

Working Capital Management and Firms' Profitability: Dynamic Panel Data Analysis of Manufactured Firms

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Abstract

This paper examines the impact of working capital management on firm's profitability performance of manufacturing firms by using not only static models such as ordinary least square (OLS), fixed and random effects but also dynamic models difference generalized method of moments (GMM) and system generalized method of moments (SGMM) over the period from 2007 to 2018. The performance was measured in terms of profitability by return on the asset as a dependent variable and the working capital management was determined by inventory conversion cycle (ICP), receivable collection period (RCP), payable deferral period (PDP) and cash conversion cycle (CCC) as an explanatory variables. This study only presents the results of System GMM model, due to efficient system estimator and producing statistically significant outcome. The results show that inventory conversion period (ICP) and payable deferral period (PDP) have a positive relationship with return on assets, whereas receivable collection period (RCP) is positive but statistically insignificant. This paper results suggest that pay suppliers prolong and collecting payments from customers earlier, moreover cement firms could add value by improving their cash conversion cycles. Furthermore, managers can create value for shareholders by reducing inventory and receivable accounts. This paper adds new knowledge to current literatures by examining the effect of working capital management on profitability in the context of an emerging capital market of Pakistan.

Keywords

Working Capital Management, Profitability, Cement Sector, Pakistan, Cash Conversion Cycle, Inventory Conversion Period (ICP), Payable Deferral Period (PDP), System GMM

1. Introduction

Working capital management is one of the most important issues and believed to have a profound impact on firm's profitability performance. In financial management the term "working capital" refers to the money needed for the firms to continue their day to day operational activities such as cash requires for the purchase of raw material, payment of salaries, payment of rent or any other day to day expenditures (Ahmed et al., 2016). The concept of working capital management refers that Organizations managed their short term working capital. The aim of working capital management is to promote a satisfactory level of liquidity, profitability and create shareholder's value. Working capital management is concerned to capabilities to control the current assets and current liabilities effectively and efficiently (Ali, 2011). Furthermore, working capital management enhances the ability of the firms to maximize return on asset and minimize payments for a liability. The short term capital consists of current asset and current liability that companies use for their regular operation. A well manage working capital promotes a company's well presence on the market and the term of liquidity and it also acts in the favor for the growth of shareholder value (Samiloglu & Demirgunes, 2008). The term net working capital is actually the measurement of working capital in term of efficiency and hence represents the excess of current assets over current liabilities. Similarly, the working capital management refers to the proper planning and controlling of current assets and current liabilities in a way through which the firms can eliminate their risk of inability to meet short term obligation on hand and avoid from the extreme investment in these assets on the other hand (Iqbal et al., 2014). Working capital management is concerned with those aspects of financial management of firms which not relates only getting the finance form the sources and uses of those finances by the firms but also the financial implication of investment, production, marketing and personnel decisions and the overall performance of the firms (Eljelly, 2004). The main aim of working capital management is decision making that is concerned with managing the liabilities and assets to a balance desire. The masses involved in discussing firms short capitals need to be aware from sufficient capitals to carry on firms operation, and also in position to pay its short term liabilities. The span of time which converts raw materials to final goods and then goes to cash called cash conversions cycle (CCC). This is used as a scale for managements for flow of cash for companies. Therefore managers used conversions cycle to identify right level of receivables, payables, inventories and cash (Qazi et al., 2011). Raheman & Nasr

(2007) investigated the impact of working capital management on profitability of the nonfinancial sector for 94 Pakistani nonfinancial firms and found negative correlation of average payment period, average collection period, cash conversion cycle and average inventory turnover with firm profitability.

Several studies have carried out on the working capital management and its impact on firms profitability such as (Alipour, 2011; Raheman et al., 2010; De-loof, 2003; Iqbal et al., 2016; Tran et al., 2016; Qazi et al., 2011) by examined the firms profitability using different indicators of working capital management in different countries by using multiple firms data of different sectors, however this study explore the effects of working capital management on firms profitability performance of manufactures firms by employing recently developed methods such as difference and system GMM. Furthermore, we also used static models for comparison purpose to compare the results with previous studies, however by using these methods, we have to admit that results are potentially inconsistent and biased due to endogeneity problem between independent and explanatory variables. In additions, the results of static models and difference GMM is not produce significant results, thus System estimator provide efficient results and can be strongly rely upon on the validity. According to our knowledge and searching no study have been carried out in manufacture sector of Pakistan recently which have used dynamic model. Therefore this is the first attempt to investigate relationship between working capital management and its effect on firm profitability performance in manufacturing sectors of Pakistan. The present study contributes to the existing literature by examining the effect of working capital management on profitability in the context of an emerging capital market such as Pakistan. In the next sections, the previous literature related to our paper is presented. The methodology and descriptive statistic are presented in section 3. Section 4 presents the results and findings. Section 5 concludes and policy implications etc.

2. Literature Review

The well management and use of current assets and current liabilities plays important role and stimulate the firm's profitability performances. Working capital management is concerned to capabilities to control the current asset and current liability effectively and efficiently, as well as enhances the ability of the firms to maximize return on asset and minimize payments for liability. Padachi (2006) argue that a well manage working capital promotes a company's well presence on the market and the term of liquidity and it also acts in the favor for the growth of shareholder value.

There is a growing literature on the association between working capital management and firm's profitability over the last two decades, across the countries although the previous findings are inconclusive, varied, and ambiguous. Number of studies reported a negative relation between working capital management and firm's profitability as well as some other indicators with firm's

profitability (Aktas et al., 2015; Aregbeyen, 2013; Ebben & Johnson, 2011; Shin & Soenen, 1998; Haq et al., 2011; Ali & Ali, 2012). The relationship between working capital management and corporate profitability for Belgium non-financial firms examined by Deloof (2003) and found negative and insignificant relationship for cash conversion cycle while, mixed results for others variable's. He further stated that managers can increase firm profitability by decreasing the number of day's accounts receivable and inventories. Furthermore, Eljelly (2004) study the relation between profitability and liquidity for stock companies of Saudi Arabia. The empirical results show that firms' profitability is found to be negative relationship with firm's current ratios and cash ratios. He further stated that at the industry level, cash conversion cycle is of more significance as an amount of liquidity than current ratio that affects profitability. Similarly, for Pakistani firms, Raheman & Nasr (2007) find out the working capital management impact on liquidity and profitability of the firm. They found a strong negative relationship between variables of the working capital management and profitability of the firm as well as liquidity. Similar study were carried out by Samiloglu & Demirgunes (2008) for Turkey manufacturing firms listed at Istanbul stock exchange and found that accounts receivables period, leverage, and inventory period affect firm profitability negatively. Similarly, using a sample of 1628 firms of Malaysian registered at Bursa capital market and by using OLS regression, Zariyawati et al. (2009) found that decrease in cash conversion cycle increases firms profitability. Using a large sample of America firms, Shin & Soenen (1998) find negative effects of CCC on firm profitability. They further highlighted that efficient working capital management (WCM) play significant role in creating value for the shareholders. For Iran, Alipour (2011) finds that there is a negative significant relation between number of day's accounts receivable and Inventory on profitability and positive relationship number of day on accounts receivable. Likewise, using data from of 7 firms of oil and gas industry of Pakistani and, by employed fixed effect estimator, Shah & Sana (2005) find a negative relationship between gross profit margin and number of day's accounts receivable and number of day's inventory, sales growth and cash conversion cycle. Likewise, Afza & Nazir (2008) also find negative relationship between firm's profitability's and working capital management policies. Similar analyses were carried out by Ali (2011) for 160 textile firms of Pakistan and found that average day's receivable and average day's payable is negatively effects firm profitability. For six truism sectors firms, the effect of working capital management on profitability were examined by Korkmaz & Yaman (2019) and found that that accounts receivables, inventory turnover period, and cash conversion cycle have statistically negatively effects on firms profitability while accounts payables has indirect effects on tourism firms profitability. Moreover, using sample of 21 cement firms listed at Pakistan stock exchange, Arshad & Gondal (2013) carried out a study to examine the effects of working capital management on firm's profitability of Cement sectors. The results suggested that working capital management nega-

tively and significantly effects firms' profitability. Likewise, for 40 small scale businesses, Afeef (2011) find that three working capital management indicators (WCM) has a visible and profound impact on firm's profitability of aforementioned firms while PDP and CCC are statistically found insignificant. Using a big sample of Finland firms Enqvist et al. (2014) found that CCC is negatively effects firms' profitability. He further stated that this effect is higher in economic downturns. Similar results were found by García-Teruel & Martínez-Solano (2007) for Spanish firms. Likewise, employing a sample of 17 firms, Cristea & Cristea (2016) partially confirmed the negative relation between cash conversion cycles and profitability of firms in CESEE region. They also confirmed negative relationship between the apparatuses of ROA and CCC. Similar results were found by Iqbal et al. (2014) for CCC indicator for Pakistani firms. Boțoc (2013) also confirmed the negative relationship between working capital management and profitability for Romanian listed firms. Similarly, one another study carried out on Romania firms by Danuletiu (2010) and found weak negative correlations. Korkmaz & Karaca (2014) investigated the association between profitability's indicators and financial variables as well as the elucidation firm's performance level by employing 78 manufacturing firms data listed on Istanbul Stock Exchange (ISE). They used panel models and came with findings that three indicators (TB/TA, DV/TA, and MDV/UVYK) are statistically significant negative relationship to explain the firm profitability performance level except model 1, while variable Net Sales /Current Assets (NS/DV) significantly positively affects Net Profit/Shareholder's Equity (NK/OS) and Net Profit/Total Assets (NK/TA).

There are some studies documented in literature which indicates a positive, mix, or insignificant relationship on firm's profitability by taken varied samples and sectors into consideration in different countries. For instance, Kung'u (2015) examines the effect of working capital management on profitability of manufacturing firms in Kenya. The result shows that there was positive relationship between all explanatory variable (credit policy, account payable practices, liquidity management practices, and working capital levels) and firm profitability. Similarly, for Pakistan Cements and foods sectors, Iqbal et al. (2016) find that current ratio and average collection period have positive relationship with firms profitably whereas, insignificant negative relationship of inventory turnover and average collection period on firms profitability. Likewise, another study carried out on Pakistani firms by Iqbal et al. (2014), and came up with results that account payable and inventory is a positive relationship. Similarly, Shah & Sana (2005) also find a positive relation between number of day's accounts payables and profitability. Gill et al. (2010) examined the relationship between working capital management and firm's profitability for 87 American firms and found significant positive relationship between the cash conversion cycle and profitability. Furthermore, using a panel static model and taken sample of 274 non-financial Pakistani firms, Nazir & Afsha (2009) examined the ef-

fects of aggressive working capital management and financing policies using Tobin Q and ROA. The empirical results suggest that conservative approach is better for manager to create value for shareholders, as well as investors prefer to invest in aggressive approaches firms. Recently, [Biswas \(2017\)](#) find the evidence of association of working capital management with firm profitability. Similar results were found by [Jana \(2018\)](#) for India. Using a sample of 263 non-financial firms registered at the Bombay stock exchange and by employing OLS regression [Sharma & Kumar \(2011\)](#) find that number of day's accounts receivables and CCC significantly and positively affect firm's profitability while inventory of number of days and number of days account payable are negatively effects firm's profitability. Conversely, employing a sample from polish firms registered on Warsaw capital market [Bolek \(2013\)](#) find no evidence of association between profitability components and capital indicators. Furthermore, [Agha \(2014\)](#) finds the evidence of working capital management on firm profitability for cement firms. [Yunos et al. \(2015\)](#) investigate the effect of government linked corporation of working capital management effects on financial performance in Malaysia and found mix results of different indicators on firm's profitability.

Several studies have proven the inverted U-shape relationship between firm's profitability and working capital management across the globe for different sectors firms. For instance, using a panel data of sample of 937 high growth gazelles firms (HGF) from 13 Europe countries and utilizations different static and dynamic panel models, [Boțoc & Anton \(2017\)](#) investigated the association of firm's profitability with working capital management. Their empirical results indicate an inverted U-shape relationship between firm profitability and working capital. They further suggest that HGF firms should uphold optimal working capital level for the purpose to increase firm profitability. Similar results were found by [Afrifa & Padachi \(2016\)](#) and [Mun & Jang \(2015\)](#). Moreover, taking a sample from nonfinancial firms of England, [Baños-Caballero et al. \(2014\)](#) also confirmed the concave association between trading cycle and its performance measure through Tobin Q. Furthermore, for Spanish, [Baños-Caballero et al. \(2012\)](#) confirm the concave relationship and stated that firms' profitability declines as they travel away from their optimal level.

The aforesaid papers concentrated on different countries by using different approaches, as well as sample from many sectors or industries. There were only few studies carried out on Pakistan by using static models as well as sample from different sectors. We extend the previous papers closely related to our work by examining the causality relationship between firm profitability and working capital management within a multivariate framework (dynamic and static methods) for manufacturing firms of Pakistan.

3. Empirical models and Data

3.1. Data

This research contributes towards a very important aspect of financial manage-

ment known as working capital management. The purpose of this study is to examine the nexus between working capital management and firms' profitability performance of 35 Pakistani firms recorded in Pakistan stock exchange for a period of nine years from 2007 to 2018. Cement industry of Pakistan is under consideration in our study because cement industry is one of the rapidly growing industries in Pakistan and there are no study reported in literature from highly reputable sources on cement industry like our study. Furthermore, from the last one decade, the demand of cement has increases due to initiating mega infrastructure projects as well as Chinese one built one road projects. There are 35 total firms in the cement industry which is listed in Pakistan stock exchange. We have purposely chosen a sample size of 17 firm's data due to availability of data. For this study, we measure profitability, i.e. the dependent variable, through Return on Assets (ROA), can be defined as net income to assets ratio. The receivable collection period is the independent variables and can be define as the average time needed to change the firm's receivables into cash. The second dependent variables is inventory conversion period which is average time required to change materials into finished goods and then to sell those goods. Another dependent variable is "Payable Deferral period" which is average measurement of time between the purchase of materials and labor and the payment of cash for them. The last independent variable is the "cash conversion cycle" the ratio is used a complete measure of working capital is at show the time-lag between payment for the purchase of raw material and the collection of sale of finished goods. In literatures the relationship of Cash conversion cycle were found negative with firm profitability such as the study of [Alipour \(2011\)](#) and [Raheman et al. \(2010\)](#). Moreover, the control variable for this study is current ration which measures a firm's ability to meet short term obligation and one of the most common and typically used of this ratio is the current ratio. The other control variables are debt to equity ratio (DER), operating profit (OP) and liquidity. The aforementioned explanatory and control variables variables have used by the studies of [\(Afza & Nazir, 2008; Nazir & Afza, 2009; Mohamad & Saad, 2010; Danuletiu, 2010; Padachi, 2006; Ching et al., 2011\)](#) in their research studies. All the data have collected from annual reports of the companies listed in the Pakistan stock exchange. The descriptive statistic and figures are given below.

In [Figure 1](#), the given indicators of working capital management are called explanatory and control variables and these components have collectively effected the profitability of the firms [Ching et al. \(2011\)](#).

[Table 1](#) reports the minimum and maximum range, statistical mean and standard deviation. This study is using 17 firms data for 12 years period which the total observations are equal to 204. The minimum value of current ratio (CR) is 0.000 while its maximum value is 4.830 out of 204 observations. Its standard deviation is 0.928 and mean is 0.996. The credit period against the sale of firm's goods take an average of 37 days to receive money back whereas, minimum and maximum times are 0.08 and 143 days respectively. The inventory in the stocks

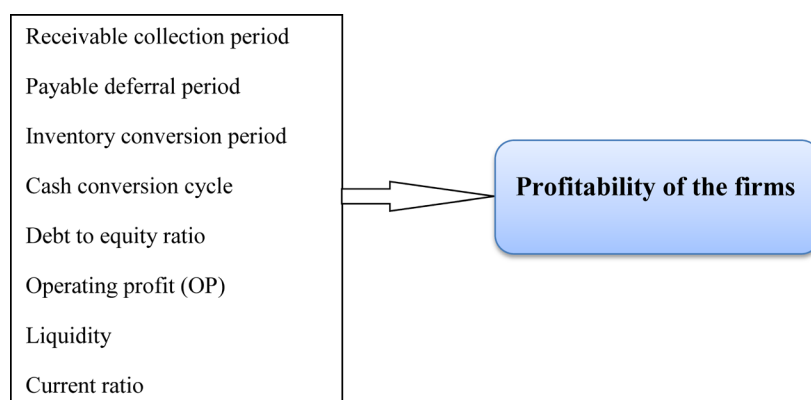


Figure 1. Conceptual framework.

Table 1. Descriptive statistics.

Variables	CCC	ICP	RCP	ROA	PDP	CR	LQD	OP	DER
Mean	-608	2.181	30.009	4.726	540.012	1.149	0.931	0.060	1.222
Maximum	1197.517	27.324	1152.946	37.680	2103.709	4.830	4.554	0.784	-17.46
Minimum	-84,900,253	1.45E05	0.087994	-28.210	0.001	0.000	0.133	-0.470	6.49
Std.Dev.	159,221	4.635	124.619	11.728	470.109	1.058	0.802	0.171	1.969
Observation	204	204	204	204	204	204	204	204	204

Note: The current Ratio of the firm, CCC represents the Cash conversion cycle, ICP stands for Inventory conversion period, RCP represents the Receivables Conversion period, ROA stand for return on assets and PDP (payable deferral period). LQD represents the Liquidity, operating profit (OP) stand for profitability and DER (debt to equity ratio).

on average take 2 days to sell with standard deviations of 5 days while the maximum time is taking to sell inventories is 27 which is a very short period. The cash conversion cycle average value is -6,082,020 and standard deviation is 15,922,901 days. The averages time payment of cash 486 days and having standard is 474. The minimum time take company to pay cash is 0.001 days and maximum is 2103 days.

Figure 2 display that 2016 is the cement sector's best year in term of average ROE attained, while 2008 shows a negative average ROE. **Table 2** lists the best-performing cement firms that are able to create value for shareholders by giving them the highest returns on their invested Attock Cement Pakistan Ltd. leads with the highest 11-year average ROA, 20.216, and is thus ranked first followed by other leading performers in this respect while the lowest 11-year average ROA, -17.481 which ranked last.

3.2. Main Models

The purpose of this study is to examine the relationship between working capital management and firms profitability by employ the Static model such as pooled OLS, Random effect, and fixed effect and dynamic models (GMM and System GMM) explored by [Arellano & Bover \(1995\)](#) and [Blundell & Bond \(1998\)](#) models in order to see the impact of working capital management on firms

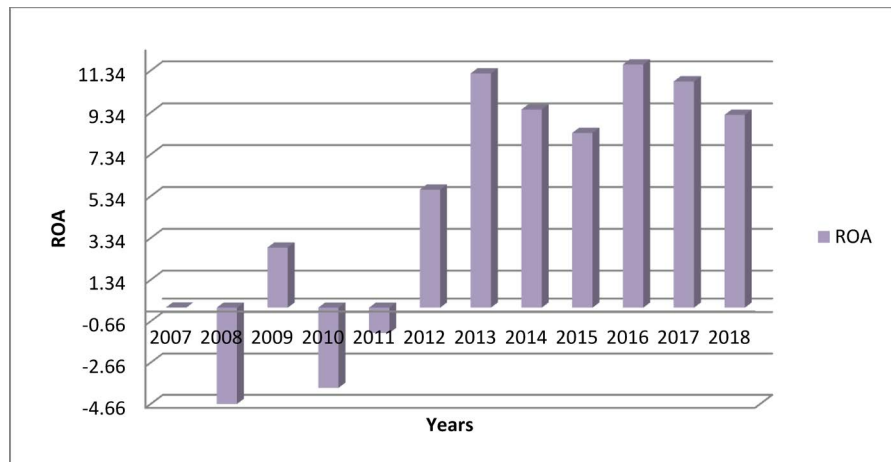


Figure 2. Average ROE for Cement Sector (2007-2018).

Table 2. Firms ranked by return on assets (ROA) (2007-2018).

Firms	Eleven-year average ROA	Rank
Attock Cement Pakistan Ltd.	20.216	1
Dandot Cement Ltd.	14.189	2
Lucky Cement Ltd.	13.488	3
Kohat Cement Ltd.	13.074	4
Fauji Cement Ltd.	8.634	5
Bestway Cement Ltd.	10.143	6
Fecto Cement Ltd.	10.126	7
Pioneer Cement Ltd.	9.982	8
D.G Khan Cement Ltd.	6.003	9
Maple Leaf Cement Factory	3.486	10
Lafarge Pak. Cement Ltd.	2.733	11
Power Cement	1.821	12
Dewan Cement Ltd.	1.252	13
Thatta Cement Co Ltd.	1.423	14
Gharibwal Cement Ltd.	1.0667	15
Mustehkam Cement Ltd.	0.953	16
Zeal Pak Cement Factory Ltd	-17.481	17

profitability of Pakistan cement industries. The static models are as following.

$$ROA_{it} = \beta_0 + \beta_1 RCP_{it} + \beta_2 PDP_{it} + \beta_3 ICP_{it} + \beta_4 CCC_{it} + \beta_5 CR_{it} + \beta_6 LIQD_{it} + \beta_7 DER_{it} + \beta_8 OP + \varepsilon_{it} \tag{1}$$

$$ROA_{it} = \beta_0 + \beta_1 RCP_{it} + \beta_2 PDP_{it} + \beta_3 ICP_{it} + \beta_4 CCC_{it} + \beta_5 CR_{it} + \beta_6 LIQD_{it} + \beta_7 DER_{it} + \beta_8 OP + \delta_t t + a_i + \varepsilon_{it} \tag{2}$$

where is ROA is return on asset, RCP is receivable collection period, PDP is payable deferral period, ICP denote inventory conversion period, CCC is cash

conversion cycle, CR is current ratio, LIQD is liquidity, DER is debt to equity, OP is operating profit of firms and i denote firms and t denotes time, ϵ =error term. δ is time fixed effects while α_i is firms fixed effect. Using OLS or fixed effect model we have to admit that results are potentially inconsistent and biased due to endogeneity problem between independent and explanatory variables. The endogeneity problem can be reducing by adopting the instrumental variables (IV) approach [Kurul & Yalta \(2017\)](#). But due to weak instruments the OLS approach estimators are likely to be biased to similar to fixed effect (FE) estimator. Instead of ordinary least squares and instrumental variables approach, we are using the system GMM estimators proposed by [Arellano & Bover \(1995\)](#) and [Blundell & Bond \(1998\)](#). We are also using static, difference GMM for comparison purpose but it not produce significant results, thus System estimator provide efficient results and can be strongly rely upon on the results validity [Khan et al. \(2019\)](#). The GMM models can be estimated through the following equation.

$$ROA_{it} = \beta_1 ROA_{i,t-1} + \beta_2 WC_{it} + \beta_3 X_{it} + \epsilon_{it} \quad (3)$$

where ROA_{it} represents the return on Asset, β_{it-i} is the lag of ROA_{it-1} is used as an explanatory variable to measure the effect of the previous year's firm's profitability on the current period ROA. WC represents the vectors of working capital indicators of manufacturing firms. WC includes receivable collection periods, payable deferral period, inventory conversion period, and cash conversion cycle. X_{it} is the vector of control variables that potentially effect firms profitability. It includes debt to equity ratio, liquidity, operating profit, and currents ratios. ϵ is error term, whereas i and t is firms and time index respectively.

4. Empirical Results and Discussion

Table 3 provides the association among the variables of interest in the study. Correlation analysis is used for data to see the association between variables such as working capital management indicators with profitability of the firms. Analyses

Table 3. Correlation matrix.

Variables	ROA	RCP	ICP	PDP	CCC	CR	LQD	OP	DER
ROA	1.000								
RCP	-0.079	1.000							
ICP	0.035	-0.079	1.000						
PDP	0.675	0.034	-0.220	1.000					
CCC	0.331	0.069	-0.0785	0.402	1.000				
CR	-0.042	-0.143	0.262	-0.053	-0.345	1.000			
Liquidity	0.568	-0.088	0.383	0.377	-0.424	0.325	1.000		
OP	0.769	-0.014	0.022	0.492	0.003	-0.023	0.532	1.000	
DER	-0.163	-0.173	-0.027	0.092	0.036	-0.037	-0.008	0.042	1.00

of correlation start from the results between the return on asset and receivable collection period. The result of receivable collection period (RCP) and current ratio (CR) show a weak negative association with return on asset while the inventory conversion period (ICP) and cash conversion cycle (CCC) is weak positive associate with return on asset. Furthermore, the payable deferral period (PDP), liquidity, and operating profit (OP) are strongly positive correlate with return on asset. The CCC correlation with ROA suggests that keeping inventories longer improves profitability as well as the PDP results also suggest that that cements firms shorten payments time to their creditors in order to make higher profits.

Table 4 presents the results of working capital management effects on firms' profitability of manufacturing firms in Pakistan. Hausmann test statistic result indicates that fixed is appropriate model against the random effects. The ROE_{it-a} represent lag of dependent variable and this is correlated with error term, when we apply the static models such as pooled OLS estimators with random effect and fixed effect may create the problem of endogeneity and results may unbiased and unreliable. Therefore, to solve this problem we are only presenting GMM estimators results and the all other models results only used for comparison purpose. The estimated values of ROA_{it-1} are statistically significant at 1 and 5 percent level of significant, which indicates that GMM methods is efficient and the empirical results are highly reliable to carry out statistical analysis. Moreover, the Seragan statistic estimated value is associated with a p-value higher than 10 percent in GMM and system GMM model which these outcomes confirm the validity of the two-step GMM and system GMM approach for undertaking the empirical analysis. Moreover, serial correlation test results reject the first order serial correlation (AR1) and accept the alternative hypothesis which indicates the absence of the second order serial correlation (AR2). The PDP has the estimated coefficient value of OLS is 0.011, the RE, FE, GMM and System GMM are 0.011, 0.010, 0.008 and 0.009 respectively which depicted that the PDP is positive relation with return on asset and highly significant which implies that if payable deferral period increase it would have positive effect on firm profitably and this results are align with the precious study [Iqbal et al. \(2014\)](#), [Sharma & Kumar \(2011\)](#), [Rahman & Nasr \(2007\)](#). While [Korkmaz & Yaman \(2019\)](#), [Ali \(2011\)](#), and [Shah & Sana \(2005\)](#), found positive relationship between PDP and ROA. Similarly, the estimated coefficient of ICP of pooled OLS, RE and FE are positive but statistically insignificant while the GMM and system GMM also positive but statistically significant which indicates that increase in ICP increases firms profitably (measured by ROA). Similar results were found by [Iqbal et al. \(2014\)](#), while [Alipour \(2011\)](#), [Korkmaz & Yaman \(2019\)](#), [Samiloglu & Demirgunes \(2008\)](#), and [Sharma & Kumar \(2011\)](#) found negative effects of ICP on firm's profitability. Conversely, the variable CCC results of OLS, RE, FE and GMM are statistically non-significant, while the coefficient of system GMM results indicate statistically significant and negative relationship with firms profitability which implies

Table 4. The effect of working capital management on profitability of firms (measured through ROA).

VARIABLES	(OLS) ROA	(RE) ROA	(FE) ROA	(GMM) ROA	(SGMM) ROA
Rcp	-0.007* (0.004)	-0.005 (0.004)	-0.003 (0.004)	0.009 (0.006)	0.002 (0.006)
Icp	0.018 (0.150)	0.0532 (0.151)	0.117 (0.157)	0.385** (0.178)	0.455** (0.177)
Pdp	0.011*** (0.001)	0.011*** (0.001)	0.010*** (0.002)	0.008*** (0.002)	0.009*** (0.002)
Ccc	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001 (0.001)	-0.001** (0.001)
Cr	-1.001** (0.444)	-0.308 (0.499)	0.593 (0.582)	1.391* (0.823)	-0.793 (0.618)
Liquidity	1.822** (0.875)	1.621* (0.859)	1.439* (0.857)	-1.461 (1.316)	-0.745* (1.265)
OP	33.56*** (3.215)	30.53*** (3.196)	25.28*** (3.337)	29.81*** (5.160)	37.52*** (4.654)
Der	0.330 (0.221)	0.007 (0.234)	-0.375 (0.252)	-0.185 (0.267)	-0.155 (0.262)
ROA _{it-1s}				0.335*** (0.084)	0.126** (0.060)
Constant	-4.193*** (0.920)	-4.315*** (1.149)	-3.609*** (1.275)	-1.970 (1.666)	-1.174 (1.553)
Hausman test			33.67		
AR1				-5.19**	-0.12
AR2				0.85	0.14
Sergan				113.48	112.44
Observations	204	204	204	170	187
R-squared	0.746		0.551		

Note: (***) sig at 1% level, (**) sig at 5% and (*) sig at 10% level, Standard error are in parenthesis. OLS, RE, FE, GMM and SGMM represent the pooled ordinary least square, random and fixed effect, generalized and system generalized method of moments respectively.

that as the cash conversion cycle rises it will go to reducing profitability of the firms, and managers can create a positive value for the stakeholders by decreasing the cash conversion cycle to a possible minimum level. This result suggests that suggests that cement firms could add value by improving their cash cycles. Our results are aligned with previous studies of [Cristea & Cristea \(2016\)](#), [Ali \(2011\)](#), [Enqvist et al. \(2014\)](#) and [Iqbal et al. \(2014\)](#). On the other hand, the coefficient value of Operating profit (OP) increase perceived level of firms profitabil-

ity in all models, therefore, even though this results is strong, is coherent with the common view about firms performance in literatures in which firms with strong working capital management (WCM) tend to perform well in terms of operating profit performance. The estimated coefficient of control variable “Liquidity” is seem to positively affect profitability of firms in model OLS, FE, and RE while the GMM results seem to negatively effects firms profitability which indicate that 1 percent increases in liquidity decreases firms profitability of firms. In additions, furthermore, the debt to equity ratio (DER) estimated coefficient sign are positive in all models but statistically insignificant. The variable CR results of pooled RE, FE and system GMM indicates a statistically non-significant relations with firms profitability while GMM results is positively and significantly effects return on assets at 10 percent level of significant which indicate that increase in liquidity increases firms profitability of the manufactures sectors of Pakistan and same results were found by [Raheman & Nasr \(2007\)](#), [Eljelly \(2004\)](#), [Deloof \(2003\)](#) and [Khan et al. \(2005\)](#). The pooled OLS and FE result also shows that R-square weighted is 75 percent which depicted that there is 75 percent variation in the dependent variable explained by the independent variable while in fixed effects model depicts only 55 percent variation.

Table 5 presents the results of working capital management effects on firms’ profitability of manufacturing firms in Pakistan. The regression analysis of fixed effects consists of five specifications: one each for the single explanatory variable of WCM, along with the control variables of current ratio (CR), operating profit (OP), liquidity, and debt to equity ratio (Der). Use return on asset as a dependent variable in **Table 5** report that there are few differences with respect to explanatory and control variables. The CCC is significantly and positively effects firms’ profitability while the ICP is negatively significantly effects profitability of firms. The PDP and liquidity variables results are similar to the results given in **Table 4** which confirm the results reliability and robustness while the debt to equity ratio (Der) significantly and positively effects firms’ profitability from specification (1) to (4).

Table 6 report the results of explanatory variables effects on firm’s profitability using return on assets (ROA) by employing GMM model from specifications (1) to (5). The results indicate that there are few differences with respect to explanatory and control variables.

The CCC and ICP are significantly and positively effects firms’ profitability (measured by ROA) while the ICP is negatively insignificantly effects profitability of firms. The estimated coefficient sign of “liquidity” variable in specification (1) to (4) are different in term of sign but specification 5 results are similar in term of sign to the results given in **Table 4** of GMM model.

The PDP, DER and Operating profit (OP) variables result are similar to the result given in **Table 4** which confirm the results reliability; while the ICP and current ratio (Cr) results are contrary to the results given in **Table 4**.

Table 7 presents the results of explanatory variables effects on firm’s profitability by using system GMM model from specifications (1) to (5) for each single

Table 5. The effect of different indicators of working capital management on firm's profitability performance using fixed effects (FE) model.

Dependent variable: ROA	(1) (FE)	(2) (FE)	(3) (FE)	(4) (FE)	(5) (FE)
Cr	0.767 (0.756)	0.520 (0.745)	0.784 (0.659)	0.390 (0.713)	0.599 (0.648)
Liquidity	5.273*** (0.957)	5.402*** (0.939)	3.136*** (0.883)	5.852*** (0.906)	2.920*** (0.872)
Der	-0.720** (0.327)	-0.749** (0.319)	-0.615** (0.284)	-0.767** (0.306)	-0.399 (0.282)
OP	33.61*** (3.215)	31.53*** (3.196)	24.28*** (3.337)	27.81*** (5.160)	28.94*** (3.589)
Rcp	-0.001 (0.005)				
Icp		-0.416*** (0.155)			
Pdp			0.012*** (0.002)		
Ccc				0.001*** (0.001)	
Constant	-0.154 (1.280)	0.831 (1.280)	-4.773*** (1.244)	1.674 (1.231)	0.067 (1.068)
Observations	204	204	204	204	204
R-squared	0.204	0.234	0.392	0.296	0.413

Note: (***) sig at 1% level, (**) sig at 5% and (*) sig at 10% level, Standard error are in parenthesis. FE is fixed effect.

Table 6. The effect of different indicators of working capital management on firm's profitability performance using generalized method of moments (GMM) model.

Dependent variable: ROA	(1) (GMM)	(2) (GMM)	(3) (GMM)	(4) (GMM)	(5) (GMM)
ROA _{IT-1s}	0.314*** (0.081)	0.327*** (0.081)	0.210** (0.082)	0.291*** (0.082)	0.206*** (0.074)
Cr	1.829* (0.974)	1.576 (0.980)	1.640* (0.920)	1.526 (0.966)	1.005 (0.855)
Liquidity	2.018 (1.382)	2.064 (1.417)	0.018 (1.417)	2.088 (1.382)	-0.052 (1.297)
Der	-0.418 (0.314)	-0.437 (0.313)	-0.382 (0.294)	-0.402 (0.309)	-0.272 (0.276)
OP	34.56*** (4.215)	31.53*** (2.196)	26.28*** (3.337)	28.81*** (4.160)	30.65*** (4.979)
Rcp	0.008 (0.007)				

Continued

Icp		-0.039 (0.185)			
Pdp			0.009*** (0.002)		
Ccc				0.001** (0.001)	
Constant	-0.044 (1.512)	0.490 (1.577)	-2.609* (1.585)	1.697 (1.571)	1.508 (1.300)
Sargan	85.151*	76.100**	72.506*	73.558**	76.808**
Observations	170	170	170	170	170

Note: (*) sig at 1% level, (**) sig at 5% and (*) sig at 10% level, Standard error are in parenthesis. GMM represent the generalized method of moments.

Table 7. The effect of different indicators of working capital management on firm's profitability performance using system generalized method of moments (SGMM) model.

VARIABLES	(1) (SGMM)	(2) (SGMM)	(3) (SGMM)	(4) (SGMM)	(5) (SGMM)
ROA _{it-1}	0.417*** (0.064)	0.437*** (0.063)	0.291*** (0.067)	0.385*** (0.065)	0.252*** (0.057)
Cr	-0.841 (0.757)	-0.794 (0.749)	-0.752 (0.702)	-1.117 (0.747)	-0.760 (0.629)
Liquidity	4.807*** (1.266)	4.622*** (1.283)	2.009 (1.316)	5.161*** (1.254)	0.603 (1.182)
Der	-0.601* (0.320)	-0.528* (0.315)	-0.475 (0.295)	-0.500 (0.310)	-0.167 (0.268)
OP	36.56*** (5.315)	33.53*** (4.170)	28.28*** (3.337)	34.81*** (5.170)	37.89*** (4.420)
Rcp	-0.003 (0.007)				
Icp		-0.131 (0.190)			
Pdp			0.012*** (0.003)		
Ccc				0.001*** (0.001)	
OP					
Constant	0.501 (1.475)	0.624 (1.522)	-3.331** (1.525)	1.891 (1.503)	2.161* (1.208)
Sargan	135.396***	126.7092**	123.5097**	122.608**	118.594
Observations	187	187	187	187	187

Note: (***) sig at 1% level, (**) sig at 5% and (*) sig at 10% level, Standard error are in parenthesis. OLS, RE, FE, GMM and SGMM represent system generalized method of moments respectively.

explanatory variable. The results indicate that there are few differences with respect to explanatory and control variables.

The results of payable deferral period (PDP) in specification (3) and operating profit (OP) in specifications (1) to (5) are similar to the results given in **Table 5** while the results of ICP and RCP are different in term of signs and magnitude. Furthermore, the results of CCC are significantly and positively effects while the CCC results given in **Table 5** are reverse. The debt to equity ratio (Der) results in specification (1) and (2) are similar but statistically significant while the other three specifications from (3) to (5) results are statistically insignificant which confirm the results validity. Moreover, the results of “Liquidity” variables are completely different in term of sign and magnitude.

Working capital management and firms’ profitability using ROE

This result is only presenting for robust check by taking return on equity is a dependent variable along with explanatory and control variables but this results is only for comparison purpose as these results are not part of conclusion or abstract.

Table 8 presents the results of working capital management effects on firms’ profitability of manufacturing firms in Pakistan. Using ROE as a dependent variable from model OLS to SGMM in **Table 7** report that there are complete differences with respect explanatory and control variables to the results given in **Table 4** of all model. The results revealed that only current ratio (CR) significantly positively affect firm’s profitability while the other all variables results such as ICP, RCP, PDP, CCC and Liquidity are statistically insignificant except the operating profit (OP) results in model OLS, RE and FE in term of sign.

Table 9 presents the results of working capital management effects on firms’ profitability of manufacturing firms in Pakistan. The regression analysis of fixed effects consists of five specifications: one each for the explanatory variables of WCM, along with the control variables of current ratio (CR), operating profit (OP), liquidity, and debt to equity ratio (Der). Using alternative specifications, model 1 to 5 of **Table 9** report that there are certain differences with respect to controls variables in all specification.

The, PDP, CCC and Operating profit (OP) significantly and positively effects return on equity while RCP and ICP negatively effects which confirmed the results robustness given in **Table 5**. The specification (1), (2), (3), (4) and (5) results are similar to the results given in **Table 5** which confirm the results reliability. Moreover, the estimated coefficient of current ratio (CR) is positively and significantly effects firm’s profitability from specification (1) to (5) and these results are contrary to the results given in 4. The result of Liquidity and debt to equity ratio (Der) is contrary with the results of **Table 5**, except the specification (4) results.

Using alternative specifications (1) to (5) in **Table 10** reports that there are complete differences with respect to explanatory and control variables.

All the explanatory as well as control variables results are significantly and

Table 8. The effect of working capital management on firms' profitability (measured through ROE).

VARIABLES	(OLS) ROE	(RE) ROE	(FE) ROE	(GMM) ROE	(SGMM) ROE
Rcp	-0.004 (0.005)	-0.004 (0.005)	-0.008 (0.006)	0.003 (0.007)	0.002 (0.008)
Icp	-0.118 (0.205)	-0.118 (0.205)	-0.113 (0.240)	-0.144 (0.243)	-0.079 (0.240)
Pdp	0.003 (0.002)	0.003 (0.002)	0.006*** (0.002)	-0.003 (0.003)	-0.002 (0.003)
Ccc	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)	0.001 (0.001)
Cr	3.278*** (0.606)	3.278*** (0.606)	4.044*** (0.887)	3.504*** (1.262)	3.662*** (1.251)
Liquidity	-1.177 (1.194)	-1.177 (1.194)	-0.848 (1.307)	-1.230 (1.859)	-1.100 (1.891)
OP	15.20*** (4.388)	15.20*** (4.388)	17.25*** (5.091)	3.513 (6.714)	3.971 (6.045)
Der	-0.043 (0.301)	-0.043 (0.301)	0.145 (0.384)	0.113 (0.373)	0.169 (0.360)
ROE _{it-1s}				0.512*** (0.075)	0.598*** (0.061)
Constant	-0.105 (1.255)	-0.105 (1.255)	-3.874** (1.946)	1.606 (2.467)	0.186 (2.201)
R-squared	0.227		0.255		
AR1				0.08	-0.14*
AR2				0.12	0.15
Sargan				110.259***	114.15
Observations	204	204	204	170	187

Note: (***) sig at 1% level, (**) sig at 5% and (*) sig at 10% level, Standard error are in parenthesis. OLS, RE, FE, GMM and SGMM represent the pooled ordinary least square, random and fixed effect, generalized and system generalized method of moments respectively

Table 9. The effect of different indicators of working capital management on firm's profitability performance using fixed effects model.

Dependent variable:	(1)	(2)	(3)	(4)	(5)
ROE	(FE)	(FE)	(FE)	(FE)	(FE)
Cr	4.198*** (0.924)	4.080*** (0.924)	4.282*** (0.896)	4.058*** (0.917)	4.160*** (0.888)
Liquidity	1.758 (1.169)	1.899 (1.163)	0.525 (1.202)	2.131* (1.166)	0.250 (1.195)

Continued

Der	-0.077 (0.399)	-0.065 (0.395)	0.021 (0.387)	-0.068 (0.393)	0.170 (0.386)
OP	15.20*** (4.388)	15.20*** (4.388)	17.25*** (5.091)	18.09*** (4.319)	19.08*** (4.919)
Rcp	-0.006 (0.006)				
Icp		-0.319* (0.192)			
Pdp			0.007*** (0.002)		
Ccc				0.001** (0.001)	
Constant	-1.803 (1.564)	-1.371 (1.586)	-4.895*** (1.694)	-1.099 (1.583)	-1.987 (1.464)
Observations	204	204	204	204	204
R-squared	0.154	0.162	0.197	0.171	0.214

Note: (***) sig at 1% level, (**) sig at 5% and (*) sig at 10% level, Standard error are in parenthesis. FE is fixed effect.

Table 10. The effect of working capital management on profitability of firms using different indicators using generalized method of moments (GMM) model.

Dependent variable: ROE	(1) (GMM)	(2) (GMM)	(3) (GMM)	(4) (GMM)	(5) (GMM)
ROE _{it-1s}	0.518*** (0.073)	0.512*** (0.074)	0.520*** (0.074)	0.514*** (0.074)	0.513*** (0.074)
Cr	3.733*** (1.233)	3.600*** (1.225)	3.641*** (1.224)	3.661*** (1.221)	3.559*** (1.224)
Liquidity	-1.725 (1.717)	-1.722 (1.698)	-1.432 (1.804)	-1.575 (1.698)	-1.608 (1.684)
Der	0.108 (0.364)	0.096 (0.368)	0.107 (0.367)	0.106 (0.367)	0.137 (0.369)
OP	16.20*** (5.388)	18.20*** (5.388)	16.25*** (5.012)	6.091 (7.319)	4.636 (5.997)
Rcp	0.003 (0.007)				
Icp		-0.181 (0.189)			

Continued

Pdp			-0.001		
			(0.003)		
Ccc				0.001	
				(0.001)	
Constant	0.087	0.701	0.513	0.498	-0.058
	(1.754)	(1.845)	(2.121)	(1.813)	(1.750)
Observations	170	170	170	170	170
Sargan	118.222***	117.019***	118.127**	118.189***	118.189***

Note: (*) sig at 1% level, (**) sig at 5% and (*) sig at 10% level, Standard error are in parenthesis. GMM represent the generalized method of moments.

statistically different in term of sign and magnitude from the results given in **Table 6**, except the specification (1) and (3) result of current ratio as well as all specification result of operating profit (OP) which indicates positive relationship with firm's profitability.

Table 11 reports the results of explanatory variables effects on firm's profitability (measured through ROE) by employing system GMM model from specifications (1) to (5). All the model results are completely different from the results given in **Table 7** which indicate weak validity. Moreover, the results of "current ratio (CR)" is positively affect firms profitability from specification (1) to (5), which indicate that increase in current ratio increase firms profitability using return on equity.

5. Conclusion and Remarks

The concept of working capital management refers that companies managed their short term working capital. The main objective is to promote a satisfactory level of profitability and create shareholder's value. Working capital management is concerned to capabilities to control the current asset and current liability effectively and efficiently. Profit maximization is the main goal of every firm but at the same time the firms also want to maintain its liquidity because without liquidity the firms are unable to pay the short term dues or obligation or liability and without sufficient liquidity the firms cannot deliver goods or services to customers as they are unable to purchase the raw material, pay wages and salaries, rent etc. which effect their profitability very badly. If the firms want to increase the profitability without increasing their liquidity it creates many problems for the firms, firstly the firms do not maintain their existence for long time period as the firms' need cash/money for their operations, secondly the firms may face the situations of bankruptcy as the firms not having sufficient cash for short term due to obligations. Based on the aforementioned reasons, the objective of the paper is to examine the effect of working capital management on firms' profitability performance of Pakistan cement industry firms. The results of pooled OLS show that R-square weighted is 75 percent, which depicted that

Table 11. The effect of working capital management on profitability of firms using different indicators using system generalized method of moments (SDGMM) model.

Dependent variable:	(1)	(2)	(3)	(4)	(5)
ROA	(SGMM)	(SGMM)	(SGMM)	(SGMM)	(SGMM)
ROE _{it-15}	0.604*** (0.057)	0.601*** (0.057)	0.606*** (0.059)	0.601*** (0.057)	0.594*** (0.059)
Cr	3.809*** (1.227)	3.719*** (1.221)	3.762*** (1.219)	3.739*** (1.218)	3.710*** (1.214)
Liquidity	-1.380 (1.664)	-1.348 (1.652)	-1.220 (1.794)	-1.253 (1.667)	-1.453 (1.661)
Der	0.154 (0.354)	0.146 (0.357)	0.163 (0.357)	0.150 (0.357)	0.169 (0.356)
OP	5.267 (7.233)	4.312 (6.233)	3.721 (5.443)	4.215 (6.233)	3.615 (5.443)
Rcp	0.002 (0.007)				
Icp		-0.099 (0.175)			
Pdp			-0.001 (0.003)		
Ccc				0.001 (0.001)	
Constant	-0.656 (1.697)	-0.312 (1.756)	-0.449 (1.933)	-0.451 (1.722)	-0.632 (1.674)
Sargan	113.596***	113.357***	113.469***	113.722***	114.181***
Observations	187	187	187	187	187

Note: (***) sig at 1% level, (**) sig at 5% and (*) sig at 10% level, Standard error are in parenthesis. OLS, RE, FE, GMM and SGMM represent system generalized method of moments respectively.

there is 75 percent variation in the dependent variable explained by the independent variable while in fixed effects model only 55 percent variation. The results of system GMM indicate that PDP has positive effect on firms' profitability (measured by ROA) which indicates if Payable Deferral period increases, it will cause to increase profitability of firms operating in Cement industry of Pakistan. The CCC estimated coefficient negatively and significantly affects firms' profitability. This result implies that increase in cash conversion cycle reduces profitability of the firm, which suggests that managers can create a positive value for the stakeholders by decreasing the cash conversion cycle to a possible minimum level. Likewise, the estimated coefficient of ICP also is positive and statistically significant which revealed that increase in inventory conversion period rises firm's profitability level while RCP estimated coefficient is positive but non-significant

and shows no effect on firm's profitability. It is clear from the above discussion that working capital indicators have an effect on firm's profitability. Therefore this study suggests that managers should be properly managing the components of working capital management in order to get higher profitability. This study also suggested that if firms want to increase the profitability of the firms, there is a need to reduce the payable deferred period, and also reduce the cash conversion cycle. This study is limited to the sample of manufacturing sectors of Pakistan such as cement industries. Therefore, we suggest that in future study the researcher should include the other sectors of Pakistan and sample size should be increased, as well as must use the dynamic model.

Availability of Data and Material

The dataset on which the conclusions of the manuscript rely is a secondary data and it will be made available upon request.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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