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The Impact of Working Capital Components on Profitability of Public Limited Firms in Pakistan (A Comparison of Crisis and Pre Crisis Period)

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ABSTRACT
This study examines and compares the impact of working capital components like average collection period (ACP), inventory conversion period (ICP), average payment period (APP) and cash conversion cycle (CCC) on profitability indicator return on asset (ROA) for KSE listed manufacturing companies in two different periods. For this purpose years from 2004-2006 and years from 2008-2009 covers period before and during financial crisis respectively. Forty KSE registered manufacturing firms were taken as a research sample. Multiple linear regression and correlation techniques were used to check the influence of WC components on return on asset. It was concluded that average collection period in both period has negative impact on firm's performance. Cash conversion cycle has positive impact before and negative impact during crisis period on company profitability. Similarly, inventory conversion period has negative impact before crisis and positive impact during crisis period. However, there is insignificant relationship between average payment period and return on asset of a company. Hence it is suggested for managers to keep average collection period, inventory conversion period up to minimum level and cash conversion cycle up to maximum level before crisis period. However, by keeping average collection period and cash conversion cycle up to minimum level and inventory conversion period up to maximum level during crisis period will enhance firm's profitability.
Key words:Working capital management, Return on assets, Average collection period, Inventory conversion period, Average payment period, Cash conversion cycle

Introduction

Generally, businesses need funds either for business establishment or to carry out day to day operations and these can be divided into two major groups: long term capital and working capital. Long term capital is required to purchase fixed property such as plant and machinery, land, building and equipment for production purposes, on the other hand to purchase raw material, pay wages and to interact with other day to day expenses, the management of such type of assets refers to working capital management (Rahman and Nasr, 2007). Working capital management comprises the administration of cash, account receivable, inventories and account payable through efficient technique (Gitman, 2002). These parts are very important in decision making because its prime objective is associated to the balancing of current resources and liability engagements in course of time, thus it guides us to two main functions of WCM; Profitability and liquidity (Pass & Pike, 1984).The maximization of shareholders wealth is profitability and the ability to pay short term obligation is called liquidity. These two dual targets create conflict for all organization during working capital operation.

Though the ultimate goal of any business is to raise the profit but sustaining optimal liquidity is equally important. The complexity arises when profit is increased at the cost of firm liquidity (Shin and Soenen, 1998). There must be balance between the two objectives of the firms, because if firm forgo profits its long term existence will be affected and if liquidity position is not maintained, the normal operation will be affected which leads to insolvency or bankruptcy. Appropriate execution of working capital can save material and also increases the monetary benefits on investment while inappropriate supervision of working capital not only decrease productivity but also leads to many problems. WCM is an important factor for maintaining the liquidity position, long term survival of the firm and also an effective input of business profitability (Mukhopadhy, 2004). Therefore a proper consideration is required during working capital components deployment.

Problem Statement

In the emergence of financial crisis of 2008-2009 a sudden decrease took place in granting loans of banks to non-financial firms. So reduction of 36% loans supply was recorded from August to October 2008 with respect to last three months (Ivashina & Scharfstein, 2008). Monetary constraints wrapped most of the business industry in the world. According to (Meltzer, 1960; Brechling & Lipsey, 1963; Swartz, 1974 and Yang, 2011) in such circumstances large firms are suitable alternative for banks loans as they can grant excess cash balances to financially constraints firms during financial recession. During the time of crisis large firms play the role of financial intermediaries and substitute for banks in supplying loans to others firms (Gerlet et al.,1996).During the time of crisis the prime goal

of a firm is to manage trade credit and to lessen the threat. Yet large firms again maintain their financial constraint customers as they are provided trade credit (Pike & Cheng 2001). According to VU. (2016) before 2008 the managers of firms were not taking care of working capital because they did not have had cash problem as to manage day to day expenses. However after 2008 there was a serious problem of liquidity so working capital management got more attention from managers.

Though different authors have studied working capital management in numerousways; some studies have suggested the importance of favorable inventory management, other claim account receivable and account payable are important inputs for firm performance. However the previous studies do not provide a comparison to know how working capital strategies changesin non-crisis and during the time of financial crisis. Therefore, an attempt is being made to shed light on the issue which is not highlighted in Pakistan.

Objectives

i. To study and compare the impact of days of account receivable on profitability of KSE registered manufacturing firmsduring and before global financial crisis.
ii. To studyand compare the impact of inventory conversion period on profitability of KSE registered manufacturingfirms during and before global financialcrisis.
iii. To examine and compare the impact of days of account payable on profitability of KSE registered manufacturing firms during and before global financial crisis.
iv. To evaluate and compare the impact of cash conversion cycle on profitability of KSE registered manufacturing firmsduring and before global financial crisis.

Limitation of the Study

It was targeted that all manufacturing firms will be studied for the mentioned objective but due to the unavailability of complete data of all variables only 40 firms out of 200 hundred were studied.Secondly the study is only limited to non-financial firms so the results of the study cannot be applied to financial firms like banks because of theirinherit differences.

LiteratureReview

Theoretical literature

The literature of corporate financial management usually focused on financial assets of long term, capital structure, dividend and firm assessment. However the investment which has less than one year maturity as a huge portion of total assets in the balance sheet of a firm .These current assets occurs in the realm of working capital management (WCM).It is important because it links between the risk and productivity of the firms (Brechling et al). The role of working capital in business organization is like blood flow in the vessels (Flanagan, 2005).The survival and profitability of the firms cannot be disconnected from the proficient management of working capital of any organization (Dong , 2010).

The functions of manufacturing firms are largely concerned with the production of goods which is mostly depends on working capital management (Wang, 2002). According to Weston and Copeland (1992) if an organization perfectly forecasts each component of working capital then there would be optimal level of cash for making payment, sufficient inventory for production and sales purposes and optimal credit policy for account receivable.

Accounts Receivable Management

The formulation and implementation of sound credit policies are necessary for better debtors' management (Maas Dava 2008).Credit sales make debtors which depend on two things; the permitted duration to debtors and the sum of credit sales. Mathematically this relationship can be expressed in the following way:

$$ACP = \frac{\text{Receivable account} \times 365}{\text{Net sales}}$$

Inventory Management

Generally inventory can be categorized into raw materials, work in progress and finished goods in manufacturing concern industry. The proper management of inventory is very necessary because holding excessive stock will engage the capital while inadequate stock may face shortage of inventory which consequently firm profitability and goodwill may be affected. Therefore a firm will need to locate holding stock to most favorable level through economics order quantity model (Meltzer,1960).The said model works under certain postulations; the yearly demand and successive used for raw material must be known and constant. Quantity discount with respect to purchases volume will not be available, stock out cost will be zero meaning that firm run out stock will instantaneously be replaced without time gape. Similarly ordering cost and carrying cost must be known and constant. In conventional inventory management system, stock of material is kept in warehouse but many firms adopt just in time purchasing system. In this materials are only purchased when there is a need for production, while firm does not sustain stock of raw materials. The main purpose of this approach is to eliminate inventory storage cost, wastage and theft of materials and also to abolish other inventory handling cost like insurance and cost of store keeping. The formula for calculating inventory conversion is given below:

$$ICP = \frac{\text{Inventory} \times 365}{\text{Net sales}}$$

Account Payable Management

A firm can operate its accounts payable as source of fund for financing motive which is free of cost. If it is properly managed it will decrease the reliance of firms on banks to approach for loans. In working capital components management account payable is an important tool (Chowdhury & Amin, 2007).Firms measures its valuable operation of account payable in

term of average payment period. It is the time gap between the purchase of material from suppliers and cash payment to them. If a company delays its account payable this can be used as free of cost funds for other purposes but on the other hand the trust of supplier can be raised up as a result the process of supplying raw material can be affected. Therefore the favorable management of account payable plays important role on the performance of a company. Mathematically account payable period can be described as follow:

$$APP = \frac{\text{Payable account} \times 365}{\text{Net sales}}$$

Cash Management

Holding cash in most liquid form earn nothing for a business (Pandey, 2005). Because excessive cash usage loses opportunity cost and does not generate interest. However, there is a need of holding optimal cash balance because inadequate cash holding can put a firm into trouble in implementing operating activities while maintaining unnecessary cash does not generate interest income. Therefore insufficient cash cannot meet firm's short term obligations but on the other hand if there is any idle cash hold by a firm it must be engaged in short term marketable securities for earning purposes. Cash conversion period is calculated as:

$$CCC = ACP + ICP - APP$$

Working Capital Management and Profitability

The capability of a firm to produce profit from the invested resources is known as profitability. Working capital components like cash, inventories, account receivable and account payable affects firm's profitability in many ways. Excessive stock holding is associated to extra handling costs, descent in the value of stock due to spoil and theft etc. All the mentioned costs negatively affects firm's profitability but insufficient inventory can cause stock out costs and losses of firm goodwill. When high level inventories are maintained it keeps capital tied up in stock which reduce profitability due to forgone interest income (Saleemi, 2009).Improper cash management is linked with high holding cost of cash, financial distress, lot of investment income because cash is engaged in idle. Financial distress comprises of interest costs, debt reformation costs and legal costs which cause to reduce firm performance. Aveg. Collection Period and Profitability

Gill et al., (2010) used 88 companies registered in NYSE which covers a duration of three years i.e. from 2005 to 2007 to examine the impact of working capital management on company productivity. ACP, APP, ICP and CCC. Falope and Ajilore (2009) took 50 non-financial Nigerian companies as a sample to identify the influence of ACP on firm profitability and they observed negative association. A negative relationship between average collection period and profitability have been observed by Mathuva (2009) and Harvesh (2012) after studying 88 companies of New York from 2005 to 2007.Dong (2010) suggested a company can maximize its profit by keeping its average collection period up to minimum level. He proposed this policy after investigating Vietnam companies for the period 2006-2008, in order to check the association between average collection period and return ROA.

Baveld(2012)took a sample of 37 largest manufacturing firms registered in Netherland Stock exchange, in order to investigate working capital management policies during crisis and non crisis period. The data were taken for two period 2004-2006 and 2008-2009 before crisis and during crisis period respectively. He observed that firms don't not require altering policies for working capital with respect to inventory and accounting payable, if the target is to improve profit.However this observation is not true for account receivable management during financial crisis because days of account receivable positively influence firm's profitability for the next year.

Inventory Conversion Period and Profitability

The success of business firms greatly depends on effective management of its account receivables, inventory and account payable (Filbeck & Krueger, 2005).The financing cost of a firm can be reduced and its available funds can be properly executed by decreasing the investment in current asset. As Inventory conversion period is a part of current asset therefore its effective management plays important role in the performance of an organization.Garcia-Teruel and Martinez-Solano (2007) made an effort to find out the influence of working capital components on small and medium-sized enterprises by collecting a panel data of 8,872 firms in Spain. It was confirmed that managers could generate worth of a firm by minimizing the age of inventory.

According to Dong (2010) ICP has inverse connection with firm performance. (Izadinia and Taki, (2010) longer ICP leads to lower profitability. Abdul et al. (2010) studied Pakistani companies and declared that longer inventory conversion period cause lower profitability. The study for manufacturing firms listed in Bombay Stock Exchange show inverse relationship between ICP and return on assets (Sharma & Kumar, 2011). Ashraf (2012) investigated a sample of 16 Indian companies and it was concluded a company can increase its financial performance if it reduce days of inventory turnover.Gameson (2007) worked on Telecom industry to know how working capital components affect performance of a company. He used ACP, ICP, and APP as working capital components and return on asset as

profitability indicator. Findings show negative relationship between dependent and independent variables. Kulkanya (2012) tested 255 companies registered on TSE from 2007 to 2009, in order to review the impact of various components of working capital on company performance .Findings of the study claim that a company can improve its productivity by reducing inventory conversion period. Vural et al., (2012) observed no relation between ICP and firm performance after investigating a sample of 75 listed companies in Istanbul Stock Exchange.

Average payment period and Profitability

Average payment period has a special link with firm performance. According to Ramchandram (2009) lengthy period of account payable directly influence profitability.Mathuva (2009) also proposed a longer payment period for company profitability. Alipour (2011) also encouraged all manufacturing companies to pay later their account payable to improve firm's financial performance. Cash conversion formula show that, days of account payable is subtracted from CCC, so it is anticipated that APP will positively affect (Deloof, 2003; Uyar, 2009).Supporting arguments were provided by Onodje (2014) when he tested Nigerian firms. He proposed that a company can enhance its performance by paying delay to its suppliers.

Mukhopadhyay (2011) examined the influence of working components on the profitability of heavy engineering companies. His findings show that average payment period does not play any significance role in the profit maximization of the studied firms.Khan et al., (2011) examined the impact of WCM on profitability for Pakistani firms. It was concluded that despite from sugar and allied industry average payment period has less importance for firm profitability. Afeef (2011) studied SME's in Pakistan, in order to find the trend of WCM on firm's performance. ACP, ICP, APP and CCC were used as parts of WCM and return on asset as profitability indicator. It was observed that all these working capital components have noticeable influence on profitability measured as return on asset.

Cash conversion cycle and Firm Profitability

Shin and Seonen (1998) took a sample of 58,985American registered firms for a lengthy duration of twenty years, in order to find the behavior of CCC on firm productivity; he observed cash conversion cycle strongly negatively affect profitability of a firm. After his findings he suggested for managers that they can increase shareholders wealth by keeping CCC to a balanced level. Deloof (2003) found the same result after studying a large sample of 1009 non-financial Belgium firms. Similarly, Garcia-Teruel and Martinez-Salano, (2004) examined a sample of 8872 Spanish firms, he suggested that shorter CC period increase firm's performance.

Ching et al.,(2011) studied the association between cash conversion period and profitability for Brazilian-listed companies and he suggested that there was inverse relationship between the variables. Cash conversion goes in opposite direction with profitability (Ashraf, 2012; Harvesh, 2012).Abuzayed (2012) studied a sample of Jordan companies listed in Aman Stock Exchange, in order to investigate the impact of cash conversion cycle on firm productivity. It was revealed that if a company reduces CCC it will directly influence firm performance. Ebrahim and Datin (2012) confirmed negative relationship of cash conversion period with company performance. Cash conversion cycle is used to test the combine impact of working capital components on firm profitability. The available literature leads us to this conclusion that cash conversion cycle inversely influences firm profitability. It is because the majority of the studies reveal to keep days of cash conversion cycle up to minimum level to improve firm's profitability.

Conceptual Framework

The conceptual and logical frame work between working capitals components (independent variables) and dependent variable ROA and also control variables has been given below.

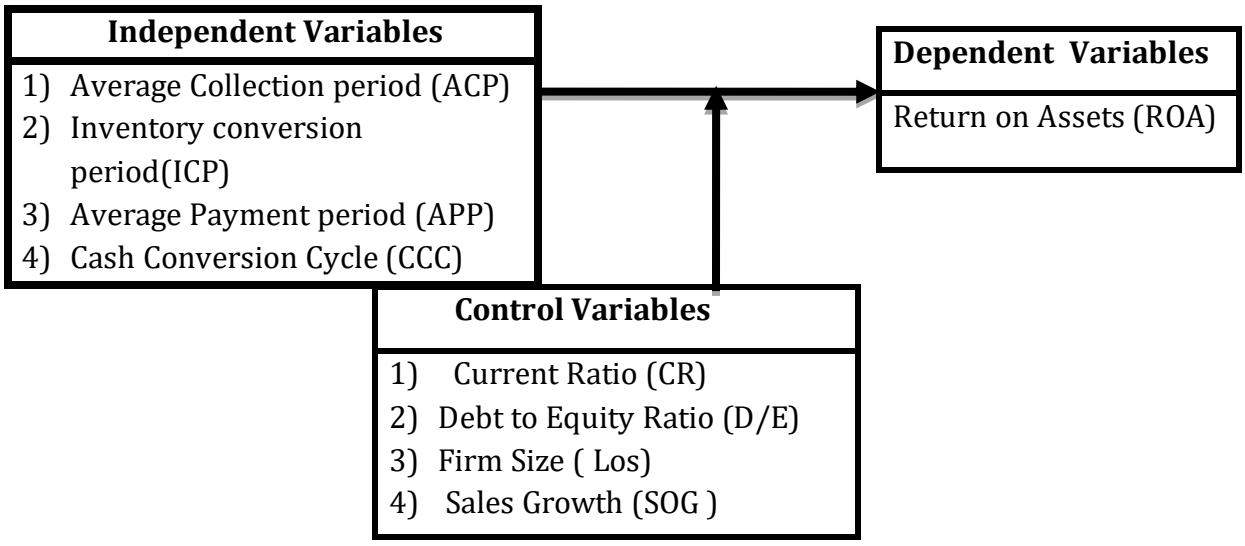

Figure 1: Shows conceptual frame work between WCM and firms profitability

Hypotheses

H_1: *The average collection period of a firm are significant negatively related to a firm's profitability during non-crisis years.*

H_2: *The effect of a firm's accounts receivables on its profitability will be positive during crisis period.*

H_3: *The average payment period of a firm are significant negatively related to a firm's profitability during non-crisis years.*
H_4: *The days of account payable has a negative effect on a firm's profitability during crisis periods.*
H_5: *The inventory turnover of a firm is significant negatively related to a firm's profitability during non-crisis years.*
H_6: *The level of inventories has a negative effect on a firm's profitability during crisis periods.*
H_7: *The cash conversion cycle of a firm is significant negatively related to a firm's profitability during non-crisis years.*
H_8: *The effect of the cash conversion cycle on firm's profitability during crisis years is negative.*

Research Methodology

Model Specification

Correlation and multiple regression techniques were used to analyze the collected data. Working capital components consist of average collection period (ACP), inventory conversion period (ICP) and average payment period (APP).Similarly cash conversion cycle was used to measure the combine effect of working capital on profitability. To examine the relationship among depended and independent variables, panel data were used in multiple regression models which were developed by (Deloof 2003; Padachi 2006).This model indicates change in dependent variable with respect to change in one or more than one independent variables (Kothari, 2004). Similarly variance inflation factor (VIF) test was carried out to check the presence of multi-collinearity among control variables. This test has been used by different authors like Falope & Ajilore (2009), Mathuva (2010), Dong & Su (2010), Gill et al., (2010) and Sharma and Kumar (2011) for such study. We apply the following four models to examine the hypothesis for the relationship among the variables during non-crisis period.

Model 1: This hypothesis model is used to test the relation between average collection period and profitability:

$$ROA = \lambda 0 + \lambda 1\ (ACP\ it) + \lambda 2(SOG\ it) + \lambda 3(CR\ it) + \lambda 4(LOS\ it) + \lambda 5(D/E\ it) + \varepsilon$$

Model 2: This model describesthe relation between average payment period and profitability.

$$ROA = \lambda 0 + \lambda 1\ (APP\ it) + \lambda 2\ (SOG\ it) + \lambda 3\ (CR\ it) + \lambda 4\ (LOS\ it) + \lambda 5\ (D/E\ it) + \varepsilon$$

Model 3: The third model shows the relation between inventories conversion period (ICP) and profitability:

$$ROA = \lambda 0 + \lambda 1\ (ICP\ it) + \lambda 2\ (SOG\ it) + \lambda 3\ (CR\ it) + \lambda 4\ (LOS\ it) + \lambda 5\ (D/E\ it) + \varepsilon$$

and profitability.

$$ROA = \lambda 0 + \lambda 1\ (CCC\ it) + \lambda 2\ (SOG\ it) + \lambda 3\ (CR\ it) + \lambda 4\ (LOS\ it) + \lambda 5\ (D/E\ it) + \varepsilon$$

The following regression model will be tested for crisis period.

Model 5: The fifth regression model will provide the output of the relationship between account receivable period and firm performance during crisis period.

ROA =λ0 + λ1 (ACP it)+ λ2 (SOG it) + λ3 (CR it) + λ4 (LOS it) + λ5 (D/E it) + ε

Model 6: This model tests the association between profitability and average collection period during crisis period.

ROA =λ0 + λ1 (APP it) + λ2 (SOG it) + λ3 (CR it) + λ4 (LOS it) + λ5 (D/E it) + ε

Model 7: The seventh hypothesis model shows the association between inventories conversion period (ICP) and profitability during recession period.

ROA=λ0 + λ1(ICP it) + λ2 (SOG it) + λ3 (CR it) + λ4 (LOS it) + λ5 (D/E it) + ε

Model 8: The last hypothesis model checks the relation between cash conversion cycle and ROA in the time of financial crisis.

ROA =λ0 + λ1 (CCC it) + λ2(SOG it) + λ3(CR it) + λ4 (LOS it) + λ5(D/E it) + ε

β0 = Constant term for the independent variables

Variables

Firm profitability:

The excellent profitability indicator is return on asset (ROA), because it connects the profitability with total asset (Falope & Ajilore, 2009). This variable was used by (Samiloglu & Demirgunes ,2008; Nazir & Afza ;2009 ; Karaduman et al., 2011).

Independent variables

Average collection period, inventory conversion period, average payment period and cash conversion cycle are independent variables for this study.

Average collection period (ACP): The time required to collect the receivables is known as average collection period and it can be expressed as:

$$ACP = \frac{\text{Receivable account} \times 365}{\text{Sales}}$$

Inventory conversion period (ICP) The average number of days needed to transfer raw materials into finished goods and selling them to customers. Mathematically can be described as:

$$ICP = \frac{\text{Inventory} \times 365}{\text{Cost of goods sold}}$$

Average payment period (APP) The number of days in which a company pay its short term obligations

$$APP = \frac{\text{Payable account} \times 365}{\text{Cost of goods sold}}$$

Cash conversion cycle (CCC) The number of days in which a company pays its payables and receive its receivables which can be calculated as:

$$CCC=ACP+ICP-APP$$

Control Variables Current Ratio (CR), sales growth (SG), size of the company (LOS) and debt to equity ratio are control variables.

Liquidity (CR) The ability to pay short term obligation is known as liquidity. Current radio is used as a proxy for liquidity so as to make the performance of the firm impartial. Mathematically it can be written as:

$$\text{Current ratio} = \frac{\text{Current asset}}{\text{Current liability}}$$

The Company Size (LOS) Usually firms generates high sales produce more profit. Size of the company can be measured by taking the natural log of total sales.

Debt to Equity Ratio (D/E) It is a leverage ratio which can be calculated as:

$$\text{Debt ratio} = \frac{\text{Total debt}}{\text{Total equity}}$$

Sales growth (SOG) Sale growth measures change in sales in current year with respect to previous year.

$$SOG = \frac{\text{current year sales- previous year sales}}{\text{Previous year sales}}$$

Population of the study

All KSE listed manufacturing companies were targeted for the current study. However there were some companies which do not provide data for the both periods. Therefore such companies were excluded from the sample size. During this research study total 40 manufacturing firms provide full data for all variables. Therefore a sample of 40 companies will answer the research questions.

Data Collection Procedures and analysis

The data were extracted from the annual reports available on the website of Karachi Stock Exchange, State Bank of Pakistan and official websites of the concerned manufacturing companies. Further data were analyzed through correlation and regression procedure in SPSS.

Results and Discussion

Descriptive analysis

Descriptive statistics shows different characteristics like mean maximum, minimum and standard deviation of independents, dependent and control variables which provide a comparison between two periods.

Table 1Descriptive Statistics

	N		Minimum		Maximum		Mean		Std. Deviation	
	B crisis	D crisis	B crisis	D. crisis	B Crisis	D crisis	B crisis	D crisis	B crisis	D Crisis
ROA	120	80	2.20%	9.00%	38.30%	37.30%	16.42%	25.34%	11.26%	10.64%
ACP	120	80	2	3	164	47	30.8	16.7	42.22	14.26
APP	120	80	10	7	94	66	42.53	32.2	21.18	18.29
ICP	120	80	8	2	164	65	69.63	40.8	39.01	23.84
CCC	120	80	-5	-1	171	130	46.6	46.8	48.48	40.21
CR	120	80	0.9	0.69	5.1	5.09	1.69	2.16	1.07	1.59
LOS	120	80	4.76	0.08	14.01	14.97	9.03	9.62	2.63	5.15
SOG	120	80	0.06	0.04	10.61	2.3	1.09	0.561	1.92	0.691
D/E	120	80	0	0	2.33	1.6	0.553	0.705	0.723	0.558
N	120	80								

Table 1 provides the descriptive statistics for fourty manufacturing KSE registered companies. The data has been collected for two time period 2004-2006 and 2008-2009.The total numbers of observations are equal to 200, in which 120 and 80 observations show two different periods respectively. Return on asset (ROA) gives a mean of 30% and standard deviation of 11% before financial crisis. Its mean that the value of profitability of the firm revolves 11% on both side of the mean value. Similarly in this period the maximum and minimum value of ROA is 38.30% and 2.20% respectively. During crisis period the mean value of return on asset (ROA) is 25.34% and standard deviation is 10.64% which indicates that return on asset deviate 10.64% on both side of mean value. Maximum and minimum value of return on asset during crisis period is 37.30% and 9.00% respectively.

Before financial crisis the mean of average collection period is 30.80 days standard deviation is 42.22 days, maximum value of days is 164.00 and minimum is 2.00 days. During crisis period mean becomes 16.70 days, standard deviation is 14.26 days, maximum 47.00 days and minimum is 3.00 days. This information makes it known that before crisis period the value of average collection period change 30.80 days and crisis period its deviate 14.26 days from both sides of the mean value.

The average period paying to supplier before crisis period is 42.53 days, standard deviation is 21.18days maximum and minimum are 94.00 and 10 days respectively. However these values alter during crisis period mean becomes 32.20 days, standard deviation is 18.29 days maximum 66.00 days and minimum is 7.0days. This specifies that the average payment period change 21.18 days and 18.29 days from both side of the mean value before and during crisis respectively. Mean time required to sale inventory before crisis is 69.63 days and during crisis it becomes equal to 40.80days.Similarly before crisis period standard deviation, maximum and minimum values are 39.01 days, 164.00days and 8.00days correspondingly. During the time of crisis the standard deviation from mean value is 23.84days, maximum 65.00days and minimum 2 days. Cash conversion cycle is the time lag which starts from the purchasing of materials, converting them into finished good, selling to customers, receiving of cash and payment to suppliers. Table I shows that the mean value for this variable before crisis and non crisis period which are 46.60days and 48.48 days correspondingly. Similarly before crisis the standard deviation for cash operating cycle is 48.48 days maximum is 171.00 days and minimum is -5.00 days. In crisis period standard deviation is 23.84, maximum is 130.days and minimum is -1.0days.

The mean of current ratio before crisis is 1.69 time, standard deviation is 1.07 , maximum value is 5.10 and minimum value is 0.90 , while in crisis period these values are different as mean is 2.16 time, standard deviation is 1.59 , maximum is 5.09 and minimum is 0.69.
The average of natural log of sales before crisis is 9.03 which have changed to 9.62 during crisis time. Before crisis period standard deviation is 2.63, maximum value is 14.01 and minimum value is 4.76.During the time of global financial crisis the mean value for 40 manufacturing companies is 2.16, maximum value is 5.09 minimum value is .69 and standard deviation is 1.59.Standard deviation of current ratio before crisis is 1.07, maximum value is 5.10 minimum value is .90, mean value is 1.69 while in crisis period these values are different as mean is 2.16, standard deviation is 1.59, maximum is 5.09 and minimum value is 0.08. The average of natural log of sales before crisis is 9.03 which have changed to 9.62 during crisis time. Before crisis period standard deviation is 2.63, maximum value is 14.01 and minimum value is 4.76.Standard deviation of current ratio during crisis is 5.15, maximum value is while in crisis period these values are different, as mean is 2.16, standard deviation is 1.59, maximum is 14.97 and minimum value is .08.Furthermore mean of sales growth vary from 9.03 to 9.62 in crisis period. Standard deviation changes from 1.92 to 0.691, maximum value is 14.01 before crisis time and 2.30 during crisis period. Similarly in pre- crisis period minimum value of sales growth is .06 which changes to .04 during the time of crisis.The mean of debt to equity ratio in pre-crisis period is .553 which alters to 0 .7050 in the time of crisis. Standard deviation is 0 .723 and 0.558 before and during crisis time respectively. Finally the maximum value is 2.33 and 1.60 in pre- crisis and crisis period correspondingly. However minimum value of debt to equity ratio in both cases is 0.

Correlation Analysis

The correlation analysis is used to analyze the relationship between different components of working capital and productivity of the firms. To interpret the association among the variables, Pearson correlation is applied for calculating coefficients of the variables.

Table 2Before global financial crisis

Variables		ACP	APP	ICP	CCC	CR	LOS	SOG	D/E	ROA
ACP	Pearson Correlation									
	Sig. (2-tailed)	1								
APP	Pearson Correlation	-0.055	1							
	Sig. (2-tailed)	0.547								
ICP	Pearson Correlation	.609**	-0.099	1						
	Sig. (2-tailed)	0	0.282							
CCC	Pearson Correlation	.712**	-.439**	.885**	1					
	Sig. (2-tailed)	0	0	0						
CR	Pearson Correlation	-0.108	-0.147	-0.13	-0.021	1				
	Sig. (2-tailed)	0.242	0.11	0.158	0.318					
LOS	Pearson Correlation	-.222**	0.168	-.373**	-.220**	0.168	1			
	Sig. (2-tailed)	0	0.067	0	0	0.067				
SOG	Pearson	0.05	0.15	-	-	.393*	.239*	1		

	Correlation	7	8	.180*	0.085	*	*			
	Sig. (2-tailed)	0.535	0.084	0.049	0.357	0.034	0.009			
D/E	Pearson Correlation	.337**	-.181*	.25**	.271**	.273**	.458**	0.143	1	
	Sig. (2-tailed)	0.002	0.048	0.001	0.004	0.003	0.013	0.119		
ROA	Pearson Correlation	.485**	-0.06	.550**	.591**	0.014	.238**	0.089	-.624**	1
	Sig. (2-tailed)	0	0.518	0	0	0.882	0.009	0.335	0	

**. Correlation is significant at the 0.01 level (2-tailed).
* Correlation is significant at the 0.05 level (2-tailed).

Table-2 shows the Correlation matrix of all variables incorporated in the analysis which consists of 120 observations of fourty manufacturing firms before global financial crisis. The information from the table show that average collection period (ACP) is strongly negative correlated to return on asset (ROA) is r=-.485 at 99% confidence level.The value of r= -.060 between the relationship of ROA and average payment period (APP) and the relationship is insignificant. ROA and inventory conversion period (ICP) provide r=-.550 and it shows strongly negative relationship. There is weak positive association between ROA and cash conversion cycle (CCC) as the value of r= .014. The correlation between return on asset (ROA) and control variable current ratio (CR) is (.14). However this relationship is insignificant. The connection between ROA and natural log of sales (LOS) shows insignificant positive relationship as r=.238. ROA and sales growth (SOG) is (.089) which is insignificant.ROA and debt to equity (D/E) presents strongly positive correlation with r =-.624.Negative sign shows inverse relationship and positive sign shows direct association. There is high level of correlation between average collection period and inventory conversion period. Similarly, from the correlation table it is very vivid that cash conversion cycle is also correlated to average collection period and inventory conversion period.These relationships show the presence of multicollinearity among independent variables. Soseparate regression models are applied for all independent variables.

Table 3During global financial crisis

variables		ACP	APP	ICP	CCC	CR	LOS	SOG	D/E	ROA
ACP	Pearson Correlation	1								
	Sig. (2-tailed)									
APP	Pearson Correlation	.638**	1							
	Sig. (2-tailed)	0								
ICP	Pearson Correlation	.268*	.870**	1						
	Sig. (2-tailed)	0.016	0							
CCC	Pearson Correlation	.350**	.014**	-.095**	1					
	Sig. (2-tailed)	0.001	0.003	0.002						
CR	Pearson Correlation	.322**	.473**	0.156	.560**	1				
	Sig. (2-tailed)	0.06	0.04	0.168	0					
LOS	Pearson Correlation	.317**	.225**	.337**	.306**	.374**	1			
	Sig. (2-tailed)	0.004	0	0	0.006	0.001				
SOG	Pearson Correlation	0.027	-.302**	-.339**	.073**	.037**	0.092	1		
	Sig. (2-tailed)	0.815	0.006	0.002	0.04	0.0251	0.416			
D/E	Pearson	.506*	.583*	.565*	-	.263*	.503*	-.521**	1	

	Correlation	*	*	*	.329**		*			
	Sig. (2-tailed)	0	0	0	0.003	0.018	0.041	0.0167		
ROA	Pearson Correlation	-.599**	-0.012	.348**	-.737**	-.723**	0.104	-.659**	.223*	1
	Sig. (2-tailed)	0	0.913	0.002	0	0	0.358	0	0.047	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table-3 shows the correlation and measurement of different variables of eighty observations of forty manufacturing firms during global financial crisis of 2008-2009. The correlation between return on asset (ROA) and average collection period (ACP) gives a negative coefficient which is (-.599) and with p value (000) which indicates that the result is highly significant and average collection period negatively affects return on asset during crisis. Correlation analysis between return on asset (ROA) and average payment period (APP) also provides a negative coefficient (.012) and p is (.913).This means there is insignificant inverse relationship between return on asset and the payment period to suppliers. In the time of crisis inventory conversion period (ICP) positively affects firm profitability because correlation coefficient presents positive value (.348) and p is (.002).This suggests that if inventory is hold for a long period as a result profitability will increase. Looking to the relationship between cash conversion cycle (CCC) and return on asset (ROA) in the table, the firm performance in term of return on asset strongly negatively affected by cash conversion cycle with coefficient value(-.737) and p is (000).Control variables current ratio (CR) and sales growth(SOG) have significant negative association while firm size (LOS) and debt to equity (D/E) have insignificant positive association with return on asset(ROA)as p value are .358 and .047 respectively. However during the time of financial crisis again there ishigh correlation issue among predictors,which leads to multicollinearity.So the main rationale behind using several regression models is to avoid multicollinearity problems.

Table 4A Comprehensive comparison table of correlation among variables in two periods

Explanatory	Variables	Relationship	ROA Before crisis	ROA During crisis
	Average collection period(ACP)	Correlation	-.485**	-.599**
		p-Value	0	0

	Average payment period(APP)	Correlation	-.550	-0.012
		p-Value	0.518	0.913
	Inventory conversion period(ICP)	Correlation	-.550**	.348**
		p-Value	0	0.002
	Cash conversion cycle (CCC)	Correlation	.591**	-.737**
		p-Value	0	0
Control	Current ratio (CR)	Correlation	0.014	-.723**
		p-Value	0.882	0
	Natural log of sales (LOS)	Correlation	. 238**	0.104
		p-Value	. 009	0.358
	Sales growth (SOG)	Correlation	-0.089	-.659**
		p-Value	0.335	0
	Debt to equity ratio (D/E)	Correlation	-.624**	.223*
		p-Value	0	0.047

Multiple Linear Regressions

Multiple regression models have been drawn for every working capital component to check how much each variable affects profitability (ROA) in the presence of control variables. Therefore for each case regression model has been checked and then the comparisons have been made to know the difference between the two specified periods. In this way the first regression model has been constructed for average collection period.

Table 5ACP Model Summary

R		**R Square**		**Adjusted R Square**	
B. crisis	D. crisis	B. crisis	D. crisis	B. crisis	D. crisis
.695[a]	.775[a]	0.481	0.592	0.452	0.536

a. Predictors: (Constant), D/E, CR, LOS, SOG, ACP
b .Dependent variable ROA

The adjusted R square value is 0.452 and 0.536 before crisis and during crisis period respectively. These values indicate that before crisis period the model explained 45.2% change in the dependent variable while 54.8% variance in the variable has not been explained by the model. During the time of crisis 53.6% of the variance was accounted by the model. However 46.4% remained unexplained. From table 5 it is clear that the entire regression model is good fit for the data. Results from the table indicate that average

collection period statistically predicts firm performance in term of return on assets in the presence of control variables in both crisis and non-crisis periods.

Table 6Coefficients

Model	Standardized Coefficients		Sig.		Colinearity Statistics			
	Beta				Tolerance		VIF	
	Before	During	Before	During	Before	During	Before	During
1.(Constant)	23.48	14.695						
ACP	-0.0191	-0.0461	0	0	0.393	0.182	2.547	5.492
CR	-0.0191	0.021	0.054	0	0.77	0.14	1.298	7.142
LOS	-0.0061	0.0344	0.007	0.818	0.365	0.562	2.736	1.78
SOG	-0.063	-0.626	0	0	0.779	0.265	1.284	3.768
D/E	-1.291	0.103	0.368	0	0.197	0.281	5.081	3.554

One of the important things which should be taken into consideration in multiple regressions is multicolinearity. It is the phenomena in which two are more than two independent variables in\multiple regression models are highly correlated with each other. In such situation it is difficult to know which independent variable became a cause of change in the depended variable. To know the existence of multicolinearity, variance of inflation factor (VIF) or tolerance value is determined which is inverse of each other. If the value of tolerance is less than 0.01 or if the value of VIF is greater than 10 then multicolinearity is exist otherwise not.

B coefficient can be interpreted in different scales; usually the standardized coefficient value of Beta parameter is examined to test the impact on depended of independent variable (Muijs, 2004). From the table 6 it is clear that ACP has negative correlation with return on asset (ROA) before and crisis during crisis period.Before crisis period if account receivable is received one day later it will decrease the profitability by 1.9% while during crisis one day delay of account receivable causes a decrease of 4.56% in return on asset at 99% significance level. The value of VIF for average collection period (ACP) is 2.547 and 5.492 for both periods respectively. These values indicate that there is no multicolinearity conflict among independents variables in the both periods.

Conclusion and Recommendations

Conclusion

Findings of our study show that average collection period strongly negatively affect firm profitability. These results are consistent to the findings of others studies because Shin andSoenen (1998), Deloof (2003),Falope and Ajilore (2009), Dong (2010), Gill et al., (2010), Dong and tyh-tay-su (2010), Harvesh (2012), Vural et al., (2012) also observed negative association. Its means that if a company increases its days of account receivables as a result the profitability of a company will decrease. It is further stated, that in the time of global financial crisis this inverse association is comparatively high to non financial crisis which support VU. (2016) findings. Public limited companies have high reputation with respect to the quality of their products. Therefore customers have no arguments to avail credit sales and this is the main rational behind the inverse association between average collection period and profitability. The impact of inventory conversion period on profitability provides two different results before and during crisis. Analysis shows that there is highly negatively significant correlation between days of inventory conversion period and firm performance before financial crisis. Deloop(2003), Teruel and Solano (2005), Padachi (2006), Garcia-Teruel and Martinez-Solano (2007), Gameson (2007), Mohammadi (2009), Dong (2010), Sharma and Kumar (2011), Ashraf (2012), Kulkanya (2012) also found negative association. This is because large firms have sophisticated inventory management system and there is no need to engage, extra cash in inventory management.However during crisis period the result is totally different because there is significantly positive association between the two variables. According to Singh (2008), Charitou et al., (2010, Mathuva (2010), Adeel et al., (2012) companies can reduce cost by avoiding stoppage production through maintaining large level of inventory.

According to analysis tables there is insignificant negative association between average payment period and firm financial performance because p value is greater than 0.05 in both periods which shows no relationship between the variables. Therefore for average payment period we accept the null hypothesis and reject the alternate hypothesis. These findings strongly match to the results of Khan et al. (2011), Mukhopadhyay (2011) and Vural et al.,(2012).This leads us to a fact that average payment period play less role with respect to profitability of manufacturing firms.

However, findings show that during global financial crisis lengthy cash conversion period inversely influence firm'sprofitability. Kamath (1989), Soenen (1993),Shin and Seonen (1998), Garcia-Teruel and Martinez-Salano (2004),Nobanee and Alhajjar (2005), Lazridis and Tryfonidis (2006) , Alkella (2006), Reheman and Nasr (2007),Sadlovska and Viswanathan (2007), Uyar (2009), Mohammadi (2009), Ramachandran and Janakiraman (2009), Falope and Ajilore (2009), Izadinia and Taki, (2010),Ching et al.,(2011), Abuzayed (2012), Ebrahim and Datin (2012) also confirmed inverse relationship.

Future Recommendations

Findings of the study suggest a firm to keep average collection period up to minimum level in both periods in order to improve profitability. Similarly lower inventory conversion period improve profitability in non-crisis period. However manufacturing firms need to keep inventory conversion period up to maximum level to increase profitability during financial crisis.Our findings lead us to the fact that average payment period play less role with respect to profitability in manufacturing industries.Finally the whole proxy indicator cash conversion cycle for working capital management show that, firms are needed to keep lengthy cash conversion cycle in pre-crisis period but shorter cash conversion cycle during financial crisis, in order to improve profitability.

Suggestions for Future studies

The following are some of the areas that further research may be focused:

i. The period after crisis was not taken into consideration. So it will be more convenient for future researchers to include the period after global financial crisis.
ii. Such study separately for each sector in manufacturing industries will be more fruitful.
iii. Similar study with an extended scope to cover other components of working capital management including cash and marketable securities.
iv. Future researches could do the same study for financial firms.

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