Cash conversion cycle and financial performance: evidence from manufacturing firms of Bangladesh

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Abstract

Purpose – The purpose of the present study is to determine how the cash conversion cycle (CCC) affects the financial performance of manufacturing companies in Bangladesh.

Design/methodology/approach – The authors have collected data of 61 Dhaka Stock Exchange (DSE)-listed firms from the 10 distinct manufacturing industries of Bangladesh for 18 years, from 2003 to 2020. The data have been analyzed through the two-steps system generalized method of moment (GMM) regression model, using profitability indicators return on asset (ROA) and earnings per share (EPS) as dependent variables, while CCC has been used as the independent variable, whereas asset turnover (ATO) and financial leverage (LEV) were used as control variables to assess the relationship between the CCC and financial performance.

Findings – The findings indicated that CCC has a negative connection with profitability – ROA and EPS, with the connection between CCC and EPS being highly significant. This indicates that reducing the inventory conversion time, reducing the period of receivable collection and making payments to creditors with potential delays might help Bangladeshi manufacturing firms boost their profitability. In addition, the firm-specific characteristics, namely ATO and LEV significantly affect the firm's profitability.

Research limitations/implications – The research was based only on secondary sources and information was scarce. This research was conducted to determine the impact of the CCC on the corporate profitability of the manufacturing sector solely. There might be many other working capital variables that are still unexplored through this study.

Practical implications – The current study's findings are consistent with the traditional rule that minimizing the firm's days of the cash cycle may optimize financial performance. The results of this research have added to the

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Ethical approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

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existing body of knowledge on the topic of working capital management (WCM). Future research endeavors can be initiated for assessing the impact of the CCC on the firm's profitability in other industrial sectors or to identify other working capital variables that have much impact on corporate profitability.

Originality/value – This study is an original work of the researchers and adds value to the current literature in the domain of WCM and corporate profitability. The present study is the first one that covers firms in all the manufacturing industries in Bangladesh. The corporate managers, creditors, investors and other concerned stakeholders will be benefited from the findings of the present study.

Keywords Cash conversion cycle, Liquidity, Financial performances

Paper type Research paper

1. Introduction

Traditionally, corporate finance has always prioritized the long-term aim of increasing shareholder wealth. The key tools for achieving this long-term business goal are capital structure decisions, capital budgeting, dividend decisions and so on. However, there is no question that a company's long-term goals are met through the implementation of short-term plans. Working capital management (WCM), often termed as liquidity management, is one of the most critical short-term choices for any business. Richards and Laughlin proposed the WCM theory based on the classic cash conversion cycle (CCC) models (Richards and Laughlin, 1980). WCM components, particularly CCC, are the most important variables in ensuring the business's liquidity, solvency and profitability (Deepak, 2004).

The WCM has been studied in several ways by various academics. Diverse research explored the impacts of optimum inventory management, while others examined the significance of receivables management to determine and speculate how to optimize profit (Besley and Meyer, 1987; Lazaridis and Tryfonidis, 2006). Another key parameter of liquidity is trade credit, which can help boost sales by allowing a company to inspect the product's quality before making a payment (Long *et al.*, 1993; Raheman and Nasr, 2007).

According to many studies, managers devote a significant level of effort to "day-to-day" short-term capital management decisions, because current assets are the investment in short-term assets that are constantly transformed into the form of other assets (Rao, 1989). Working capital is seen as an organization's lifeblood since it helps to maintain fundamental operations and productivity, particularly in manufacturing organizations (Srinivas, 2013). Businesses' existence and potential growth may be ensured through effective financial management. Therefore, financial managers are placing a greater emphasis on short-term capital management. In the recent two decades, financial managers have focused more on short-term financial choices – like the decision concerning the working capital strategy (Lyroudi and Lazaridis, 2000). The level of components of current assets like account receivables, inventory, cash and marketable securities and the degree of the element of current liabilities like account payables and short-term loans affect the liquidity position of the firm substantially.

Existing research identifies a multitude of factors as indicators of liquidity of a firm, with the quick ratio and current ratio (CR) being two of the most frequently utilized indicators. However, both of these ratios are static and some researchers (e g. Aziz and Lawson, 1989; Largay and Stickney, 1980) doubt whether they are adequate for evaluating liquidity. As a consequence, the CCC technique was first developed in 1976 (Hager, 1976) and subsequently endorsed by several researchers (Kamath, 1989; Largay and Stickney, 1980) and others as one of the quantitative indicators that help comprehend the firm's operational and management efficiency. CCC is the most generally used metric for assessing and comparing the risks and returns of liquidity management (Appuhami, 2008; Jose *et al.*, 1996; Keown *et al.*, 2003; Moss and Stine, 1993; Prasad *et al.*, 2019).

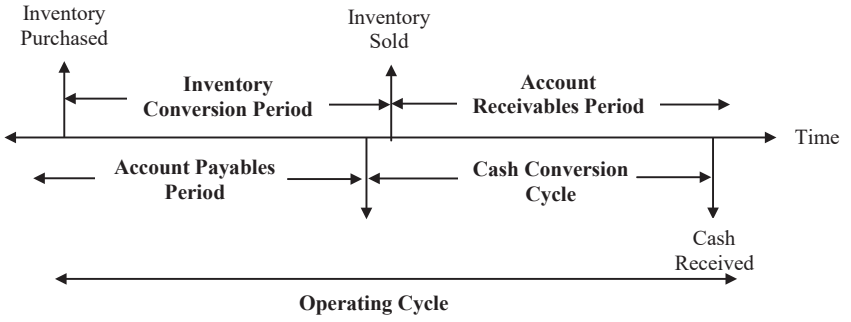
The cash cycle is a critical indicator because it connects incoming material operations with manufacturing processes, suppliers and outbound distribution and sales activities with customers. Therefore, this is critically used for managers to comprehend how well the CCC

measure is derived and its significance from both a financial and supply chain viewpoint (Farris II and Hutchison, 2002).

Appropriate liquidity management has been recognized as one of the most important aspects of financial management due to the substantial trade-offs between risks and returns connected with the management of short-term assets and liabilities (Farris II and Hutchison, 2002). For manufacturing enterprises, CCC is said as the span of time between payment of cash for raw materials and resalable products and converting receivables into cash created by the sale of those goods (Brigham and Gapenski, 1991; Khan and Jain, 2011; Rahmatika and Kholid, 2021; Shubita and Alsawalhah, 2012). CCC is often differentiated as a static measure of business liquidity by its temporal or flow component. It's the difference between the conversion period of inventory and days' outstanding receivables, minus the average days to convert the payables into payment.

The larger value of CCC requires more investment in the firm's working capital (Abuzayed, 2012; Deloof, 2003). CR and acid test (QR) are two liquidity gauges that focus on the static values of the balance sheet. While these standard indicators are helpful for analyzing a firm's capacity to recompense its liabilities when they are due, they fall short of demonstrating the firm's total cash management competence (Moss and Stine, 1993). Manufacturing firms hold a significant portion of their assets as the current assets form. Current assets account for over half of manufacturing firm's total assets (Raheman and Nasr, 2007). Therefore, decision-makers should pay particular attention to the management of current assets, which may have a favorable impact on the business's profitability.

Extensive studies have been done to determine the influence of the CCC on the profitability of companies in various manufacturing industries, with diverse findings ranging from negative to positive, and inconsequential to considerable. For instance, the negative significant effects of CCC on corporate profitability have been found by some researchers, such as Chang (2018), Deloof (2003), García-Teruel and Martínez-Solano (2007), Jakpar *et al.* (2017), Jaworski and Czerwonka (2022), Linh and Mohanlingam (2018), Mmaduka *et al.* (2022), Nwude *et al.* (2018) and Al-Mohareb (2019), while Mandalaputri *et al.* (2021) have found insignificant positive effects. On the contrary, Lin and Lin (2021), Gill *et al.* (2010) and Amahalu and Beatrice O (2017) have found a significant positive impact of the cash cycle on a firm's profitability, while, AL-Zararee *et al.* (2021), Kasozi (2017), Mbathi *et al.* (2021) and Chowdhury *et al.* (2018) have found positive but insignificant impact. The discrepancies in the empirical results imply that the connection between the CCC and corporate profitability may be more complex, depending on the business nature, economic situations, transaction habits of the customers, etc. This paper tries to understand the nature and the effects of the CCC on corporate profitability covering a vast number of observations of Bangladeshi manufacturing firms. This paper is the first one that covers the firms from all of the manufacturing sectors listed with Dhaka Stock Exchange (DSE) in Bangladesh to observe the results through the examination of the latest dataset of the emerging economy.



Source(s): Ross *et al.* (2003)

Figure 1.
The cash conversion cycle

2. Theoretical framework

The cash cycle is the utmost and essential short-term liquidity indicator among other indicators for all manufacturing firms since it informs the management about several critical elements – productions, sales, collections and payments which act as reflective inputs for the decision-making. It also acts as the catalyst of liquidity management and an indicator of profitability. The CCC also illustrates the nature of the manager's approaches to the management of working capital. As the CCC divulges the firm's liquidity, the finance management may take preventative actions to avoid future cash box tremors.

The CCC metric takes into account the amount of time a business takes to sell products, collect receivables and pay bills without incurring fines and penalties (Abiahu *et al.*, 2019). The larger the CCC is, the more outlay in working capital is required since the period between paying for manufacturing inputs and receiving cash from consumers as a consequence of items of goods sold (Ali, 2021; Nobanee *et al.*, 2011). The CCC can be significantly reduced by decreasing cash held in current assets that as inventory, items in stock and debts, among other things. The following Figure 1 describes the CCC and its components.

CCC is a useful instrument for determining a company's liquidity because it is defined as the time between paying for manufacturing inputs and collecting from debtors (Brigham and Gapenski, 1991). The CCC can be one of the meaningful indicators of the smooth circulation of supply chain financing needs (Chand *et al.*, 2020). The company should attempt to lower the CCC duration by shortening the average conversion period of inventory and the average collection period of receivables while extending the average days to pay outstanding, which could improve the firm's financial performance because a longer CCC period may increase the cost of external financing (Moss and Stine, 1993).

3. Review of related literature

Liquidity management is one of the most important requirements for a company's regular operations, regardless of its size or structure, as it symbolizes the company's capacity to satisfy current obligations and pay operating expenses. As a consequence, the management of liquidity of the firm may affect financial performance in a significant way. The previous studies, primarily on the topic of WCM, looked at a variety of elements that influence a firm's liquidity condition and its effect on its performance. The prior studies on the theme of WCM looked at a variety of factors that indicate liquidity and its influence on a company's financial performance. In the last few years, many researchers have been using the CCC as a dynamic and useful technique for measuring the liquidity level of the firm.

The CCC has been using one of the best techniques to study the liquidity management of business firms and many empirical studies show that the CCC is responsible for making a fluctuation in the profitability of firms. The CCC technique is found to be one of the influencing factors of the profitability of the firm using different proxies (Anser and Malik, 2013; Deloof, 2003; Gill *et al.*, 2011; Nobanee *et al.*, 2011; Panigrahi, 2013).

Normally two basic approaches are being used in the study of liquidity management of a corporation – the static ratio analysis approach and the dynamic approach or CCC approach (Lancaster and Stevens, 1999). In a static view, the ratio like CR, quick ratio or ratio of the QR, etc. are measured using financial statement information and these static ratios measure the liquidity at a certain point of time. But through using the dynamic approach, the CCC, the firm can measure the ongoing liquidity for a broader period.

Several empirical studies have explored the connection between the CCC and profitability and discovered a substantial negative association between the two variables (Anser and Malik, 2013; Attari and Raza, 2012; Chowdhury *et al.*, 2018; Farris II and Hutchison, 2002; Gul

et al., 2013; Jose *et al.*, 1996; Lyroudi and Lazaridis, 2000; Quayyum, 2011; Saluja and Kumar, 2012).

The CCC has also a substantial impact on the firm's value (Gentry *et al.*, 1990). Effective CCC management provides managers with more control over a company's short-term investments, which may impact risk, profitability and so firm value (Ebben and Johnson, 2011; Peel *et al.*, 2000). Moss and Stine advised that the CCCs of larger retail businesses were found to be shorter. They also came to the conclusion that small retail businesses are more likely to increase their CCC by using strategies that minimize the period of inventory conversion or receivable conversion time or both (Moss and Stine, 1993). Schilling stated that the increase in the CCC upsurges the lowest liquidity requirements of the firms and the other way around (Schilling, 1996). Additionally, he remarked that the optimal level of liquidity is attained by employing the fewest resources feasible, and this study revealed a correlation between the CCC and the least threshold scale of liquidity in such a manner that as the CCC grows, so does the minimum necessary liquidity.

Deloof (2003) stated that firms should shorten the collection period of receivables for better performance. Lyroudi and Lazaradis found that proper management of working capital is critical to a firm's profitability (Lyroudi and Lazaridis, 2000). They also said that an adequate level of liquidity is very important by which the financial performance of the firm is affected on large scale. Investing too much in current assets is not a good idea for performance as Padachi argues that if the business invests more in inventory, the level would decline and the firm's profitability will decrease (Padachi, 2006). The relationship between WCM and the firm's performance is significantly positive (Nazir and Afza, 2009).

Kasozi (2017) examined 69 manufacturing enterprises in South Africa from 2007 to 2016 and discovered a significant negative connection between the average payment and average collection intervals and profitability. However, he discovered a considerable positive relationship between the period of inventory conversion and profitability. Jakpar *et al.* (2017) used discretionary panel regression and correlation to examine 164 Malaysian manufacturing enterprises and found that average days of inventory and account receivable period had a substantial positive impact on profitability indicated by the return on equity (ROE). He has also observed that profitability and the CCC have a negative connection.

Eljelly (2004), Karim *et al.* (2018), and Wichitsathian (2022) have found an inverse association between profitability and liquidity presented by CCC. García-Teruel and Martínez-Solano (2007) stated that the firm could delay in paying for enhancing financial performance. According to Dong and Su (2010), CCC has a substantial relationship with the firm's return on investment (ROI). Randall and Farris II (2009) argued that using an average cost of capital to manage a joint CCC would boost the firm's profitability. While Lee *et al.* (2021) have found that the firms with the longer CCC have to bear a higher cost of equity.

The firm-specific characteristics like the level of use of leverage in the capital structure and asset turnover (ATO) have also been found as the fact that affects corporate profitability. The financial leverage (LEV) and the profitability are negatively associated (Ahmed *et al.*, 2018; Al-Mohareb, 2019; Chang, 2018; Grau and Reig, 2021; Samo and Murad, 2019), while some have found a positive association between them (Dalci, 2018; Dong and Su, 2010; Raheman and Nasr, 2007). The firm's ATO has been found negatively associated with corporate profitability in some studies (Muritala, 2012; Niresh and Thirunavukkarasu, 2014), but, in some, it has been revealed to have a positive association with profitability (Azad *et al.*, 2018; Pouraghajan *et al.*, 2012), while Warrad and Al Omari (2015) and Santosuosso (2014) found no significant connections between them.

The CCC and the firm's size have a significant link, according to Moss and Stine (1993). The bigger company has a shorter timeline for CCC. Comparing the acid-test and CR to the CCC revealed a significant correlation, as one of the outcomes of the research focusing on

retail enterprises. The firm's size and the CCC are negatively correlated, the smaller firms may have the longer CCC as found by Uyar (2009), Attari and Raza (2012). The size of the firm is positively associated with supply chain finance (SCF), which is so significant for smooth operations of business activities (Ali, 2021).

Although some studies conducted regarding the effect of CCC on a firm's profitability are found positive, Attari and Raza (2012) discovered a substantial positive correlation between the CCC and the profitability of a firm as measured by ROE and ROA with CCC having a statistically significant influence on ROA. Panigrahi (2013) studied cement manufacturing enterprises listed on the BSE in India for ten years, 2001 to 2010, and observed the CCC and profitability of his sample company, as assessed by ROA and ROE, were both positive. Gill *et al.* (2010), from 2005 to 2007, performed a three-year exploratory research on USA firms and discovered a high positive correlation between the CCC and gross profit. They also found no correlation between the company's size and its profitability. Lin and Lin (2021) have found the aggregate CCC as a significant positive interpreter of the return of the stock market as a whole through analyzing the returns on the standard & poor's 500 index (S&P 500 index) of USA markets, while Samo and Murad (2019) have shown that firm's profitability and the liquidity holdings had a significant positive association.

On the other hand, several academics have discovered that the CCC has no effect on a firm's performance. Ali and Hassan (2010) studied the relationship between the profitability and liquidity of 37 OMX Stockholm Stock Exchange Listed companies for five years from 2004 to 2008 and came to the conclusion that there is no link between gross profit and the liquidity measured by the CCC.

Thus, the impact of liquidity on the firm's profitability, to some extent, is messy and vague, although most researchers have to be found the common decision that the liquidity and profitability of business firms are negatively related – the longerthe CCC the lower corporate profitability. Therefore, it has possible scope to examine how the duration of CCC affects the corporate profitability of Bangladeshi manufacturing companies listed on the DSE.

4. Objectives

The overall goal of this research is to look at the effects of the CCC on the profitability of manufacturing firms in Bangladesh. This general objective is divided into two subclasses, and they are as follows:

(1) To look at the link between the CCC and the firm's financial performance and

(2) To investigate the link of the firm-specific characteristics, namely financial leverage and ATO with firm's financial performance.

5. Data and methods

In order to investigate the impact of the CCC on a firm's profitability of Bangladesh's manufacturing sector, secondary cross-sectional data are collected from yearly audited annual reports of companies registered on the DSE. The data are collected from the DSE library and the published audited annual reports from the DSE website and the websites of respective firms.

The samples from the DSE-listed industrial companies in Bangladesh were chosen using a purposive sampling approach. The firms having four years or more of data are chosen as the sample for this research, which spans 18 years from 2003 to 2020. As a result, the panel data

were gathered from audited annual reports from a sample of 61 DSE-listed manufacturing companies. This analysis excludes firms with incomplete or unavailable data, as well as companies that were liquidated during the study period. As a result, this research covers 671 observations from ten industries: cement, steel, ceramics, engineering, food and allied, fuel and power, jute, pharmaceuticals, tannery and textiles.

Hypotheses: Hypotheses have been developed to be investigated by regression models based on existing literature and empirical results of the majority of previously conducted research. Here, we have inserted only the null hypotheses below.

H1. The CCC has positive significant effects on the firm's financial performances.

H2. The LEV has significant positive effects on the firm's financial performances.

H3. The ATO has significant negative effects on the firm's financial performances.

Model specification: To explore the impact of the CCC, ATO and firm's LEV on financial performances, we have used the two-step system generalized method of moment (GMM) regression model to the dynamic panel data. Return on assets (ROA) and earnings per share (EPS) were employed as financial performance indicators and dependent variables in the regression models. The CCC has been used as the independent variable while the firm's LEV and ATO have been used as the control variables, as these variables significantly affect the financial performances of the firm. The variables are calculated as follows:

$$\textit{Return on Asset}\,(ROA) = \textit{Earnings before Interest and Taxes}/\textit{Total Assets}$$

$$\textit{Earnings Per Share}\,(EPS) = \textit{Earnings Available for Common Stockholder}/\textit{Number of Common Stocks Outstanding}$$

$$\begin{aligned}\textit{Cash Conversion Cycle}\,(CCC) &= (\textit{Inventory}/\textit{Cost of Goods Sold}) \times 365 \\ &\quad + (\textit{Receivables}/\textit{Sales}) \times 365 \\ &\quad - (\textit{Account Payables}/\textit{Cost of Goods Sold}) \times 365\end{aligned}$$

$$\textit{Asset Turnover}\,(ATO) = \textit{Sales} / \textit{Total Asset}$$

$$\textit{Leverage}\,(LEV) = \textit{Total Debt}/\textit{Total Asset}$$

As we have estimated the relationship among the considered variables using the two-step system GMM estimator for controlling the issues of endogeneity and autocorrelation, the estimated regression models can be specified as the following equations (1) and (2).

$$ROA_{it} = \alpha + \beta_1 ROA_{it-1} + \beta_2 CCC_{it} + \beta_3 LEV_{it} + \beta_4 ATO_{it} + \varepsilon_{it} \quad (1)$$

$$EPS_{it} = \alpha + \beta_1 EPS_{it-1} + \beta_2 CCC_{it} + \beta_3 LEV_{it} + \beta_4 ATO_{it} + \varepsilon_{it} \quad (2)$$

Where α is the constant term, β is the coefficient, i is the number of firms which ranges for this study ranges from 1 to 61, t is the time period ranging from 2003 to 2020 and ε is the error term.

Diagnostic tests: To assure that the regression findings are not erroneous or biased, basic pre-estimation and post-estimation diagnostic tests are conducted.

Panel unit root: The "Fisher-type unit root based on the augmented Dickey-Fuller" test with the null hypothesis, all panels have unit roots – was used to verify the panel unit root. Because the p-values of all the variables are less than 0.05, we found p-values of 0.000, which means they are significant at the 1% level, indicating that none of the studied variables have the unit root at their level.

Multicollinearity: Table 2 reveals that the correlation coefficients for all variables are less than 0.80, indicating the absence of multicollinearity among independent variables (Cooper and Pamela, 2014; Gujarati, 2003; Wooldridge, 2015). The absence of multicollinearity is further shown by the "value of variance inflation factor (VIF)," which is less than 5.00 for all independent variables (Lind *et al.*, 2012; Gujarati, 2003; Mwangi, 2016).

Autocorrelation: The Wooldridge test was used to see whether there was any autocorrelation in panel data. The null hypothesis in the Wooldridge test is "there is no first-order autocorrelation." Since the Wooldridge test produces the *p*-values for both the regression models of less than 0.05 (0.0000, and 0.0001, respectively), it is clear that the autocorrelation is a concern.

Hausman specification: Between the fixed effects model and the random effects model, the Hausman specification test has been used to choose the appropriate one with superior interpretability. The Hausman test hypothesizes the null "the random effect model is appropriate." As we found the *p*-values of the Hausman chi-square greater than 0.05, for equation (1) with ROA of 0.4478 and for equation (2) with EPS of 0.1155, we cannot reject our null hypothesis, hence the random effects model is chosen over the fixed effects model (Greene, 2008).

Heteroscedasticity: All panel group-wise tests, such as the Wald test, "the Lagrange Multiplier test (LM test)" and "the Likelihood Ratio test (LR test)," assume that panel homoscedasticity is the null hypothesis. Both regression models using ROA and EPS produce *p*-values of 0.000, signifying that the value of chi-square is significant at 1% and null hypotheses are rejected. As a consequence, the presence of a heteroscedasticity problem is clear.

Therefore, the regression models suffer from the problem of autocorrelation and heteroscedasticity; we did not go for any of the "ordinary least square (OLS)," "fixed effect model" or "random effect model" for this study. Rather, we have employed the two-steps system "generalized method of moment (GMM)" estimation model of Arellano and Bond (1991) as it controls the issues of endogeneity in our data, using the statistical software package STATA version 16. The two-step GMM is said to be more efficient and robust to autocorrelation and heteroscedasticity (Roodman, 2009).

6. Main results

6.1 Descriptive statistics

Table 1 provides descriptive data for each of the study's variables. The minimum, the maximum and the standard deviation of the variables are shown in terms of within, between and overall value in the table, repectively, while the mean is used to calculate the overall value of the variables. The average CCC of our sample firms is 204 days with a very high range and a standard deviation of 223 days, while the average value of ROA is 15.10% with a standard deviation of 1.045 and the mean of EPS is Tk. 14.96, with the standard deviation of 38.08. CCC's high value may be due to the fact that it includes organizations of all sizes and sectors and due to differences in their ages. Our sample firm's average ATO is 1.28 times, with a standard deviation of 2.376, and their average LEV is 0.815 times, with a value standard deviation of 3.374.

6.2 Correlation matrix

Table 2 demonstrates that Pearson's correlation was utilized to evaluate the connection between all dependent and independent variables in our study. The CCC is inversely associated with both ROA and EPS. The CCC has a negative coefficient of correlation of −0.060 with ROA and of −0.202 correlation coefficient with EPS, with the

Variable		Mean	Std Dev	Min	Max
ROA	Overall	0.151	1.045	−1.339	24.522
	Between		0.549	−0.114	4.276
	Within		0.934	−4.246	20.398
EPS	Overall	14.962	38.079	−181.59	290.71
	Between		23.489	−34.172	125.213
	Within		27.052	−132.456	185.798
CCC	Overall	203.045	222.438	−385.778	1663.098
	Between		176.882	−60.257	735.938
	Within		143.039	−266.909	1706.635
ATO	Overall	1.282	2.376	−5.471	44.251
	Between		1.143	0.197	5.724
	Within		2.103	−5.900	39.809
LEV	Overll	0.815	3.374	−12.068	79.088
	Between		0.7645	0.202	4.971
	Within		3.257	−16.224	74.932

Note(s): Number of entities = 61 and number of observations = 671
Source(s): Authors' calculation

Table 1.
Descriptive statistics

Variables	*ROA*	*EPS*	*CCC*	*ATO*	*LEV*	*Fisher-ADF Chi-square p-value*	*VIF*
ROA	1.000					0.000	
EPS	0.044	1.000				0.000	
CCC	−0.060	−0.202***	1.000			0.000	1.94
ATO	0.163***	0.158***	−0.124***	1.000		0.000	1.91
LEV	0.025	−0.053	0.047	0.678***	1.000	0.000	1.05

Note(s): ***$p < 0.01$, **$p < 0.05$ and *$p < 0.1$
Source(s): Authors' calculation

Table 2.
Matrix of correlations, Fisher–ADF chi-square *p*-value and VIF

CCC–EPS relationship being statistically significant. The table also shows that the ATO correlation coefficients show significant positive correlations with both ROA (0.163) and EPS (0.158). The ATO and the CCC have a negative and substantial relationship (−0.124). The correlation coefficient of companies' LEV is positive and insignificant with ROA (0.025), CCC (0.047) and ATO (0.678), while the relationship with ATO is statistically significant. However, LEV exhibits a non-significant negative connection with EPS (−0.053).

6.3 GMM estimation results

We applied two-step system GMM regression models to determine the impacts of examined variables – the duration of the CCC and control variables on the companies' performance. The predicted results from Equations (1) and (2) are shown in Tables 3 and 4. The findings indicate that the length of CCC has a negative coefficient of −0.094 with ROA, which is statistically insignificant with a *p*-value greater than 0.05. ATO has a positive value of the coefficient of 0.900, and LEV has a negative coefficient of is −0.276 with ROA, respectively, and both coefficients are significant at the 1% level as their *p*-values are less than 0.05. The result of the lagged (ROA_{it-1}, denoted by L.1, implies that the financial performance of firms

Table 3.
Two-steps results of GMM system estimation with ROA

ROA	Coef	St Err	*t*-value	*p*-value	[95% Conf	Interval]	Sig
ROA (L.1)	0.448	0.314	1.43	0.154	−0.168	1.064	
CCC	−0.094	0.067	1.40	0.162	−0.038	0.225	
ATO	0.900	0.105	8.58	0.000	0.695	1.106	***
LEV	−0.276	0.085	−3.27	0.001	−0.442	−0.111	***
__Constant	−3.087	0.382	−8.08	0.000	−3.836	−2.339	***

Mean dependent var	−2.604	SD dependent var	1.052
Number of obs	504	Chi-square	78.148
Number of groups	60	Number of instruments	10
AR(1)	0.047	Hansen	0.072
AR(2)	0.420	Sargen	0.120

Note(s): ***$p < 0.01$, **$p < 0.05$ and *$p < 0.10$
Source(s): Authors' calculation

Table 4.
Two-steps results of GMM system estimation with EPS

EPS	Coef	St Err	*t*-value	*p*-value	[95% Conf	Interval]	Sig
EPS (L.1)	0.028	0.007	3.85	0.000	0.014	0.043	***
CCC	−0.089	0.092	−0.97	0.030	−0.269	0.090	**
ATO	0.617	0.172	3.58	0.000	0.279	0.954	***
LEV	−0.154	0.139	−1.11	0.006	−0.426	0.118	***
__Constant	1.645	0.358	4.59	0.000	0.943	2.348	***

Mean dependent var	1.729	SD dependent var	1.599
Number of obs	492	Chi-square	220.409
Number of groups	59	Number of instruments	13
AR(1)	0.014	Hansen	0.057
AR(2)	0.400	Sargen	0.403

Note(s): ***$p < 0.01$, **$p < 0.05$ and *$p < 0.10$
Source(s): Authors' calculation

during the previous year has a positive but insignificant impact on the financial performance of firms in the current year as it has a coefficient of 0.448 with the p-value of 0.154 ($p > 0.05$).

Again, Table 4 represents the results of regression based on equation (2) with EPS as the dependent variable. The findings indicate that the coefficient of CCC has a negative and statistically significant coefficient of −0.089 with firm's performance indicated by EPS, with p-value of 0.030 ($p < 0.05$), which indicates it is significant at 5% level. ATO is positively associated with EPS as it produces the value of the coefficient of 0.617, and the LEV is negatively linked with the coefficient of −0.154 with EPS, respectively, and both coefficients are significant at 1% level as produced p-values of 0.000 and 0.006 ($p < 0.01$). Furthermore, the result of lagged EPS_{it-1}, denoted by L.1, indicates that the firm's profitability in the previous year has significant positive effects on the firm's profitability in the current year as it has a coefficient of 0.028 with the p-value of 0.000 ($p < 0.01$), which indicates it is significant at 1% level.

The first null hypothesis claims that "the cash conversion cycle has positive significant effects on the firm's financial performances." The coefficient of CCC with ROA does not indicate any meaningful impacts, while the negative coefficient with EPS does. This suggests that our null hypothesis cannot be rejected with ROA, but with EPS the result indicates that this should be rejected. Consequently, it is evident that the CCC has a significant negative

influence on EPS but not on ROA. The findings of the relationship of ATO and LEV with both of the regression equations, with ROA and EPS, imply rejecting the second and third null hypotheses. Our second null hypothesis assumed that "the financial leverage has positive significant effects on the firm's financial performances," while the third one hypothesized that "the asset turnover has significant negative effects on the firm's financial performances." Our results state that ATO has significant positive effects, while LEV has significant negative effects on both the profitability indicators measured by ROA and EPS.

6.4 Discussion and practical implications of findings

Examining the link between the CCC and businesses' profitability (ROA and EPS) was the primary focus of this research. Our results indicated that CCC is negatively linked with the ROA and EPS, while this relationship with EPS is statistically significant. Thus, businesses with shorter CCCs are more profitable than those with longer CCCs. Possibly, in line with the findings, it can be said that the relatively shorter CCC can reduce a firm's dependency on external sources of financing, which may result in reducing the cost of financing and interest, henceforth increasing the firm's profitability (Uyar, 2009). The results of this research are congruent with those of a number of earlier investigations (Anser and Malik, 2013; Chang, 2018; Deloof, 2003; García-Teruel and Martínez-Solano, 2007; Jakpar *et al.*, 2017; Jamal *et al.*, 2014; Jaworski and Czerwonka, 2022; Linh and Mohanlingam, 2018; Mmaduka *et al.*, 2022; Murugesu, 2013; Nobanee *et al.*, 2011; Nwude *et al.*, 2018; Oseifuah and Gyekye, 2016; Uyar, 2009), while contradicts with the results found by some researchers (AL-Zararee *et al.*, 2021; Amahalu and Beatrice O, 2017; Chowdhury *et al.*, 2018; Gill *et al.*, 2010; Lin and Lin, 2021; Mbathi *et al.*, 2021).

The second objective was assessing the relationship between ATO and firm's leverage with firm's profitability. The findings revealed that ATO is positively and significantly connected to companies' profitability, while leverage is negatively and significantly related to companies' profitability. The results designated that the profitability may significantly increase with the increase of firm's ATO. These results are supported by the results found in some previous studies (Azad *et al.*, 2018; Pouraghajan *et al.*, 2012). While the results suggested that with the increased use of debt capital in the capital structure, firm's profitability may be significantly decreased. These findings are consistence with the results found in a number of previous studies (Ahmed *et al.*, 2018; Al-Mohareb, 2019; Chang, 2018; Grau and Reig, 2021; Samo and Murad, 2019), but contradict the results found by some researchers (Dalci, 2018; Dong and Su, 2010; Raheman and Nasr, 2007). The results of this study concluded that there was a negative relationship between the CCC and financial performance – significant with EPS but insignificant with ROA. The findings are supported by a number of previous studies while the findings of some others were contradicted.

The findings of the present study reveal several significant implications for managers and other stakeholders of the manufacturing firms in Bangladesh. A significant portion of the assets maintained by a manufacturing concern are of the short-terms in nature – especially the raw materials, produced goods and debtors – which have been considered major making areas for the business managers. This study find that the length of CCC negatively affect firm's profitability; thus, the inventory conversion period, receivables collections period and payables payment period have substantial effects on the firm's profitability. As we have found a significant negative relationship between the CCC and profitability, the manufacturing firms of Bangladesh are suggested to try to lessen the length of the cash cycle to boost up their profitability. Finally, the findings of this study deliver managers and other stakeholders of the industry with a greater insight concerning the use and management of short-term assets and investments which may help in attaining the goal of the increasing profitability level of the manufacturing firms in Bangladesh.

7. Conclusion

This paper aimed to explore the connection between the CCC and the profitability of DSE-listed manufacturing firms in Bangladesh. Using the two-step GMM estimation model, the results indicated that the CCC is negatively related to the dependent variables of profitability indicators defined by the ROA and EPS, with the impact of CCC on EPS being statistically significant. Consistent with the prevalent belief that the longer the CCC, the worse the firm's profitability, this analysis confirms the conclusions of other previous studies. It may be claimed that by minimizing the number of days to convert the inventory into the finished goods, shortening the days in the collection of receivables and extending the days of mitigating the payables as much as possible, overall reducing the days in the CCC, the management can boost the financial performances of the manufacturing firms in Bangladesh. In addition, the firm-specific characteristics – ATO and leverage significantly affect the profitability of firms. The ATO has a positive and statistically significant relationship with profitability, but the amount of LEV deployed in the capital structure of manufacturing enterprises has a negative and statistically significant relationship with financial performance. Results of the present study, being the first study covering all the sectors and 18 years of data of manufacturing firms in Bangladesh, have added knowledge to the previous findings in the field of working capital management. Future research endeavors can be initiated for assessing the impact of the CCC on firm's profitability in other industrial sectors or to identify other working capital variables that have much impact on corporate profitability.

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Further reading

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