Table 3: Pair-wise correlation coefficients

	Tobin's Q	ROCE	CCC	RCP	APP	ICP	DTR	ITR	CATA	WCTR	FS	SG	DER	CR	CF	LEV	QR
Tobin's Q	1.000																
ROCE	0.249	1.000															
CCC	-0.010	-0.086	1.000														
RCP	-0.064	-0.214	0.538	1.000													
APP	-0.002	-0.269	-0.006	0.458	1.000												
ICP	0.033	-0.092	0.833	0.171	0.188	1.000											
DTR	0.018	0.069	-0.173	-0.262	-0.089	-0.069	1.000										
ITR	-0.020	0.018	-0.055	0.038	-0.024	-0.109	-0.004	1.000									
CATA	-0.074	0.089	0.336	0.345	-0.002	0.159	-0.150	-0.072	1.000								
WCTR	0.004	-0.167	0.585	0.601	0.431	0.509	-0.152	-0.039	0.262	1.000							
FS	0.253	0.121	-0.098	-0.072	0.125	-0.001	0.084	-0.103	-0.318	0.045	1.000						
SG	0.036	0.185	-0.083	-0.150	-0.132	-0.062	0.047	-0.003	0.024	-0.111	0.020	1.000					
DER	-0.043	-0.110	-0.007	-0.023	-0.008	0.004	-0.004	-0.017	-0.056	-0.015	-0.008	0.010	1.000				
CR	0.092	0.237	0.278	0.153	-0.170	0.140	-0.059	-0.002	0.322	0.226	-0.127	-0.020	-0.112	1.000			
CF	0.224	0.689	-0.118	-0.202	-0.273	-0.141	0.057	0.036	0.075	-0.224	-0.025	0.168	-0.059	0.216	1.000		
LEV	-0.065	-0.158	0.093	-0.078	-0.211	0.060	-0.009	-0.013	-0.295	-0.048	-0.002	-0.003	0.115	0.007	-0.085	1.000	
QR	0.087	0.256	0.106	0.294	-0.087	-0.132	-0.106	0.039	0.295	0.206	-0.082	-0.003	-0.101	0.848	0.216	-0.070	1.000

The pair-wise correlation analysis is carried out to check the multi-collinearity problem in multiple correlations. The multi-collinearity arises when a high degree of correlation is found between the variables. According to the results of Table III, the multi-collinearity problem is found between ICP, CCC, and QR and CR because the positive high degrees of correlation in both cases are 0.833 and 0.848, respectively. Therefore, we have taken CCC and ICP in separate models and dropped QR in our further analysis because QR has a high correlation in the study. The correlation value of CCC, RCP and APP is negative with both ROCE and Tobin's Q. This implies that the increase in these values leads to decreased firm profitability and vice-versa. Whereas ICP also shares a negative correlation with ROCE but a positive correlation with Tobin's Q.

Two-step Generalized Methods of Moments

This section presents the estimated results of equation 1 to equation 8 obtained by the two-step GMM model proposed by Arellano and Bond. These results will help us to understand the impact of working capital management on a firm's profitability. This section is further divided into two subsections, the first section presents the impact of working Capital on Tobin's Q and the second section contains the results of Working Capital Management on ROCE.

The relationship between WCM and firm profitability taking Tobin's Q as a dependent Variable

Table IV presents the estimated result of equations 1, 2, 3 and 4 where Tobin's Q has been taken as a dependent Variable. The reason of estimating four equations for Tobin's Q is the multi-collinearity in the variable CCC and ICP. Therefore, all four equations have been estimated by taking each independent Variable in a separate model.

According to Table 4, the coefficient value of CCC in Equation 1 is implied to be positive and significant at a 1% level implying that one unit increase in the cash conversion cycle leads to 0.483 unit increases in profitability of firm in Tobin's Q. Therefore, by raising the CCC, the business can raise Tobin's Q. However, this expansion must stay within the optimum level's bounds, as continuing growth outside of these boundaries will result in a shortfall in net working capital, which is essential for sustaining operations and meeting client requests. In Equation 2, the coefficient of the inventory conversion period has positive and significant at a 1% level implies that one unit change in the inventory conversion period leads to 0.700 unit increases in Tobin's Q. Increasing the ICP's size will help businesses add value, boost performance, and boost profits by demonstrating to customers that they can reliably meet their needs at any time. This will help them avoid losing customers to competitors who are better able to meet their immediate demands. To prevent the companies from paying storage and obsolescence expenses, it must be considered that the increase in ICP must be within a fair and ideal level. In the case of Equation 3, the coefficient value of RCP is found to be negative and significant at a 1% level implying that one unit decrease in the receivable conversion period will lead to 0.282 unit decreases in firm profitability, which indicates that a decrease in the number of days collected from debtors would have a negative effect on Tobin's Q, whereas a decrease in RCP is an indicator of the company's ability to

collect money from customers and invest it in its operations, and thus the reduction in the company's need to finance its operations from external sources, thereby reducing the burden of external debt; and whereas this reduces the burden of external debt, it reflects negatively on the company's ability to achieve operating profits. Similarly, in case of Equation 4, the coefficient value of the average payable period is also found negative and significant at a 1% level implying that with one unit decrease in payable period time a firm profitability will decrease by -0.134, indicating that a reduction of the corporate APP will lead to an adverse change in Tobin's Q, it indicates that businesses defer payments to their creditors in order to use the available funds for their working capital needs. In order to reduce earnings, the corporation can use this extra cash to buy short-term assets. However, a protracted payback time may result in the acquisition of suitable suppliers; as a result, businesses should retain stronger bonds with their suppliers. The control variable in all the equations is CATA is found to be negative and significant in all these equations. In contrast, firm size is found to be positive and significant in all the equations implying that as the firm's size increase, the profitability also all increase. Moreover, the coefficient value of the current ratio and cash flow is positive in all equations which indicate that an increase in these variables also leads to increase in profitability while the coefficient value of leverage is found to be negative and significant in all equations implying that one unit change in leverage inversely affects the profitability.

All the models are estimated using the two-step GMM estimator to determine the relationship between working capital management and firm profitability and the results are presented in Table 4. The p-values for the m2 statistics presented in columns 1 to 4 serve as a test for the absence of autoregressive process serial correlation in the first difference residuals. The non-significance of these p-values for m2 statistics indicates that there is no second-order serial correlation. In addition, the results of the Sargan test are displayed in columns 1 to 4. The Sargan test measures the relationship between instruments and the error term. The non-significant results of the Sargan test indicate that there is no correlation between instruments and error terms.

The relationship between WCM and firm profitability taking ROCE as dependent Variable

Table 5 presents the estimated result of equations 5, 6, 7 and 8 where ROCE has been taken as a dependent Variable. The reason for estimating these four equations for ROCE is the multi-collinearity in the variable CCC and ICP. Therefore, all four equations have been estimated by taking each independent Variable in a separate model.

Table V presents the results of the component of working Capital on ROCE. Table V is divided in 4 parts, every part is represented by equation 5 to equation 8. The estimated coefficient on Equation 5 of CCC is positive and significant at the 1% level implying that one unit increase in the cash conversion cycle will lead to 0.480 unit increase in the profitability of the firm, while the coefficient of Equation 6 of ICP is a positive and significant level of 1% implies that one unit increase in inventory conversion period will leads to 0.923 unit increase in profitability of the firm.

Table 4: Estimates of Regression Equations 1 to 4 (Dependent Variable: Tobin's Q)

Variable	Eq. 1	Eq. 2	Eq. 3	Eq. 4
CCC	0.483(0.004)*			
ICP		0.700(0.003)*		
RCP			-0.282(0.001)*	
APP				-0.134(0.009)*
DTR	-0.087(0.823)	-0.193(0.615)	-0.233(0.552)	-0.170(0.660)
ITR	0.008(0.754)	0.016(0.550)	0.009(0.746)	0.006(0.821)
CATA	-277.371(0.001)*	-240.269(0.002)*	-208.764(0.010)*	-229.023(0.004)
WCTR	-6.740(0.874)	-13.569(0.755)	78.51(0.066)	63.322(0.120)
FS	188.773(0.000)*	187.369(0.000)*	186.287(0.000)*	186.85(0.000)*
SG	20.584(0.564)	18.286(0.607)	13.771(0.701)	16.334(0.648)
DER	-0.964(0.600)	-0.977(0.594)	-0.985(0.592)	-0.97(0.597)
CR	69.113(0.000)*	73.184(0.000)*	73.94(0.000)*	72.961(0.000)*
CF	1068.824(0.000)*	1077.639(0.000)*	1043.122(0.000)*	1050.886(0.000)*
LEV	-111.098(0.000)*	-105.723(0.000)*	-97.082(0.000)*	-99.268(0.000)*
Constant	-349.043(0.000)*	-384.376(0.000)*	-361.291(0.000)*	-354.856(0.000)*
Sargan Test	0.023	0.023	0.023	0.023
Wald(χ^2)	65.266 (0.000)*	47.205 (0.000)*	64.165 (0.000)*	54.940 (0.000)*
m ²	0.606	0.605	0.503	0.611

Notes: Values in the parenthesis are the P-values of respective coefficient and *, ** and *** indicates the significant p-value at 1%, 5% and 10% level respectively.

Table 5: Estimates of Regression Equations 5 to 8 (Dependent Variable: Return on Capital Employed)

Variable	Eq. 5	Eq. 6	Eq. 7	Eq. 8
CCC	0.480(0.001)*			
ICP		0.923(0.000)*		
RCP			0.220(0.000)*	
APP				0.460(0.000)*
DTR	0.006(0.187)	0.007(0.172)	0.012(0.015)**	0.009(0.067)***
ITR	0.000(0.792)	0.000(0.77)	0.000(0.729)	0.000(0.763)
CATA	1.243(0.216)	1.089(0.267)	-0.375(0.716)	1.899(0.065)***
WCTR	-1.276(0.016)**	-1.504(0.003)*	-3.225(0.000)*	-3.714(0.000)*
FS	1.07(0.000)*	1.079(0.000)*	1.084(0.000)*	0.946(0.000)*
SG	0.83(0.061)**	0.842(0.058)***	1.124(0.013)**	1.169(0.012)**
DER	-0.071(0.002)*	-0.071(0.002)*	-0.069(0.003)*	-0.068(0.004)*
CR	1.883(0.000)*	1.867(0.000)*	1.89(0.000)*	2.346(0.000)*
CF	83.469(0.000)*	83.508(0.000)*	85.008(0.000)*	86.931(0.000)*
LEV	-1.684(0.000)*	-1.728(0.000)*	-1.779(0.000)*	-1.075(0.000)*
Constant	-8.718(0.000)*	-8.679(0.000)*	-8.74(0.000)*	-11.692(0.000)*
Sargan Test	8.624	8.621	9.449	10.022
Wald χ^2	3.368 (0.066)	3.090 (0.079)	3.439 (0.064)	6.091(0.014)
m ²	0.816	0.834	0.769	0.788

Notes: Values in the parenthesis are the P-values of respective coefficient and *, ** and *** indicates the significant p-value at 1%, 5% and 10% level respectively.

Similarly, in Equation 7 the coefficient of the RCP is positive and significant at the level of 1% implying that one unit increase in the receivable collection period will lead to 0.220 unit increases in profitability of firm. The estimated coefficients on Equation 8 of APP positive and significant at the 1% level implies that one unit increase in the accounts payable period will lead to a 0.460 unit increase in the firm's profitability in ROCE. Further, in all four equations, WCTR is found to be negative and significant in all these equations. In contrast, firm size is positive and significant in all the equations, implying that as the firm's size increases, the profitability also increases. Moreover, the coefficient value of sale growth, current ratio and cash flow is positive in all equations which indicate that an increase in these variables also leads to an increase in profitability. In contrast, the coefficient value of debt to equity ratio and leverage is negative and significant in all equations, implying that one unit change in leverage inversely affects profitability. The p-values for the m² statistics depicted in columns 5 to 8 of Table 5 serve as a test for the lack of autoregressive

process serial correlation in the first difference residuals. The non-significance of these p-values for m² statistics indicates that there is no second-order serial correlation. The Sargan test is the test for correlation between instruments and error terms, and its results are presented in columns 5 to 8. The non-significant results of the Sargan test indicate that there is no correlation between instruments and the error term.

5. Conclusion

This study aims to examine the connection between the effectiveness of a company's working Capital and its profitability in a sample of 269 manufacturing companies in India. Concerning the relationship between working capital efficiency and company profitability, the empirical data supports the quadratic specification over other estimating methods. In the case of Tobin's Q, the coefficient of CCC and ICP is positive and significant, whereas the coefficient of RCP and APP is negatively related to Tobin's Q. In the case of ROCE, the coefficient of CCC, ICP, RCP and APP

is positive and has a significant relation with the Return on Capital Employed. Because working capital is crucial to a company's profitability and performance, managers need to understand how to manage it. The COVID-19 crisis-related shortages of liquidity and credit limits have made good management of working capital components vital. The ideal working capital management will supply the liquidity necessary to finance the company's activities through automatic financing.

6. Practical Implication

In conclusion, this study emphasizes the significance of effective WCM in facilitating a company's cost-benefit analysis of working capital investments. There are management implications arising from our Research. This Research indicates that a company can maximize its earnings by finishing its CCC in an average of 48 days. Given the conflicting assumptions regarding the effect of WCM on company profitability, future Research must examine the quadratic specification.

7. Managerial implications

The current study identifies crucial managerial implications for the manufacturing sector and its subsector industries engaged in export activities. This circumstance also depends on the firm's debt level, profitability, assets, and productivity, as explained in this paper. Therefore, policymakers responsible for short-term financial decisions must develop working capital management plans based on these crucial elements. In addition, financial managers and policymakers must conduct a comprehensive evaluation before designing working capital rules such as payment and collection policies. The findings of the present study demonstrate that increasing the CCC or inventory days improves the sales and profitability of businesses. Hence, CCC components like receivable days, inventory days, and payable days must be addressed separately and optimally. Generally, companies must prioritize speeding cash collections and deferring payments. Nonetheless, organizations must have enough supervision and competent guidance. Experts in their respective sectors of finance must be recruited to provide thoughtful guidance that could improve WCM efficiency.

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