Empirical Analysis on the Impact of Working Capital Management on EPS: A Panel Observation on the Cement Companies in Bangladesh

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Working Capital Management which includes managing of short-term assets and liabilities has a significant impact on firm's performance. The purpose of this study is to investigate the impact of working capital management on earnings per share (EPS) of the cement companies in Bangladesh. The authors used the secondary data collected from annual reports of the Dhaka Stock Exchange (DSE) listed cement companies over the period of 2009-2015. The study used cash conversion cycle as a proxy for Working Capital Management and used panel data regression technique. The empirical evidence shows that there is an insignificant negative impact of cash conversion cycle on earnings per share of the cement companies. Size (natural log of assets) and leverage (TD/TA) of the sample firms during the period also have an insignificant negative impact on EPS.
Keywords: Working Capital Management, EPS, Cash Conversion Cycle, Panel data, Cement Industry, Bangladesh

Introduction

Working capital management (WCM) is a prerequisite for the survival and growth of the business as it affects both profitability and liquidity. WCM involves planning and controlling current assets and current liabilities in such a manner that eliminates the risk of the inability to meet short-term obligations, on one hand, and avoids excessive investment in these assets, on the other [1]. Among the other factors of business growth, one factor is the efficient management of working capital [2]. It is a crucial element in determining the financial performance of an organization [3]. Working capital refers to capital available for running the day to day operations of a business. It is the ability of a firm to fund the difference between short-term assets and short-term liabilities. Positive working capital means that the firm is able to pay off its short-term liabilities, whereas, negative working capital means that the firm is unable to meet its short-term liabilities with its current assets. Working capital management is crucial in manufacturing firms since part of their major assets is composed of current assets [4]. The goal of WCM is to maintain an optimum balance among the components of working capital to maximize financial health. Working capital management focuses on satisfying liquidity, profitability and shareholders' value [5].

Cash conversion cycle (CCC) was introduced in 1980 by Verlyn Richards and Eugene Laughlin in their article "A Cash Conversion Cycle Approach to Liquidity Analysis" [6]. Cash conversion cycle is the time lag between the expenditure for the purchase of raw materials and the collection from the sale of finished goods. It is a great measure for determining how well a corporation is organizing its working capital [7]. Gitman (1994) concluded that CCC is the most important aspect and a key measure of performance in working capital management. Cash conversion cycle of individual firms, as well as the collective cycle of the industry, highlights how the firms are performing [8]. CCC is a basic financial concept which has three components: inventory conversion period, days sales outstanding and payables deferral period. A larger CCC indicates that cash is tied up for a long time and more borrowing is needed to run the day-to-day operation. A shorter CCC indicates that cash is tied up for short period of time and the business can invest back into the business.

Befumo (2010) states that the conventional way of measuring the financial health and efficiency of a firm is by assessing the company's Earnings per Share (EPS). EPS is the amount of income earned by each ordinary share in a period. It is the most frequently quoted measure of financial performance to which investors attach a great deal of importance [9]. Graham et al. (2005) surveyed 400 financial executives in the US and reported that the majority consider that EPS is the most important performance measure they report to outsiders. EPS neatly summarizes the earnings generated for shareholders and appeals to investors and management alike [10]. EPS affects strategic decision-making such as share valuations, management performance incentive schemes, and merger and

acquisition negotiations. It is simple to calculate and easy to understand and management is congratulated when there is a positive EPS growth [11]. It is no surprise that managers take a special interest in EPS when their compensation is linked to the EPS performance of the company.

In this context, this study is an empirical investigation to understand the impact of working capital management on earning per share for the cement industry in Bangladesh. Though a number of studies have been conducted on the relationship between working capital management and earning per share for manufacturing companies, there is a dearth of related empirical literature on this study area in this specific industry in Bangladesh [19]. The reason for focusing particularly on the cement industry is that Bangladesh cement industry has been observing stable growth in last few years, driven by the steady pace of urbanization and construction of large infrastructure projects. In terms of cement production, Bangladesh is the 40th largest market in the world [12]. Increase in demand for cement is due to acceleration in urban development, with the construction of houses, apartments and infrastructural development projects such as Padma Bridge, GulistanJatrabari Flyover, Kuril Flyover, Hatirjheel Project, Dhaka-Chittagong Access Control Highway, Dhaka Metro Rail Transit, Dhaka-Narayanganj-Gazipur-Dhaka Elevated Expressway and deep-sea port in Chittagong [13]. This study attempts to provide an insight into the effect of working capital management on earnings available to equity shareholders. The results of the study will help develop ground for new ideas, techniques, and methods in respect of managing working capital in cement industry.

Literature Review

Several empirical studies have been conducted by different researchers, in South Asia and elsewhere, in attempts to unveil the relationship between working capital management and earning per share.

Working capital management is the best possible mixture of working capital elements such as current assets and current liabilities in such a way that heightens the value of shareholder [14].

To investigate the impact of WCM on firm performance, studies were carried out by Madugba and Ogbonnaya (2016), Samuel and Abdulateef (2016), Inyiama (2014), Aghajani et al. (2015) in different countries and across different industries. For example, in Nigeria, Madugba and Ogbonnaya (2016) investigated working capital management and financial performance for manufacturing firms where they used earnings per share as the measure of firm performance and average collection period (ACP) and average payment period (APP) as measures of WCM. The authors found that working capital has asignificant impact on EPS. The findings also confirmed that average payment period has a significantly positive impact on EPS and average collection period has a significantly negative impact.In another study in Nigeria, Samuel and Abdulateef (2016) studied the

relationship between cash conversion cycle and earning per share The sample comprised of 10 firms and used panel data over a 10 year period from 2004 to 2013. The study revealed that cash conversion cycle (CCC) of the sampled firms during the study period has an insignificant negative impact on EPS. Similar results were found for the brewery industry in Nigeria, in which Inyiama (2014) evaluated the extent to which working capital affected the earning per share where he used current ratio as aproxy for working capital. Results showed that current ratio has both short and long-term negative and insignificant effect on EPS. Bagh et al. (2016) also found similar results for non-financial firms listed on the Karachi Stock Exchange (KSE), where they concluded that cash conversion cycle has a negative impact on EPS that is statistically insignificant. Ali and Ali (2014), in a study to investigate the relationship between working capital and EPSfor non-financial companies listed on Karachi Stock Exchange (KSE), also found working capital (measured by current ratio) has no significant impact on EPS.

Opposite results were found by Aghajani et al. (2015), where the results indicated a significant inverse relationship between the cash conversion cycle and profitability (measured by EPS) in the automotive and cement companies listed on Tehran Stock Exchange. Awad and Al-Ewesat (2012) also found that there is a positive relationship between working capital management (measured by current ratio) and EPS. Similar results were concluded by Sajjad and Bukhari (2013), where the researchers found a significant positive relationship between working capital management components and EPS [21,22,23,24]. Mand and Singh (2014) conducted a similar study on working capital management and earning per share for traditional and modern Indian firms. The result implied that working capital management has insignificant negative relation with EPS for traditional firms but a significant positive relation with EPS for modern firms.

In the context of Bangladesh, research on WCM and EPS were conducted Hoque et al. (2015), Mazumder (2015), and Quayyum (2011, 2012)). Mazumder (2015) investigated the relationship between working capital management and profitability for cement companies listed on Dhaka Stock Exchange (DSE) from 2009 to 2014 [15]. This study tried to show the profitability and working capital position of the cement industry, the correlation between them and whether the profitability is affected by working capital management. It is observed from the study that profitability and working capital management position of the cement industry are not satisfactory. In his study, he found no significant effect of cash conversion cycle on profitability that was measured by ROA. Quayyum (2011) examined the effect of WCM on profitability for four cement companies listed on the Dhaka Stock Exchange (DSE) for the period 2005-2009 [16].The results showed that cash conversion cycle has a significant negative correlation with profitability measured by ROA.In addition to that, in another study by Quayyum (2012), results

showed that cash conversion cycle has a significant negative impact and thecurrent ratio has a significant positive impact on firm performance (measured by ROA) [25,26,27].

The review of empirical studies shows that the relationship between and the impact of working capital management on EPS as a measure of firm performance has not been examined extensively. It should also be noted that in the existing literature, data analysis techniques were mostly limited to descriptive statistics, correlation, and OLS regression techniques. In this context, this current study adopts the panel data regression technique and utilizes EPS as the endogenous variable and CCC as a proxy for working capital management to examine the impact of working capital management on the EPS for cement companies in Bangladesh.

Research Methodology

SampleSize and Data Collection

The study included an all-inclusive sampling of all the 7 cement companies listed on the Dhaka Stock Exchange (DSE) for the period of 2009-2015. The reason for choosing only listed firms is primarily due to availability and reliability of financial statements as listed companies are required to present profits, if existing, to make their shares more attractive to investors.The data werecollectedfromannual reports and financialstatements of the sample companies.

Data Source

The sources of the data for the study are secondary in nature, comprisingannual reports and financialstatements.

Empirical Model

The following empirical model was adopted to analyze the data; the model has previously been adopted by Samuel and Abdulateef (2016) who conducted a similar study where cash conversion cycle, leverage, and size of the firm have been treated as exogenous variables and EPS as an endogenous variable.

$$EPS_{it} = \alpha + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \varepsilon_{it}$$

(1)

Where CCC_{it} (cash conversion cycle) is used as a proxy for working capital for firm i at time t; $SIZE_{it}$ is the natural log of total assets for firm i at time t; LEV_{it} is debt ratio for firm i at time t; α is the intercept and ε_{it} is the error term. Here EPS is thedependent variable, CCC is theindependent variable,Size (SIZE) and Leverage (LEV) are used as control variables to adjust theindividual firm effect [17, 20].

Panel data have space and time dimension [18,19]. Well organized panel data models provide robust analysis, more informative data, more degrees of freedom and efficiency [18]. As the study used panel data, thechoice between Random effect model versus Fixed effect model was performed which is a classical test for panel data analysis. In fixed effect model, it is assumed that firm-specific intercepts are specific to each firm and are constant over time. In random effect model, the assumption is there is a single common intercept and it varies from firm to firm in a random manner. To determine which of these models is appropriate, Hausman specification test was performed to decide the appropriate model. Each variable is in book value and in local currency Taka. Empirical analysis has been performed using STATA 12.

Results and Analysis

Table 1 presents the summary statistics of the variables of the study. It is apparent that average EPS over the study period is 14.1549 Taka. It ranges from 1.88 Taka to 33.18244 Taka. The average CCC over the study period is 24.16823 days and

Table 1. Descriptive Statistics

Variable	Label	Obs	Mean	Std. Dev.	Min	Max
EPS	Earnings Per Share in Taka	49	14.1549	33.18244	1.88	177
CCC	Cash Conversion Cycle in Days	49	24.16823	33.18244	-36.8438	142.5752
SIZE	Enterprise Size in Taka	49	7258398696.63	5728915998.77	20695036000	718871757
LEV	Leverage in %	49	.5434314	.2108798	.1948	.9042

Table 2. Panel Unit Root Test

Variable	LLC		IPS	
	Level	First Difference	Level	First Difference
EPS_{it}	-117.290 (0.0000)	-7.48073(0.0000)	-7.48073 (0.0000)	-2.56745 (0.0051)
CCC_{it}	-1.56976 (0.0582)	-9.12986 (0.0000)	0.55425 (0.7103)	-2.46383 (0.0069)
$SIZE_{it}$	-5.86448(0.0000)	-3.02127(0.0013)	-1.02314(0.1531)	-2.54051 (0.0055)
LEV_{it}	-1.74899(0.0401)	-5.61532(0.0000)	0.44900(0.6733)	-1.84065 (0.0328)

it highly varies across the sample ranging from -36.8438 days to 142.5752 days. Other variables also show similar patterns in terms of mean, minimum and maximum values.

At first, the stationary property of panel data was examined in the study. Panel data requires that variables considered in the model need to be stationary in order to avoid the spurious regression. Many different types of unit root tests are available in theliterature, among which authors performed the most widely used Levin- Lin-Chu (LLC) test and Im-Pesaran-Shin (IPS) test. Table 2 reports the results. The results reveal that only EPS is stationary at level. However, all the variables are stationary at first difference, that is, I (1).

Table 3 presents the correlation between all the variables of the sample data. Results show that CCC and EPS are negatively correlated though the correlation is not significant. This means if CCC rises by one unit, EPS will insignificantly decrease by -0.1216. EPS is also negatively correlated with SIZE and LEV, however, both the correlations are insignificant.

Table 3. Correlation Matrix

	EPS_{it}	CCC_{it}	$SIZE_{it}$	LEV_{it}
EPS_{it}	1.0000			
CCC_{it}	-0.1216	1.0000		
$SIZE_{it}$	-0.0435	-0.4417**	1.0000	
LEV_{it}	-0.1795	0.0990	-0.4279**	1.0000

***Coefficients are significant at the 0.05 level*
Source: Authors' own calculation

Table 4 shows the results of VIF test to test multi-co-linearity among the independent variables. Results show that the VIF of 1.26, 1.52 and 1.24 for CCC_{it}, $SIZE_{it}$ and LEV_{it} respectively. The mean VIF is 1.34. It was found that the VIF

implying that there is absence of perfect multi-co-linearity among independent variables of the study.

Next, Hausman's Specification Test has been conducted to check whether Fixed Effect or Random Effect model is appropriate for this study. Table 5 presents the results of Hausman Test. Results indicate that the individual effects are supposed to be random because this test has a $\chi2$ statistics of 2.24 with a p-value of 0.5243. Thus, the Random Effects model has been considered appropriate for this study. Therefore, for the remainder of the analysis, the study proceeds with random effect model.

Table 4. VIF Test

Variable	VIF	1/VIF
CCC_{it}	1.26	0.794976
$SIZE_{it}$	1.52	0.655866
LEV_{it}	1.24	0.806865
Mean VIF	1.34	

Table 6 presents the random effect regression results. It is revealed that CCC of the sampled firms during the study period has an insignificant negative relationship with EPS. This means that increasing CCC by one unit insignificantly decreases EPS by -.0765982. This indicates that CCC and EPS have an inverse relationship. The findings are consistent with Samuel and Abdulateef (2016), Bagh et al. (2016) and Mand and Singh (2014). SIZE of the sampled firms during the period has an insignificant negative impact on EPS. This is evidenced by the coefficient of -18.62437 and z-value of -1.12. The LEV of the sampled firms during the period also has an insignificant negative relationship with EPS.

Conclusion

In Bangladesh, empirical studies on working capital management are quite scarce. To the authors' knowledge, this is the first empirical study to examine the relationship between working capital management and EPS for cement

Table 5. Hausman's Specification Test

Variable	Coefficients			
	(b)	(B)	(b-B)	Sqrt (diag(V_b-V_B))
	Fixed	random	Difference	S.E.
CCC_{it}	.1170103	-.0765982	.1936085	.1712537
$SIZE_{it}$	-31.87226	-18.62437	-13.2479	12.75916
LEV_{it}	28.32387	-14.67105	42.99492	32.55627

Test: Ho: difference in coefficients not systematic
chi2(3) = (b-B)'[(V_b-V_B)^(-1)](b-B)
= 2.24
Prob>chi2 = 0.5243

is less than 5 and 1 / VIF are greater than 0.10 in all the cases,

companies in Bangladesh.

In this study, panel data regression analysis is used to examine the impact of working capital management on EPS for cement companies listed in DSE over the period 2009-2015. The study reveals that cash conversion cycle has an insignificant negative impact on EPS. This means the shorter the cash conversion cycle, the greater the EPS is likely to be. So the cement companies can increase the EPS by reducing their CCC. To get more insight and apply the knowledge practically further study on individual components of CCC i.e. inventory conversion period, days sales outstanding and payables deferral period can be conducted in future. Moreover, CCC of the sample firms has a wide range (-36.8438 days to 142.5752 days) which may also affect the result. So, further studies may be conducted by using a larger sample size that also includes the cement companies which are not listed in DSE.

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