Journal of Applied Economics and Business Studies (JAEBS)

Journal homepage: https://jaebs.com
ISSN (Print): 2523-2614
ISSN (Online) 2663-693X

An empirical analysis of the impact of working capital management on the firm performance in cement and ceramics industry of Pakistan- A panel approach

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ABSTRACT

The real impact of Working Capital management is captured through its constituent policies such as Inventory, Receivable, and Payable managements. The aim of this study is to analyze the effects of Working Capital management i.e. inventory turnover period, the cycle of cash conversion, accounts receivable and payable periods, on the firm performance of cement and ceramics industry of Pakistan. The target population of the current research work is the whole cement and ceramics industry of Pakistan. The fixed-effect model was used for empirical analysis and incorporated by using the Stata software. The model parameters were tested at 1% and 5% level of significance. The outcomes of the fixed-effect model indicated that the account receivable period (AR) in days, inventory turnover (IT) in days and cash conversion cycle (CC) has an inverse nexus with the firm value of cement and ceramics industry of Pakistan. However, the account payable period has a positive relationship with the profitability of the cement and ceramics industry of Pakistan.

Keywords
Cash Conversion Cycle, Payable Account Period, Fixed Effect Model

JEL Classification
G3, G30, G39, G32

1. Introduction

The social and economic development of the country depends on infrastructure development. Therefore, the construction industry occupies an important place for the development of the infrastructure of the country, the economic growth of the country and more job opportunities. In this respect, the cement and ceramics industry occupy an important place because it acts as the barometer in the emerging countries of the world like Pakistan. The number of plants of cement and ceramics in Pakistan is increasing so that the increasing demand of the country for cement and ceramics can be met from this. The cement and ceramics industry currently have 49 units, and it has the 45 million annual production capacity to produce and meet the needs of the country. There are many

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infrastructure developments projects which are in progress in Pakistan, and the cement and ceramics are a basic need for their completion. The CPEC project is one of its examples for making the economy strong, and there is a need to take measures so that these projects become successful. The success of these projects carries development for the overall economy of Pakistan (Ajilore, 2009). However, the projects' success gets impact from the resources' management.

Therefore, for the successful completion of projects, cement is needed for developing the ongoing projects on the healthy footing. In this way, the working of the industry is important for the economy of Pakistan. Therefore, the effective management of the resources is needed in this industry. The need for cement increases in Pakistan, and therefore this sector is obtaining the loan (Rs 75 billion) for meeting the increasing need for the cement and ceramics production in-country (Arifin, 2013). The resources need to manage in this industry in an effective way like working capital management thus better results can be seen for the industry in the long run. The study sets the target to know about the impact of working capital management on the value of the cement and ceramics industry of Pakistan.

The study fills the gap left by previous studies, as it is taping the effect of working capital management (WCM) on the firm's performance by using the accounting measure as well as the market measures. There are studies on this connection in Pakistan but with accounting measures mainly and inclusion of market measure with accounting measure is the uniqueness of this work. Therefore, through the help of this measure, the definite impact of working capital management (WCM) on the performance of WCM can be explored.

The results of some of the past studies indicated that WCM influences the performance of the firms. The firms which can manage the working capital effectively can generate more profitability as inked to those who are unable to manage the WCM (Ganesan, 2007). WCM capital helps to improve the value of the firms because managers keep an eye on every aspect of the WCM in the organizations (Nwaobia and Adedeji, 2014).

2. Literature review

The performance of the companies is important, because if companies are earning profitability, then they less rely on the loan from loan advancing institute. Therefore, from this, it has inferred that the company's operations go in the correct way and ultimately the profitability comes for the organizations in the long run. But the better performance also depends upon resources' managing of the companies. Working capital management is also one of the main resources of companies (Richard, 2013). The current work is exploring the impact of the working capital management on the value of the cement and ceramics industry of Pakistan. Because effective management can lead to a better working

of the companies in the long run. The number of studies exists on the connection between the WCM and the value of the organizations. But the positive, as well as negative both relationships, exists between WCM and profitability of the organizations in the past literature (Riyazahmed, 2016).

The current liabilities, as well as current assets difference, is perceived as the WCM in the past literature (Roselyn Gakure, 2012). Current assets denote account receivable, inventories, and cash and cash equivalent. The management of the cash and cash equivalent, account receivables and inventories, and payables is working capital management (Ahmadi, Arasi, and Garajafary, 2014). The WCM is considered an important component for the better performance of the organizations. Because resources are needed for the effective working of the companies. The shortage of WCM disturbs the workings of the companies in a negative way (Banos-Caballero, Garcia-Teruel, and Martinez-Solano, 2014). It is explored from the past literature that performance of the organizations and WCM has a positive relationship because the organizations that are effectively managing the working capital are noticing the long-run positive impact on the company's value (Suresh Babu, 2014).

The working capital management's importance can be shown by the role that it plays in enhancing the performance of the organizations in a positive way (Muneebi, 2012). The statistically significant link between the WCM and performance of the companies have denoted in past studies. It has applied the regression analysis approach on the 131 companies and data was taken from 2001 to 2004 for exploration of the intended relationship (Lazaridis and Tryfonidis, 2006). While in another study, it is explored that the performance of the organizations has a negative association with the WCM and illustrated in more details. The study was shown on the companies operating in the context of Saudi Arabia (Eljelly, 2004).

The influence of the WCM on the profitability of the companies has studied in detailed in past and highlighted that the impact of WCM on the performance of the organizations can be explored. The study was conducted in Ghana and data was collected from the period 2005 to 2009, and with the application of the ordinary least squares (OLS) technique, it has documented that WCM hurts the value of the firms. WCM comprises of the inventory turnover, account payable and receivable periods, and cash conversion cycle (CC) (Vijayakumar, 2011).

Further, in Pakistan context the results were different, and the study reveals that the performance of the organizations was hurt by the ratio of cash conversion cycle and inventory turnovers. While the account payable cycle has an encouraging influence on the value of the firms. Work applies the panel approach, and along with this, the data over ten years has collected. The panel methodology was also used for the examination of the results of the study (Rehman, Afza, Qayyumand, and Bodla, 2010). The positive

association between the performances of the companies and the inventory turnover period (IT) has explored in the past study (Usama, 2012). Whereas on the opposite side, a negative relationship was explored among these two variables (Zariyawati, Diana and Hirnissa, 2017). While, (Almazari, 2013) has explored a significant negative relationship among the return of assets accounts receivable period (AR) variables. Moreover, while in another study, the same relationship has explored between the AR and Tobin (Gakure, Cheluget, Onyango, and Keraro, 2012). From the past literature (Saptarshi, 2018) has also explored a positive relationship among the profitability of the companies and account payable period. The return on equity gets impact by the account payable period in a negative way for firms taken (Mehtap, 2016).

Chashmsayadan and Aghajan (2014) have explored a positive relationship between the performance of the companies and the cash conversion cycle. However, on the opposite side (Ukaegbu, 2014; Gulia, 2014; Sivasankaran, 2018) has also explored a negative relationship among these two variables i.e. performance of the companies and cash conversion cycle. Therefore, in this study, the impact of working capital management value on the organizations has explored by utilizing all these four factors including inventory turnover, account payable and receivable, and cash conversion cycle in the cement and ceramics industry of Pakistan.

3. Methodology

The study uses the data of the companies falling under the cement and ceramics industry of Pakistan. The data has taken from 2007 to 2016 for all those companies for which the data is available. The cement and ceramics industry of Pakistan is the population for the current work. There is a total of 29 cement and ceramics companies listed at the Pakistan stock exchange. Therefore, the convenience sampling technique was used so that better results can come for the study. The 22 companies have involved for data collection, and total observations are 220. The data used in this study is secondary and panel. The study uses a correlation matrix, descriptive statistics, and a fixed-effect model. Based on the Hausman test results the application of the fixed-effect model was incorporated. The model for the study as follows:

$$Tobin = \alpha + \beta_1 AR_{it} + \beta_2 AP_{it} + \beta_3 IT_{it} + \beta_4 CC_{it} + \beta_5 Age_{it} + \beta_6 LEV_{it} + e_{it} \qquad (1)$$

Here Tobin is a proxy used for the firm performance, α is an intercept of the model, AP is the account payable period, AR denotes the period of account receivable, CC indicates a cycle of cash conversion, IT is the ratio of stock turnover, and age is the firms' age, and LEV is the financial leverage, further coefficients of included variables are denoted by, "t" is a time and "i" is a number of firms, and finally error term is denoted by e.

The four independent variables and one dependent variable of the study have denoted in this section also. Tobin is a proxy used for firm value (performance). Besides, it has

used in past studies too (McNichols, Rajan, and Reichelstein, 2013). The detail on the variables of the study has denoted in the table given below. The independent variables have used in the past work of Ntui, Chrispina, Tago, Mkiibi, (2014). The size and leverage have used in the past study of Coad, (2014).

Table 1: Variables of the study

No.	Variables	Proxy
1.	Firm value (or firm performance)	
	• Tobin	(book value of leverage + equity's market value) / Total value of asset's book
	• ROA	Total net income / average assets of firms
2.	Working Capital Management	
	• AR	(Total receivables / total sales)*365
	• IT	(Total Inventory/ total cost of goods sold)*365
	• AP	(Total payables /Total purchase)*365
	• CC	[{(inventory minus account payable) divided by cost of goods sold} plus (Total receivables / total sales)]*365
3.	Variable used as control	
	• Financial leverage	Total leverage / total assets of firms
	• Age	Natural logarithm of age since firms establishment

4. Results and discussion

The descriptive statistics of the variables used in the study has denoted so that the properties of the variables can be determined from this. The average return on the assets of companies is 0.037, and some of the firms are noticing the negative return on assets (-0.270) while some of the firms have positive and more return on the assets of the companies. Next is the Tobin which is the other measure of firm performance, and the average value of the firm performance based on market information is 1.140, its maximum, and minimum value has also reported in the continuing section of this work. The average days of account receivable (AR) are 18.44, and some firms collect the account receivable in less than one day while some take 613.28 days for the collection of account receivables.

On the other hand, the average days of account payable (AP) are 75.878 and minimum and maximum days denote the extent of days used in companies for payment credit purchase payment. The cash conversion cycle is 24.201 days on average. The inventory of the companies takes 45.69 days for the disposal. Further, the control variables denote that the age of companies is 9.19 and LEV is .559 on average.

Table 2: Descriptive statistics

Variable	Mean	Standard Deviation	Minimum	Maximum
ROA	0.037	0.102	-0.270	0.244
Tobin	1.140	0.463	0.437	2.802
AR	18.448	45.347	0.022	613.286
AP	75.878	105.841	0.602	614.019
CC	24.201	64.916	-362.107	252.165
IT	45.692	79.190	-683.671	645.055
AGE	9.198	0.288	8.539	9.907
LEV	0.559	0.290	0.138	2.407

Note: ROA is the return on assets and Tobin is market-based performance measures, AR is account receivable period, AP is period of account payable, CC is a cycle of cash conversion, ITD is inventory turnover period, AGE denotes the age of firms, and LEV is the debt of companies.

Table 3 presented the correlation matrix of this study. The correlation of the variables AR, AP, and IT is negative with the ROA of the study. But the correlation of CC in the present study is positive. The correlation of all the independent variables is negative with the Tobin of the study, which is one measure of firm performance. The correlation among all variables is less than 70% in the present study and presented in Table 3. Therefore, from this, it has inferred that there is no problem of multicollinearity in the predictor variables of the study.

Table 3: Correlation matrix

Variable	ROA	Tobin	AR	AP	CC	IT	Age	LEV
ROA	1.000							
Tobin	0.128	1.000						
AR	-0.161	-0.028	1.000					
AP	-0.361	-0.027	-0.066	1.000				
CC	0.169	-0.075	0.196	-0.668	1.000			
IT	-0.002	-0.107	-0.530	0.093	0.230	1.000		
Age	-0.168	-0.106	0.024	0.270	-0.117	0.103	1.000	
LEV	-0.593	0.176	0.179	0.328	-0.121	-0.091	0.125	1.000

Note: Variables are the same as under Table 2

The LM test of Breusch- Godfrey Serial Correlation is presented in Table 4 which depicts that there is no serial correlation among the study variables as values are higher than 5% and the null hypothesis is accepted for this test, which favours the absence of serial correlation or there is no serial correlation.

Table.4: LM test of serial correlation

Model	P-value
ROA	.106

Tobin	.109

Note: The null hypothesis favours the absence of serial correlation.

The p-value of the Wald test for both the models depicts that endogeneity does not prevail in data, because the p-value is higher as related 5% for both the models (Table 5).

Table.5: Wald test of endogeneity

Model	P-value
ROA	.101
Tobin	.108

Note: The null hypothesis favours the absence of endogeneity.

The Hausmann test (HT) was used for the exploration of the best model of the study. The p-values of the HT tests are less than 0.05 which reveals that the fixed-effect model is suitable for the current. The null hypothesis of the current study is that, that the random effect models are the best choice. However, the p-values of the HT test favours the fixed-effect model. In this way, the fixed-effect model has finalized as a final model of study because the presentation of the right model denotes the reliable results of the study.

Table 6: Hausmann test

Model	P-value
ROA	<0.001
Tobin	<0.001

The fixed-effect model results of the current study are presented in Table 7. The current study is applying to two measures of the firm performance, firstly is the market based while secondly is the accounting-based measures. The same results under the two models denoted the robustness and model exactness of the study.

Table 7: Fixed effect results

Dependent variable	**Tobin (1)**	**ROA (2)**
AR	-.033**	-.0004 *
AP	.053**	.0005***
CC	-.011*	-.0002*
IT	-3.541***	-7.591
Age	1.299***	0.165***
LEV	0.292*	0.167***
Constant	-10.919***	-1.392***
R square	0.302	0.197
Observations	220	220

Note: ***, ** and * denote that variables are significant at 1%, 5% and 10% level

The model results under proxy Tobin denoted that the period of account receivables in days (AR) has an inverse effect on the firm performance with coefficient - 0.033 at 5%. It

depicts that increasing one unit in AR the firm performance decreases by – 0.033 units and vice versa. Which means that an inverse relationship exists among these two variables of the study. Consequently, it has inferred that the companies who are taking more days for the collection of the account receivables from the customers are decreasing their performance. Therefore, the company's value stays stable for the long survival of the companies. The companies can make the effective policies of an early collection of the account receivable by giving the discount to customers who are making early payments. The account receivables are created through credit sales from the companies. Because all the sales cannot be made on a cash basis and therefore for enhancing sales, some of the sales have made on credit. The early collection ensures the more cash available, which assists in running the day to day operations of the business and in this way, firms' value acquires impact. The results are in line with a study in the same field (Ntui et al. (2014).

The account payable period in days (AP) has a positive link with the firms with a coefficient .053 at 5%. Therefore, from this, it has depicted that one unit increase in AP bringing 0.053 change in the firm performance. Meaning that direct relationship exists among these two variables of the current study. Hence, from these results, it has inferred that the companies who are taking more days for payments of the account payables to the customers are increasing their performance in the long run. The companies can make the effective policies of late payments of the account payables by giving the notice to suppliers who are waiting for the early payments. The image of the company also matters for the businesses and negotiation with the suppliers can help to achieve this end. The account payables are created through credit purchases made by the companies. Because it is not possible for the organizations to purchase all the goods needed for companies operations running on the cash basis, the late payments ensure the more cash available in hand of organizations which they can invest according to the urgent need of the business and in this way ultimately the company's performance gets affected. The results are in line with the study in the same field (Sivasankaran, 2018).

The cash conversion cycle (CC) in days has an inverse impact on the performance of the companies with coefficient -0.011. It indicates that the company takes additional days from getting things for doing the projects and then a collection of the cash from those projects the performance of the companies will affect negatively. Hence, a negative relationship between these two variables of the study existed. The results are according to the study of Ukaegbu (2014). IT denotes the negative effect on the value of the companies at 1%. However, it denotes that the one unit increase in days for selling and converting the inventory into cash leads towards the decrease in the profitability of the firms. The companies who are taking care are consuming less time in converting the inventory into cash so that the sales of the business increase. Also, the charges which are attached to the storage of inventory in the storeroom decreases and ultimately, the performance of the

organization increases. Therefore, we can say that the more the days consume in selling the inventory, the less will be the profitability of the firms. The results are consistent with the (Zariyawati et al., 2017) study in the same area.

Furthermore, Tobin has a positive effect on the age of the companies because old firms have more resources and experience to diversify risk and increase performance. The other control variable leverage ratio (LEV) denotes that the companies with leverage are experiencing more profitability as linked to those who are deprived of such a facility. Further, ITD is the strong predictor of this model, and in this way, we can perceive that more change in Tobin is explained by the IT. The 30.22% change in Tobin has explained by the independent variables and control variables of the study. The results are the same as past work in this area (Coad. 2014).

Model two of the study where ROA is used as a measure of the firm performance is also denoting the same relationship. But one variable ITD is insignificant under this model as related to model 1 of study. The predictive power of the model is also less under this model as linked to model one (Table 4.4). Therefore, the application of the two models signifies the robustness of the study, and in addition to this, it adds to the literature on WCM and companies' value in the Pakistani context.

5. Conclusion and future work

The aim of this study is to analyze the effects of Working Capital management i.e. inventory turnover period, the cycle of cash conversion, accounts receivable and payable periods, on the firm performance of cement and ceramics industry of Pakistan. The whole industry of cement and ceramics is the population of the current work, but data has collected on those companies, which are easy to access and for which data was easily available. The Stata software was used, and besides, the fixed-effect model has applied for exploring the results of the study. The results of the Hausman have suggested the use of the fixed-effect model. For ensuring the robustness of the study, two measures of the firm performance have used. Tobin is a market-based measure, and the other one is an accounting-based measure for the current study.

The results signify that the period of account receivables (AR) in days (AR) has an inverse association with the firm performance at a 5% level. It means that an inverse relationship between these two variables of the study exists. Hence, from these results, it is inferred that the companies who are taking more days for the gathering of the account receivables from the customers are decreasing their performance in the long run. The account payable period in days (AP) has a positive association with the firm value at a 5% level. Therefore, from this, it has inferred that the companies who are taking more days for payments of the account payables to the customers are increasing their performance in the long run. The cash conversion cycle (CC) in days has a negative effect on the performance

of the companies. IT denotes that it's more presence lowers the value of the firms at 1%. Therefore, it signifies that the one unit increase in more days for selling and converting the inventory into cash leads towards the decrease in the earning of the firms.

The policy implication of the work is that the increase in the number of days required for making a payment could lead to enhance the earning of firms. However, negotiation is crucial in this context so that the overall image of the company cannot be affected. Further, the concerned managers should reduce the days required to collect the cash from customers by giving the discount, and the inventory should be selling in a smaller number of days. Besides the short cycle of cash conversion, there is a demand for increasing the earning of the firms.

The limitation of the present work is that the data has collected for fewer years. So, in a future study, the long time frame can resolve this issue, and in this way, more deep insight as possible about the present phenomenon.

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