“Does management of working capital enhance firm value? Empirical analysis of manufacturing enterprises in India”

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DOES MANAGEMENT OF WORKING CAPITAL ENHANCE FIRM VALUE? EMPIRICAL ANALYSIS OF MANUFACTURING ENTERPRISES IN INDIA

Abstract

The long-term financial health of a corporation is assessed by its capacity to meet short-term financial commitments. Optimum working capital that maximizes enterprise value varies across companies. The purpose of this paper is to investigate whether Indian manufacturing enterprises' firm values are influenced by working capital management efficiency. The data are taken from 2016 to 2022 (a seven-year period) for 223 top BSE-listed manufacturing companies. Firm value (explained variable) is proxied using Tobin's Q, and the constituents of working capital, which include the net trade cycle, inventory period, debtors' collection period, and creditor payment period, are taken as explanatory variables. The study also controls for any differences in firm characteristics and economic conditions by employing firm size, age, current ratio, net profit ratio, sale growth and GDP growth rate. Balanced-panel data analysis is conducted by employing a two-step generalized method of moment technique. Net trade cycle, inventory period and debtors' collection period are found to have a strong and significant positive impact on Tobin's Q. The findings however did not report any evidence of the significant relationship between creditor payment period and Tobin's Q. Additionally, the outcomes also evidenced that firm value is positively impacted by company size, net profit ratio, sales growth and GDP, whereas negatively affected by firm age. This paper suggests that manufacturing firms may potentially enhance their firm value by prolonging the net trade cycle, period of inventory and lengthening the credit period to customers till the level of attainment of an optimum working capital.

Keywords working capital, firm value, panel data, GMM estimator, India

JEL Classification C33, G31, G32

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INTRODUCTION

All the financial decisions taken by corporations are centered towards increasing the performance and value of shareholders that is being depicted in the stock market price. Working capital management (WCM), as highlighted by Sharma and Kumar (2011), is an essential corporate finance theory that addresses funding of investment in current assets. Working capital is essential to meet operational expenses and support sales growth and expansion efforts. It represents the excess of short-term assets over short-term liabilities. Expressed differently, the part of long-term capital used for investment into current assets is called net-working capital.

Managerial effectiveness can improvise WCM efficiency (Prasad et al., 2019). On the one hand, a corporation needs sufficient liquidity to guarantee payment of its short-term debts and maintain a steady flow of revenue from profitable ventures (Abuzayed, 2012). Concentrating solely on liquidity, on the other hand, diminishes a firm's profitability

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(Smith, 1980). Efficient WCM involves making important financial decisions to allow the companies to cover its operation-related expenses and other short-term financial obligations as they occur and ensuring that funds are not blocked in current assets thereby balancing profitability with liquidity (Shin & Soenen, 1998).

As pointed out by Smith and Gallinger (1988), WCM addresses the difficulties linked to effective administration of short-term nature assets, namely, cash, debtors, and inventory and short-term liabilities like creditors and focuses on issues that arise in balancing these elements. WCM policies varying from stringent to liberal may have opposing effects on the financial liquidity and profitability of corporations. A liberal inventory policy may increase the carrying cost, whereas a stringent inventory policy would increase the ordering cost besides leading to stock-out situations. Likewise, a liberal credit policy towards customers may result in a boost in sales and hence increase profits, besides; it may lead to a larger amount of bad debts and affect earnings quality. Greater liquidity in the form of cash can save short-term financing cost but at the same time might compromise on long-term profitable and value creating investments, which ultimately hampers the adequate returns to shareholders. Moreover, delayed payment to suppliers may allow the cash to be used for financing other operational expenses hence saving on short-term financing costs; conversely, it could turn out to be expensive as the possible cash discounts would be lost.

Lazaridis and Tryfonidis (2006) suggest that WCM inefficiency could lead to failures of start-ups and corporate organizations. As a result, financial managers address this conundrum by maintaining optimal amounts of working capital and its various components (Nazir & Afza, 2009).

As per Sartoris and Hill (198), regardless of the significance of interrelationships between different working capital constituents, empirical literatures on the plausible effect on corporate performance by WCM constituents (Kim & Chung, 1990; Schiff & Lieber, 1974) are few particularly in developing economies like India. Moreover, two opposing conceptions have been witnessed in research over the years on the degree of capital allocation in working capital. One perspective suggests that maintaining higher levels of working capital can assist businesses in expanding sales and obtaining increased discounts for early payments, thereby potentially raising the value of firms. Trade credit leads to an increase in sales and better customer relationships. Maintaining higher levels of inventory shall ensure regular stock supply, avoid stock out situations besides securing against price fluctuations. Besides, short-term sources for financing working capital can offer lower interest rates and are not exposed to the risk of inflation (Mahmood et al., 2019). Conversely, higher levels of working capital necessitate additional financing, thereby incurring extra financing costs in the form of additional financial burden and elevating their risk of financial distress (Kieschnick et al., 2011, Aktas et al., 2015; Chang, 2018).

1. LITERATURE REVIEW AND HYPOTHESES

Working capital management has three main aspects. First being the positioning perspective that is generated from the current ratio analysis using balance sheet figures. According to Richards and Laughlin (1980), the second dimension is assessed on operational cycle efficiency, quantified by using Cash Conversion Cycle (CCC). Third, being comparison of long-term financing to short-term financing, highlighting the key distinctions between the two. WCM is crucial to a firm's value and performance (Smith & Begemann, 1997; Smith, 1980). As mentioned in Ernst and Young's (2018) report on WCM, Indian corporate firms have longer CCC as compared to their peers across the globe. Previous research has employed various proxies to assess firm performance and value, including ROCE, Gross Operating Profit, Operating Income, Net Operating Profit, ROE, ROA, and TQ (Prasad et al., 2019). These measurements help assess a company's financial performance and market value. WCM efficiency has been often quantified by NTC or CCC, which is the operational period when money is unavailable. Soenen (1993)

found a negative correlation between NTC and return on investment in US enterprises. Jose et al. (1996) identified a significant negative correlation between CCC and profitability across a wide array of American businesses. Additionally, their research highlighted that a more aggressive approach to WCM results in increased profitability. Moreover, Shin and Soensen (1998) using data of 58,985 US companies found that NTC negatively affected firm profitability. As per Aktas et al. (2015), the 30-year study examined US corporate profitability and WCM and found working capital levels that maximize firm value. Deloof (2003) conducted a study on 1,009 European firms and identified a strong inverse correlation between profitability and CCC. Akgun et al. (2020), using panel data analysis, found gross working capital being inversely correlated with corporate performance for EU-listed enterprises. Lazaridis and Tryfonidis (2006) found similar results for 131 Greek firms. The studies by Vural et al (2012) and Oner (2016) employing panel data analysis consistently revealed a negative impact of WCM on corporate profitability. However, a contradictory finding was observed in firms listed on the Cyrus Stock Exchange, where more profitable firms demonstrated a preference for a longer cash conversion cycle. Samiloglu and Akgun (2016) examined businesses in Istanbul and discovered a favorable correlation between company profitability and CCC. Similarly, Gill et al. (2010) found CCC to have positive impact on profitability and value respectively. According to Kachlami and Yazdanfar (2016), firms with higher profitability tend to place less emphasis towards WCM and have a longer CCC.

WCM frequently affects business profitability in emerging Asian countries. Vijaykumaran (2019) studied Chinese listed firms and discovered that firm value experiences a negative impact from NTC, particularly due to the extended accounts receivable period and inventory conversion period. Inventory levels, CCC, and NTC were negatively correlated with company performance in 21 Pakistani non-financial enterprises listed on the KSE-30 index (Azam & Haider, 2011). Raheman et al. (2010) show an inverse association between profitability and CCC on panel data of 208 firms listed on Karachi Stock Exchange. Similar results reported by Dong and Su (2010) wherein gross working capital and CCC exhibit a strong negative impact on the profitability of firms listed on Vietnam Stock Exchange. Yazdanfar and Ohman (2014) showed that the reducing the length of CCC increases Swedish SMEs profitability. The research emphasized that higher level of investment in working capital increases the cost of working capital maintenance and thereby reduces profitability. Mohammad (2011) found a significant negative impact of CCC particularly the inventory cycle and accounts receivable cycle on the profitability of 1,063 companies listed on the Tehran Stock exchange, indicating that companies can create value for their shareholders by decreasing accounts receivable and inventory. Shaista (2015), using an Ordinary Least Square (OLS) technique reported that the financial constraints faced firms influence relationship between working capital efficiency and market value of Malaysian firms. According to Shaista (2015), working capital efficiency has a noteworthy positive impact on firm value for financially constrained firms but does not appear to significantly influence firm value for unconstrained firms. Tripathi and Ahmad (2016) found the working capital policy with the reduced firm's CCC could increase profitability of firms in India. Altaf (2020) using a generalized method of moment technique for 185 Indian hospitality firms and Altaf and Shah (2018) for 437 non-financial Indian firms found an inverted U-shaped relation between WCM and firm profitability. Lazarus et al. (2021) examined 31 NSE-listed metal and mining firms from 2010 to 2019 using a fixed effects model and reported that IP and DCP had an inverse effect on ROA, ROE, and ROCE. In contradiction to the above studies, Malik and Bhukari (2014) demonstrated CCC having substantial positive impact on ROA for Pakistani firms. Ilakkiaa and Chakraborty (2017) investigated the correlation among firm performance and CCC in the Indian industrial sector and found that manufacturing firms typically have high volumes of cash on hand and demonstrate low cash utilization. Sharma and Kumar (2011) studied the influence of WCM on Indian firm profitability and found positive correlation. Additionally, the cash conversion cycle associated with working capital was found to further enhance firm profitability. Abuzayed (2012) studies a sample of Jordan firms from 2000 to 2008 and reported that CCC positively affects profitability. The findings suggest that more profitable

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firms show less inclination towards actively managing their working capital. Moreover, in emerging markets, financial markets seem to have not penalized managers for inefficient working capital management practices. Anton and Nucu (2020) showed empirical evidence of inverted U-shaped relationship between WCM and financial performance of 719 Polish firms between 2007 and 2016.

Erasmus (2010) also shows mixed results for less developed economies like Africa where companies lack accessible finance options and suggested that profitability of firms can be improved by reducing the quantum of fund allocation in net working capital. Ogundipe et al. (2012), Mathuva (2010), and Falope and Ajilore (2009) show that the profitability of a firm can be improved with efficient WCM. Udenwa et al. (2020) reported a significant negative effect of CCC on market value of food and beverages manufacturing firms in Nigeria. Ademoia and Kemisola (2014), however, found a positive relationship between WCM and market value of food and beverages manufacturing firms in Nigeria and suggested that more efforts should be directed towards aggressive financing policy to boost sales and in turn increase profitability. According to Gachira et al. (2014), firm profitability was found to have a favorable correlation with WCM in Africa (Marobhe, 2014; Azeez et al., 2016). Ansary and Gazzar (2011) estimated that companies listed on the Amman Stock Exchange benefit from longer CCC; however, it has an impact on business value that is unfavorable. According to Mohamed and Saad (2010) and Ogundipe et al. (2012), prior empirical studies have also found that CCC length positively affects value. Vural et al. (2012), however, contradictorily reported an adverse association between CCC length and market value of Turkish firms. Bilgin and Turan (2023) investigated 317 publicly traded Turkish companies and postulated that long cash conversion and large amount of net-working capital are not considered negative signals by investors if accompanied by sufficient cash holdings thereby implying that cash management can help in reducing the negative impact of WCM investments on firm value. Ceylan (2021), using a sample of 28 SME listed in BIST industrial index from 2010 to 2019, showed a significant positive link between CCC and profitability. Banos et al. (2014) evidenced a non-linear relation between firm value and WCM.

Based on review of previous empirical research, many studies have consistently demonstrated a negative effect of WCM on both firm performance and value. Negative association reveals that better performing companies need a lesser amount of working capital, which is being reflected in shorter NTC and CCC. A shorter CCC or NTC means that many of the firms' operational funding requirements are met from funds generated from operations and hence firms do not need huge amounts of working capital. This implies that more funds are available for investments in long-term profitable investments or distribution of dividends, which would favorably impact the financial performance and value. Outcomes from earlier studies also postulate a positive association between NTC and CCC and company profitability, arguing that more successful businesses tend to place less emphasis on effective working capital management, which results in longer NTC and CCC.

This paper aims to investigate how components of WCM affect the firm value in the developing economy of India.

Based on previous studies, four hypotheses have been developed:

H1: WCM efficiency measured through Net Trade Cycle significantly impacts firm value measured through Tobin's Q for Indian listed manufacturing firms.

H2: Inventory management efficiency measured through Inventory Period significantly impacts firm value measured through Tobin's Q for Indian listed manufacturing firms.

H3: Accounts receivable management efficiency measured through Debtors' Collection period significantly impacts firm value measured through Tobin's Q for Indian listed manufacturing firms.

H4: Accounts payables management efficiency measured through Creditor Payment Period significantly impacts firm value measured through Tobin's Q for Indian listed manufacturing firms.

2. METHODS

This study investigates whether WCM components have an influence on the firm value of top BSE-indexed Indian manufacturing organizations. The CMIE (Centre for Monitoring the Indian Economy) Prowess database is used as a source for the financial data from 2016 to 2022. The analysis removed firms with any missing data during the study period. The ultimate sample encompasses 223 distinct firms constituting 1561 firm-year observations.

Tobin's Q (TQ), taken as an explained variable, is used as a measure of firm value. Following Moussa (2018), Wu (2011), Florakis et al. (2009), and Agrawal and Knoeber (1996), TQ is derived using a number of different metrics, including the market value of equity, the book value of debt, and the book value of assets divided by the latter two. Tobin's Q effectively addresses and overcomes the limitations of an accounting-based measure of profitability. Following Shin and Soensen (1998), WCM efficiency (explanatory variable) has been measured through the period of Net Trade Cycle (NTC) which is determined by summing up IP, DCP and CPP. Further each individual component of working capital i.e., IP, DCP and CPP has also been used as explanatory variables to comprehend and explain their individual effect on the firm's value.

Besides, a group of control variables were also employed to account for variations in company characteristics. Following Samiloglu and Demirgunes (2008), firm size (SIZE) has been measured through logarithm of total assets. Since the performance of an enterprise is impacted by its stage of the life cycle in which it operates, aging of firms (AGE) has been controlled in the analysis. Debt-equity ratio is proxied to cover leverage (LEV). Percentage change in revenue from year to year measures a firm's growth (GROW). Current ratio (CR) is used to measure liquidity. The profitability of a company is ascertained by net profit ratio (NPR). Year-on-year growth rate in GDP (GDP) is taken as an exogenous variable to account for the macroeconomic effect.

Panel data regression techniques have been applied to estimate the models. Baltagi (2005) highlights numerous advantages offered by panel data, including substantial volume of data observations; reduced collinearity among exogenous variables; increased degrees of freedom and enhanced monitoring for individual heterogeneity. Before estimating the models, diagnostics tests have been performed to check for and minimize any biases in the estimated values. Pooled Ordinary Least Square (OLS) method has been applied for diagnostic testing to ascertain any evidence of multicollinearity, heteroskedasticity and endogeneity. Variance Inflation Factor (VIF) assessing the presence of multicollinearity is presented in Table 2.

All the independent variables' VIF values were found to be below 1.54, indicating that the model is not affected by multicollinearity. Presence on unit root was checked through the Levin-Lin-Chu test. The data was found to be stationary since the null hypotheses were rejected for all variables. The White test has been used to determine whether heteroskedasticity is present. The null hypothesis stands rejected which confirms that the data

Table 1. Explained, explanatory and control variables

S. No.	Measure	Variable	Formula
1	Tobin's Q (TQ)	Explained	(Market Value of Equity + Book Value of Debt)/ Book Value of Total Assets
2	NTC	Explanatory	Inventory Period (IP) + Debtors Collection Period (DCP) – Creditors Payment Period (CPP)
3	IP	Explanatory	(Stock of goods * 360)/ Cost of Goods Sold
4	DCP	Explanatory	(Debtors*360)/ Credit Sales
5	CPP	Explanatory	(Creditors *360)/ Credit Purchases
6	SIZE	Control	Logarithm of Total Assets
7	AGE	Control	Number of Years since Incorporation
8	CR	Control	Current Assets/ Current Liabilities
9	NPR	Control	Net Profit after tax as percentage of total revenue
10	LEV	Control	Long-Term Borrowings/ Total Equity
11	GROW	Control	Year on Year Percentage change in revenue
12	GDP	Control	Year-on-Year percentage change in GDP

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Table 2. Variance inflation factor

Exogenous Variables	Dependent Variable: Tobin's Q (Variance Inflation Factors)			
	1	2	3	4
NTC	1.130243	–	–	–
IP	–	1.075930	–	–
DCP	–	–	1.266212	–
CPP	–	–	–	1.185656
SIZE	1.134455	1.128750	1.120936	1.112367
AGE	1.066531	1.096173	1.063456	1.058305
CR	1.188451	1.166224	1.175590	1.168630
NPR	1.362106	1.301873	1.541992	1.346538
LEV	1.188942	1.160089	1.167764	1.206976
GROW	1.05601	1.054492	1.059286	1.053918
GDP	1.005353	1.006951	1.005380	1.009881

exhibits heteroskedasticity. According to Bano et al. (2014) and Moussa (2018), the possibility of WCM being influenced simultaneously by corporate performance and firm characteristics raises the likelihood of endogeneity in the data set. To investigate the endogeneity issue, the Durbin-Wu-Hausman test was executed, and variables were found to be endogenous. Under the assumptions of stringent exogeneity, unobserved heterogeneity may be controlled by the Fixed Effects estimation technique. Strict exogeneity implies that any alterations in a firm's past and present values do not influence the firm's current independent variables (Schultz et al., 2010) However, in practice, this fixed exogeneity assumption is broken because a firm's past values do influence the present and future values. Gujarati (1999) treats time-invariant error as fixed effects. Being a static panel model, a fixed effects technique does not allow a model to incorporate lagged dependent variables as independent variables (Wooldridge, 2012). To address the presence of endogeneity and heteroskedasticity, a two-step GMM technique is employed with white cross-sectional robust covariance matrices (Arellano & Bond, 1991; Blundell & Bond, 1992). GMM technique gives consistent results in the presence of dynamic endogeneity, unobserved heterogeneity, and simultaneity in panel models (Wintoki et al., 2012). All independent variables with lag value up to one place are used as instruments for analysis. To further test the accuracy of GMM estimators, study checks for over-identifying restrictions by applying Sargan Statistics. Moreover, the Arellano-Bond test is applied to check for second order serial correlation. For any dynamic panel model, Roodman (2009) suggests the use of Arellano-Bond test (AR(2)) statistics which is suggested to be insignificant by scholars. Models 1, 2, 3 and 4 estimate the effect of NTC, IP, DCP and CPP respectively on TQ. The estimated two-step GMM models are as follows:

$$TQ_{it} = \alpha + \beta_1 TQ_{i,t-1} + \beta_2 NTC_{it} + \\ + \beta_3 SIZE_{it} + \beta_4 AGE_{it} + \beta_5 CR_{it} + \beta_6 NPR_{it} + \\ + \beta_7 LEV_{it} + \beta_8 GROW_{it} + \beta_9 GDP_{it} + \mu_{it}, \quad (1)$$

$$TQ_{it} = \alpha + \beta_1 TQ_{i,t-1} + \beta_2 IP_{it} + \beta_3 SIZE_{it} + \\ + \beta_4 AGE_{it} + \beta_5 CR_{it} + \beta_6 NPR_{it} + \\ + \beta_7 LEV_{it} + \beta_8 GROW_{it} + \beta_9 GDP_{it} + \mu_{it}, \quad (2)$$

$$TQ_{it} = \alpha + \beta_1 TQ_{i,t-1} + \beta_2 DCP_{it} + \beta_3 SIZE_{it} + \\ + \beta_4 AGE_{it} + \beta_5 CR_{it} + \beta_6 NPR_{it} + \\ + \beta_7 LEV_{it} + \beta_8 GROW_{it} + \beta_9 GDP_{it} + \mu_{it}, \quad (3)$$

$$TQ_{it} = \alpha + \beta_1 TQ_{i,t-1} + \beta_2 CPP_{it} + \beta_3 SIZE_{it} + \\ + \beta_4 AGE_{it} + \beta_5 CR_{it} + \beta_6 NPR_{it} + \\ + \beta_7 LEV_{it} + \beta_8 GROW_{it} + \beta_9 GDP_{it} + \mu_{it}. \quad (4)$$

Where models 1, 2, 3 and 4 test hypotheses 1, 2, 3 and 4, respectively.

3. RESULTS

Table 3 presents descriptive statistics. The composite sample of 223 firms across a 7 year-period makes an aggregate of 1,561 firm-year observations.

The calculated average value of TQ is 3.32192, and lowermost value is 0.044672, and the uppermost

Table 3. Calculated descriptive statistics

	Average	Median	Maximum	Minimum	Standard Deviation
TQ	20.45784	9.862752	473.2022	0.079261	35.47426
NTC	95.07006	79.05	1244.89	–351.97	107.1395
IP	122.2077	101.39	808.45	1.61	83.84558
DCP	57.53129	46.5	1304.56	0.02	65.45237
CPP	84.66888	74.88	680.64	4.53	53.49482
SIZE	4.575191	4.509533	6.789427	2.975799	0.576062
AGE	46.52915	40	124	1	22.04693
CR	1.758142	1.44	25.56	0.1	1.374915
NPR	7.911947	8.230000	45.76000	–336.04000	17.37175
LEV	0.568312	0.17	120.49	0	3.480961
GROW	0.070407	0.062105	3.189222	–0.956059	0.226248
GDP	3.134286	–0.260000	37.31000	–12.01000	14.52717

value is 25.02753, SD is 3.215053. NTC having a mean of 95.07 days ranges 0.079 days to 1244.89 days, with SD of 107.14 days. Mean IP is 122 days with minimum range to maximum range of 1.61 days to 808 days, with SD 83.84 days. In the same way, the average DCP is 57.5 days ranging from 0.02 days to 1304 days having a deviation of 65 days. The average CPP is 84.66 days ranging from 4.53 days to 680.64 days, having a deviation of 53.49 days.

The study employed Pearson's correlation coefficient to assess intensity of the linear relationship between explained, explanatory and control variables. Appendix 1 presents correlation matrix. TQ is positively correlated with NTC (at 1%). Additionally, TQ is also significantly positively related with IP, DCP and CPP. Further firm size, working capital ratio, net profit margin, and GDP growth rate show a significant positive relation with TQ. A firm's age and leverage are found to be negatively correlated with TQ but the relationship is insignificant.

Other independent variables do not have strong linear relationships with one another; the correlation coefficients for their relationships are below 0.40. The correlation coefficient between NTC and IP is 0.77, confirming a significant positive association. Likewise, the positive association between NTC and DCP is 0.56, also statistically significant and positive. Conversely, the association coefficient between NTC and CPP is –0.1039, which is statistically significant but negative, supports working capital theory. This will not create a multicollinearity problem as these variables do not appear together in one model.

The empirical findings of 2-Step Generalized Methods of Moments (white cross section robust covariance matrices) studying the impact of WCM components respectively on TQ are shown in Table 4. Using the Arellano-Bond test, no serial order correlation was found. Sargan statistics further confirm the validity of instruments used. Thus, the requirements of GMM were satisfied. The coefficients of lagged TQ_{1-t} show a statistically significant (at 1% level) negative connection with the current TQ for all four models. At a 5% significance level, NTC exhibits a favorable impact on TQ. The study therefore accepts H1. The findings align with the previous studies executed by Sharma and Kumar (2011) and Moussa (2018). This means that the stock market investors tend to assign higher value on firms having longer NTC since those firms have potential to create higher returns on their investments. The research findings are, however, contradictory to the previous study conducted in India by Sawarni et al. (2021) where an inverse relationship is reported between NTC or CCC and firm value.

Model 1 was re-estimated using other WCM components, i.e., IP, DCP and CPP (model 2, 3 and 4, respectively), to determine the robustness of the findings (see Table 4). The study uses GMM estimators to re-estimate models 2, 3 and 4. P-value of Sargan statistics further supports the reliability of GMM estimators, indicating validity of instruments used. Results from the applied Arellano-Bond test found no problem of serial correlation. The IP positively affected TQ at the 1% significance level, which postulates that a higher inventory period increases company value. The empirical outcomes also reveal a positive influence of DCP on

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Table 4. Results of two-step GMM regression

Explanatory Variables	Explained Variable : TQ			
	1	2	3	4
TQ(–1)	–0.583713	0.471524	–0.521449	–0.486507
	(–3.05453)***	(–3.91800)***	(–3.80301)***	(–3.41341)***
NTC	0.143517 (2.59490)***	–	–	–
IP	–	0.206675	–	–
		(2.34835)***		
DCP	–	–	0.263812	–
			(4.09614)***	
CPP	–	–	–	0.071211
				(0.27539)
Size	220.1875	170.6684	208.1110	157.3715
	(3.61748)***	(5.89964)***	(4.48964)***	(4.15894)***
AGE	–3.987631	–3.487809	–4.346770	–2.947970
	(–2.66215)***	(–3.87105)***	(–3.49159)***	(–2.81152)***
CR	1.838673	0.146048	0.727385	0.003928
	(0.83972)	(0.11414)	(0.35887)	(0.00259)
NPM	0.491791***	0.213125***	0.997499	0.297302
	(2.51495)	(2.24025)	(4.23445)***	(1.97998)**
LEV	14.25833	8.7546380	4.294670	9.654775
	(1.58457)	(1.50518)	(0.61256)	(0.86145)
GROW	13.71472	11.50686	13.07420	9.677553
	(2.63022)***	(2.787428)***	(2.700091)***	(2.609907)***
GDP	0.227530***	0.179932***	0.266335***	0.188989***
	(4.70779)	(5.229669)	(4.924286)	(4.555525)
No. of Observations	1115	1115	1115	1115
Instrument Rank	25	25	25	25
Sargan Test (P Value)	15.09556	18.31022	17.60799	19.01897
	(0.517651)	(0.306047)	(0.347346)	(0.267681)
Arellano Bond Test (P Value)	(0.9687)	(0.7148)	(0.3658)	(0.6234)

Note: T-values are in parentheses, *** significant at 5%, ** significant at 1%.

firm value at the 1% significance level. This can be postulated that the longer the debtor collection period, the higher the TQ. The findings are in line with Agmas (2021) and Shaikh (2021). The findings of this study, however, contradict earlier research conducted in India (Sawarni et al., 2021; Shrivastava et al., 2017) reporting a negative relationship of both IP and DCP with that of firm value and profitability. The results of this study also contradict with the previous studies by Chen and Kieschnick (2018), Lazaridis and Tryfonidis (2006), Raheman and Nasr (2007), Enqvist et al. (2014), and Nuru (2011) who concluded that there is a negative correlation between the performance of firms and the receivables collection period. This study therefore accepts H2 and H3. However, CPP and firm value are not found to be significantly related. Hence, H4 is rejected.

Moreover, amongst the control variables, NPR, growth in sales and GDP exhibit a significant favorable impact (at the 1% level) on TQ for all four models. Similar results have been found in previous papers (Rizqia & Sumiati, 2013; Aggrawal & Padhan, 2017; Dang et al., 2019), showing that better profitability and growth in sales result in greater firm value. Firm size is strongly and positively associated with the TQ confirming the earlier outcomes of Anton (2016), Aggrawal and Padhan (2017), and Samourna and Romavati (2020). Moreover, the outcomes indicate a notable and adverse impact of a company's age on TQ across all models. CR and leverage of a firm, however, are not found to be significantly related with firm value.

4. DISCUSSION

The empirical findings present a significant positive influence of NTC on firm value, indicating that investors, in the emerging market of India, value firms with longer NTC. This finding is similar to those of Abuzayed (2012) and Moussa (2018).

A possible explanation to this relationship can be attributed to the fact that in less developed economies, financial markets are not developed and hence fail to penalize managers for inefficient working capital management. IP and DCP are found to positively significantly influence firm value. This implies that having a lengthier net trade cycle by having a longer inventory period and providing extended credit period to customers contribute to increase the value of Indian manufacturing companies. Having a larger inventory period increases the earnings by lowering the ordering cost, reducing possibilities of stock-out situations and that larger inventory does not necessarily imply reduction in sales. Moreover, extended credit period to customers helps achieve larger sales and thereby improving the profitability and company's market value. Due to the superiority of products and services offered by foreign companies compared to those of Indian companies, the latter are compelled to provide extended credit terms to maintain their presence in the market and effectively counter the competition (Sharma & Kumar, 2011). The finding is in line with Moussa (2018) and Sharma and Kumar (2011) but contradictory to the other previous studies conducted in India by Shrivastava et al. (2017) and Swarani et al. (2021). Also, the findings show no evidence of the significant impact of credit period from suppliers on firm value.

With respect to the impact of control variables on firm value, growth in sales is found to exhibit a positive effect on firm value, which reflects that an increase in growth opportunities contributes to better market value of companies. Similar results are shown by Bhatia and Srivastava (2016) and Moussa (2018). GDP growth rate having a positive association with firm value can be understood by the fact that with fall in GDP levels, companies typically have low market value, and vice versa. Besides, the study also confirms that a company's market value increases with the increase in its profitability. According to Endri and Fathony (2020), companies with high profitability attract more investment from investors in a company's share thereby increasing firm value. Additionally, GMM estimates indicate that the enterprise value is positively and significantly influenced by its size, reflecting that larger firms with better working capital management tend to maximize value for their shareholders (Hirdinis, 2019; Anton, 2016; Aggrawal & Padhan, 2017). Companies with substantial total assets are deemed to possess favorable outlooks and the capacity to generate profits, distinguishing them from enterprises with lesser total assets hence better valued by the investors. The findings are similar to those of Deloof (2003) and Mathuva (2010). Moussa (2018), Gupta (2018) and Gupta (2017), however, found a negative relationship between firm size and firm value. The study further reveals an inverse relationship between the age of firms and Tobin's Q. This means that older firms tend to perform less as compared to younger firms. Even though age could mean gaining more experience, this is a characteristic of the disadvantage that comes with passage of time. Age in this way is interpreted as obsolescence, which Drucker (1987) argues is regenerative and endangers sustainable development. The idea of the organizational life cycle is therefore associated with the age of a firm (Cole, 2002).

CONCLUSION

This study examines the effect of working capital efficiency on firm value of Indian manufacturing firms listed in S&P BSE 500 Index. The study developed four models to explore the impact of the working capital efficiency components, i.e. net trade cycle, period of inventory, debtors' collection period and creditor payment period each, on firm value measured through Tobin's Q. Hypotheses 1, 2, 3 and 4 state that net trade cycle, inventory period, debtors' collection period and creditor payment period, respectively, have a significant impact on Tobin's Q (each hypothesis corresponding to model 1, 2, 3 and 4, respectively). Data for the seven-year period from 2016 to 2022 were collected for 223 firms. The study utilized a two-step GMM estimator to analyze a balanced panel data set comprising 1,561 firm-year observations. The model also controlled for firm specific characteristics and economic conditions by using firm age, firm size, current ratio, net profit margin, leverage, growth in sales and GDP growth rate as control variables. The outcomes of the regression analysis confirm a significant positive effect of net trade cycle,

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period of inventory and debtors' collection period on Tobin's Q. Therefore, the study accepts hypotheses 1, 2 and 3. The study, however, found no significant correlation between creditor payment schedule and firm value, and hence hypothesis 4 is rejected. Besides, firm value is positively impacted by an increase in size, net profit margin, growth in sales and growth in GDP and negatively influenced by firm age.

The empirical analysis reveals that manufacturing firms in India can enhance their enterprise value by extending the net trade cycle, implementing a strategy that involves maintaining elevated inventory levels and extending credit period to customers. The results of this study are inconsistent with previously conducted studies in India and in other countries that report a negative relationship between working capital efficiency and firm value. It is therefore suggested to make further investigations by future researchers by conducting comparative studies across countries besides longitudinal and cross-section research. The current study only controlled for firm specific and economic factors. Future studies can extend the research by controlling for financial constraints and corporate governance mechanisms. The reported results can be helpful to managers in maintaining the optimum level of raw materials and inventory, devising appropriate credit policies, and maintaining optimum net trade cycle.

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APPENDIX A

Table A1. Pearson correlation coefficient

	TQ	NTC	IP	ARP	APP	SIZE	AGE	CR	NPM	LEV	GROWTH	GDP
TQ	1											
	–											
NTC	0.16918**	1										
	0.0000	–										
IP	0.11158**	0.7726**	1									
	0.0000	0.0000	–									
ARP	0.08702***	0.56276**	0.16785**	1								
	0.0006	0.0000	0.0000	–								
APP	0.05747*	–0.10329**	0.22537**	0.35941**	1							
	0.0231	0.0000	0.0000	0.0000	–							
SIZE	0.06780**	–0.15810**	–0.1002**	–0.1155**	0.01816	1.00000						
	0.0074	0.0000	0.0001	0.0000	0.4733	–						
AGE	–0.01610	0.06375*	0.16622**	–0.0948**	0.01680	0.19796**	1.00000					
	0.525	0.0118	0.0000	0.0002	0.5071	0.0000	–					
CR	0.13028**	0.13070**	0.05782*	0.01607	–0.15147**	–0.25165**	–0.04040	1.0000				
	0.0000	0.0000	0.0223	0.5256	0.0000	0.0000	0.1106	–				
NPM	0.04939*	–0.17141**	–0.1104**	–0.4109**	–0.33255**	–0.02101	0.03532	0.26910	1.0000			
	0.0510	0.0000	0.0000	0.0000	0.0000	0.4068	0.1631	0.0000	–			
LEV	–0.02597	–0.08049**	0.016431	0.08585**	0.292002**	0.013420	–0.06316**	–0.09206**	–0.36731**	1.0000		
	0.3085	0.0015	0.5165	0.0007	0.0000	0.5962	0.0126	0.0003	0.0000	–		
GROWTH	0.01160	–0.12048**	–0.1039**	–0.1551**	–0.11146**	–0.000944	–0.08859**	–0.02078	0.17820**	–0.06157**	1.0000	
	0.6468	0.0000	0.0000	0.0000	0.0000	0.9703	0.0005	0.4119	0.0000	0.0150	–	
GDP	0.06124**	0.00152	0.0459	–0.014004	0.051907*	0.012455	0.037755	0.042174	0.028629	–0.015930	–0.03823	1.0000
	0.0155	0.9521	0.0692	0.5803	0.0403	0.6229	0.1360	0.0958	0.2583	0.5294	0.1310	–

Note: * significant at 5%, ** significant at 1%.

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