

# Cash Cycle Management and the Performance of Quoted Industrial Firms in Nigeria

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## **Abstract**

*This study sought to determine the effect of cash cycle management on performance of industrial firms listed on the Nigerian Stock Exchange. A sample of 24 listed firms was used for the period 2007 to 2016. The study employed ex-post facto research design and used secondary data for the analysis. Pearson Correlation and Ordinary Least Square regression were employed to analyze the collected data. The results revealed that accounts receivables ratio and inventory conversion ratio have an inverse and significant effect on performance of selected firms, measured by return on asset, having recorded negative coefficient values of -0.0969 and -0.0456 at 1% and 5% levels of significance respectively. Accounts payable ratio and quick ratio have a significant and direct effect on return on assets at 5% level of significance. Cash cover ratio was found to have negative and insignificant effect on return on asset, even though cash cover ratio is not significant, it cannot be ignored by finance managers who wish to boost performance. We therefore recommend that the management of industrial firms should improve the performance of their firms by reducing the time frame during which cash is tied down within the firms. Also, managers should create value by reducing the number of days of accounts receivables and inventory conversion ratio to a reasonable minimum.*

**Key words:** *Cash cycle management, account receivable ratio, account payable ratio, inventory conversion ratio, return on asset*



## **Introduction**

Generally, liquid asset management is based on cash-to-cash cycle management and is considered an important factor in enhancing the performance of companies (Muscettola, 2014), since it shows how efficient a firm is, in its payment of bills, collection of payments, and selling of inventory via cash cover ratio and quick ratio. The cash cycle is a very powerful tool for assessing how well a firm's working capital is being managed. Cash cycle management is one of the most widely used measures to evaluate and measure the risks and returns associated with liquidity management since every corporate organization is extremely concerned about how to sustain and improve performance, hence organizations monitor the factors affecting their performance in their immediate environment (Mamoud, Amir & Ali; 2015, Anser & Malik, 2013). A firm's performance depends mainly on the way the firm manages its resources at all times (Zakari and Saidu, 2016). As pointed out by Kulkanya (2012), the ability of financial managers to effectively manage receivables, inventories and payables will go a long way in achieving the success of the business. Hence, this study is concerned with investigating how the changes in cash cycle management affect the performance of industrial firms quoted on the Nigerian Stock Exchange.

Previous studies have reported contradicting findings on the

relationship between cash consumption cycle (CCC) and firm performance. Ofunya (2015) and Niresh (2012) in Sri Lanka reported an inverse relationship between CCC and profitability while Zariyawati, Annuar, Taufiq, and Rahim (2009), Muscettola (2014), Habeeb (2016); and Ubesie and Duru (2016) reported that a positive relationship exists between CCC and profitability. Bala, Garba and Ibrahim (2016), Konuk and Zeren (2014) reported the existence of both negative and positive (mixed results) of CCC on firm profitability. It is therefore evident from the above findings that extant literature has created more need for further studies to substantiate the direction of the relationship between cash cycle management and firm performance. Therefore, this study aims at investigating the effect of cash cycle management (account receivables ratio, inventory conversion ratio, account payables ratio, cash cover ratio and quick ratio) on the performance of industrial firms in Nigeria.

This paper is organised into five sections including this introduction. Section two dwells on conceptual framework and review of related literature, section three dealt on methodology while in section four we discussed our hypothesized results and our findings. Finally we drew conclusion on section five and made our recommendations for policy implications.

## **Review of Related Literature**

### **Conceptual Issues**

#### ***Profitability (Return on Asset)***

This is the dependent variable in this research as it is used as a proxy for performance. Profitability as a measure of performance is the ability of asset to generate profit (return on asset). It can also be seen as the rate of return on investment (ROI). If there will be an unjustifiable over-investment in current assets then this would negatively affect the rate of return on investment (Bala *et al.*, 2016).

#### ***Cash Cycle Management (CCM)***

Cash Cycle Management is a unique financial performance metric that shows how well a firm is managing its capital. The term Cash Cycle Management can be considered as the length of time between purchase of raw-materials and collection of cash from debtors. Muturi (2015) said that cash cycle management can be defined as a function of days of accounts receivable plus days of inventory minus days of accounts payable. Ibrahim and Abdullah (2016) viewed cash cycle management as a cycle that occurs when a firm purchases stock, sells the stock on credit as an account receivable, and then collects the account receivable or turns it into liquid asset.

#### ***Account Receivables Ratio (ARR)***

As cash cycle management component, ARR shows the average

number of days it takes the firm to collect payment from its customers (Bala *et al.*, 2016). The objective of debtor management is to minimize the time-lapse between completion of sale and receipt of payment. In this respect accounts receivable ratio (ARR) is calculated as  $\text{accounts receivable} / \text{sales} * 365 \text{ days}$ .

#### ***Inventory Conversion Ratio (ICR)***

This variable represents the rates stocks are held by the firm (Mutaju, 2014). Longer storage represents a greater investment in inventory for a particular level of operation. Muscettola (2014) viewed days in inventory as a financial ratio that measures the average number of days the firm holds its inventory before selling it. Inventory Conversion Ratio (ICR) =  $[(\text{inventory} / \text{cost of sales} * 365 \text{ days})]$ . The numerator of index is the average of inventory levels at the beginning and end of an accounting period.

#### ***Account Payable Ratio (APR)***

The account payable ratio is the average time needed to purchase goods on credit and final payment for them. Ubesie and Duru (2016) opined that accounts payable are suppliers whose invoices for goods or services have been processed but who have not yet been paid. Accounts payable ratio (APR) represents the rates of payables of firms to their suppliers. Accounts payable ratio is calculated as  $[(\text{accounts payables} / \text{purchases}) * 365 \text{ days}]$ . Ibrahim and Abdullah (2016)

argued that average payment period relates to the length of time between the purchase of materials and labour and the payment of cash.

### **Cash Cover Ratio (CCR)**

Mutaju (2014) opined that cash coverage ratio or cash ratio is a liquidity ratio that measures a firm's ability to pay off its current liabilities with only cash and cash equivalents. Cash equivalents are investments and other assets that can be converted into cash within 90 days. It looks only at the assets that can be most easily used to pay off short-term debt. To show a sufficient ability to pay, the ratio should be substantially greater than 1.1. The cash coverage ratio is calculated by adding cash and cash equivalents and dividing by the total current liabilities of a company (Das, 2015).

### **Quick Ratio**

Quick ratio also known as the acid-test ratio is a liquidity ratio that is more refined and more conservative than the current ratio because it excludes inventories from current assets (Mutaju, 2014). It shows the ability of a firm to use its near cash or quick assets to retire its current liabilities immediately. It is calculated as follows –  $QR = \frac{\text{Current Asset} - \text{Inventory}}{\text{Current Liabilities}}$ . Generally, the higher the ratio, the higher the company's liquidity.

### **Theoretical Framework**

Several theories have been developed by various scholars on cash cycle management and firm performance. This study was anchored on trade off theory propounded by Kraux and Litzenberger in 1973. The choice of this theory is because an efficient cash cycle management is achieved when there is a trade-off between liquidity and profitability and the shareholders' value. Efficiency in cash management seeks to ensure that the investment in cash cycle components is neither too low nor too high. Nyamweno and Olweny (2014) argued that very high level of current assets means excessive liquidity hence return on assets will be low as funds are tied up in idle cash and stocks earn nothing while high levels of debtors reduce profitability. Bala *et al.*, (2016) were of the opinion that when the cash cycle management requirements are not properly managed and are allocated more than required, it renders the management inefficient and reduces the benefits of short-term investments. On the other hand, if the allocation on components of cash cycle management is too low, the company may miss a lot of profitable investment opportunities or suffer short term liquidity crisis, leading to the degradation of company credit, as it cannot respond effectively to temporary capital requirement.

### **Empirical Literature**

Empirical literature is presented in tabular form called webometric analysis. See table 1.

**TABLE: 1: Webometric Analysis Of Selected Empirical Studies On Effect Of Cash Cycle Management On Firm Performance**

Names/ Author	Year	Country	Period	Sector	Title	Variables	Method	Findings
1) Zakari and Saidu	2016	Nigeria	2010 to 2014	Tele-communication	The impact of cash conversion cycle on firm profitability evidence from Nigeria listed telecommunication	Inventory turnover period, average collection period, average payment and cash conversion cycle	Ordinary Least Square (OLS)	They found a significant positive relationship between cash conversion cycle (average payment period and average debtor's collection period) and corporate profitability.
2) Fayaz and Wajid	2012	Pakistan	2003 to 2009	Textile industry	Impact of working capital management on profitability. A case of Pakistan.	Number of days account receivable, number of inventory, number days account payable	OLS	From their empirical findings, they observed that all the independent variables have significant negative impact on dependent variables i.e. ROA
3) Nida Shah	2016	Pakistan	2004 To 2013	Non-financial firms	Impact of working capital management on firms profitability in different business cycles.	Sales, CCC, current ratio, Business cycle, inventory, account receivables, account payables.	Pedro panel co-integration	Results show that cash conversion cycle has negative relationships with firms' profitability in different business cycles.
4) Ubesie and Duru	2016	Nigeria	2000 To 2011	Industrial and domestic product firms	Effect of cash conversion cycle management on the profitability of industrial and domestic product firms in Nigeria	Profitability, Account receivable, Account payable, Account ratio, inventory	Multiple regression	The study found that Account receivable and Account payable had significant positive effect on the industries profitability ratio at 1% level of significant but found negative effect of inventory on profitability ratio at the same 1% levels of significance
5) Duru and Okpe	2015	Nigeria	2000to 2011	Health care companies	Cash conversion cycle, Management on the performance of health care manufacturing companies in Nigeria.	Cash conversion cycle, sales growth rate, debt ratio	Generalized least square	The findings of their study show that both cash conversion cycle and debt ratio had negative but significant effect on the profitability of health care companies in Nigeria while sales growth rate had positive and significant effect on those companies under study.
6) Mahmoud, Amir and Ali	2015	Tehran stock exchange Iran	2002 to 2012	Automotive, pharmaceutical	The relationship between CCC and profitability of companies listed in Tehran Stock Exchange.	CCC debt ratio, firm size, sales growth debt ratio	linear regression	The results indicated a significant inverse relationship between the CCC and profitability. This shows that decrease in the CCC increases earnings per share
7) Kaveh Ghaderi	2015	Iran	2003 to 2009		The study of CCC effects on return on Assets	Delay period in paying account payable, collection of receivable period, residual of account payable, daily cost of goods sold. CC, ROI	Multiple regression	Based on the results, the effect of cash conversion period index on total assets, is said to have a negative effect on the ROA
8) Muturi Harrison	2015	Kenya	2009to 2013	Tea companies	Effects of cash conversion cycle on profitability of tea factories in Kenya	Net cash conversion cycle, profitability	Descriptive research design	The results of his findings revealed that net cash conversion cycle (NCCC) has negative significant effect on profitability
9)	2014	Italy	2007to	Manufacturing	Cash conversion cycle	Account	Ordinal	The ordinal regression

Muscettola			2010	sector	and firms profitability. An empirical analysis.	receivables, number of days account payable, CCC, return on assets	regressions	results show that the CCC is significantly and positively related to profitability
10) Konuk and Zeren	2014	Turkey	2008to 2013	Food beverage	Is cash conversion cycles optimum in Turkish listed food and beverage firms	CCC, receivables, inventories, payables	Sequential panel selection method SPSM	Cash levels of 13 firms are observed non-optimal by the aid of sequential pane selection method (SPSM). This results show most firms at food- beverage index do not pursue a balanced working capital policy.
11) Yasir, Majid and Yousaf	2014	Pakistan	2007to 2012	Cement industry	Cash conversion cycle and its impact upon firm performance an evidence from cement industry of Pakistan	Return on assets receivables collection period, inventory conversion period, payable deferral period. Size, leverage, growth	Regression analysis	The findings of the study show negative relationship between the firms' cash and profitability.
12) Anser and Malik	2013	Pakistan	2007 to 2011	Manufacturing	Cash conversion cycle and firms profitability. A study of listed manufacturing companies.	CCC return on assets, return on equity, size, debt inventory holding period, receivable collection period, payable payment period	Ex-post factor	Their regression results shows that CCC is significantly and inversely related to return on equity (profitability) indicating that lesser the cash CC greater would be the profitability as measured by ROE
13) Takon Samuel.	2013	Nigeria	2000to 2009	Selected quoted firms	Does cash conversion cycle have impact on return on assets of Nigeria firms	ROA ,CCC, Size, growth, inventory, accounts receivable, account payable	Ex-post facto research design	The result shows that CCC has a negative impact on ROA which implies that a % decreases in CCC will result into a 25% increase in ROA while sizes have no significant impact on ROA. Growth have a significant positive impact on ROA
14) Mutaju	2014	East Africa	2005 TO 2012	Manufacturing firms	An empirical analysis of the relationship between working capital management and profitability. Panel evidence from East Africa.	ROA, operating margin, current ratio, quick ratio, cash cover ratio, receivables' collection period, creditors deferral period, inventory holding period, CCC, sales growth, debt ratio	Multiple regression analysis	The result revealed that current ratio, inventory holding period, payables' deferral period and cash conversion cycle have significant positive relationship with ROA while quick ratio, cash cover ratio and receivables' collection period have significant negative relationship with ROA.

## METHODOLOGY

### Research Design

Ex post facto research design was used and secondary data were collected from financial statement of the quoted firms. The study covered all industrial

firms quoted on the Nigerian Stock Exchange within the period of ten years from 2007 to 2016. Based on consideration of sampling, the size of sample in this study was twenty eight (28) but there were 4 companies that do not have the completeness of the

data. Therefore, after the filtration only 24 firms are with sufficient information and finally selected to be sample of this study. Note that 24 firms were selected based on complete availability of data.

**Operationalization of Variables:**

Variables (code)	Proxies (operational definitions)
<b>Dependent variable</b>	
Return on Assets (ROA)	Profit Before Interest and Tax /Total Assets
<b>Independent Variables</b>	
Account Receivable Ratio (ARR)	Accounts Receivables/Net Sales*365
Inventory Conversion Ratio (ICR)	Inventory/Cost of Sales*365
Account Payable Ratio (APR)	Accounts Payables/Cost of Sales*365
Cash Cover Ratio (CCR)	Cash and cash equivalents/ current liabilities
Quick Ratio	Current assets less inventory/current liabilities

**Model specification:**

The linear regression model used in this study is adapted from the prior studies of (Nazir & Afza, 2009). Consistent with previous studies, this study modified and extended the model tested by prior studies and the ordinary least square was guided by the following linear model

$$Y = F[X_1, X_2, X_3, X_4, X_5] \dots \dots \dots (1)$$

$$\text{Profitability} = F[\text{ARR}, \text{ICR}, \text{APR}, \text{CCR}, \text{QR}] \dots \dots \dots (2)$$

Based on the above model, we specify the following regression equation

$$\text{ROA}_{it} = \beta_0 + \beta_1 \text{ARR}_{it} + \beta_2 \text{ICR}_{it} + \beta_3 \text{APR}_{it} + \beta_4 \text{CCR}_{it} + \beta_5 \text{QR}_{it} + \epsilon \dots \dots \dots (3)$$

Where, ROA denotes the return on assets,

- ARR=Account receivable ratio,
- ICR=Inventory conversion ratio,
- APR=Account payable ratio,
- CCR= Cash cover ratio,

QR= Quick ratio and Subscripts *i* denote number of firms, *t* denotes years or time-series dimensions ranging from 2007-2016 ,  $\epsilon$  is the error term of the model and  $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$  = Regression model coefficients.

**Result and Discussion**

**Descriptive Analysis**

The descriptive statistics for the dependent and independent variables used in this study were presented in table 2 below.

*Table 2: Summary of descriptive statistics for the variables employed in this study.*

Variables	Mean	Minimum	Maximum	Std. Deviation	JB(P-value)	No. of observations
ROA	0.3286	0.2651	0.7811	0.2144	0.0000*	240
ARR	10.079	8.0811	130.70	31.682	0.0000*	240
ICR	18.685	6.1812	64.101	19.130	0.030**	240
APR	30.096	24.011	188.20	22.561	0.0195**	240
CCR	0.0582	0.0373	0.9661	0.7689	0.0002	240
QR	1.2401	0.2138	6.3741	1.1443	0.0302**	240

Source: Researchers summary of result, (2017).  
 Note: \*1% level of significance, \*\*5% level of significance.

The descriptive statistics table above checks the normality distribution of all the variables by showing their mean, minimum, maximum values and Jarque–Bera (JB.) statistics. From the table, the proxy for firm performance which is the return on assets (ROA) has a mean value of 33% approximately with the standard



deviation of 21%. The maximum ROA is 78% while the minimum is 27%. This means that all the quoted firms sampled in this study were characterized by positive ROA. The firms' average receivable period of credit granted to the customers is 10days while the maximum period is 131days approximately. On the same vein, the firms take an average period of 30 days to pay their creditors with the maximum value of 188 days. On the average, industrial firms take 19 days to convert their inventory to sales (maximum conversion period is 64 days). That is to say that the 18.685 mean value of the days of inventory conversion ratio indicates that firms take approximately 19 days to change inventory to sales or receivables. It can be observed that the minimum values of cash cover ratio and quick ratio were all below 1 and this implies that there are some industrial companies that are having liquidity problems despite being large in size.

Lastly, in table 2, the Jarque–Bera (JB.) which test for normality or existence of outliers or extreme value among the variables shows that return on asset (ROA), ARR, CCR are normally distributed at 1% level of significance; ICR, APR and QR were significant at 5%. This means that no variables with outlier, even if there are, they are not likely to distort the conclusion and are therefore reliable for drawing generalization.

### Correlation Matrix

Pearson's correlation matrix was applied to check the degree of association between Cash Cycle Management component and firms performance so as to determine the nature of association.

**Table 3: Summary of results of the correlation matrix.**

	ROA	ARR	ICR	APR	CCR	QR
ROA	1.000					
ARR	-	1.00				
ICR	0.217*	0	1.000			
APR	0.187*	0.18		1.000		
CCR	*	0			1.000	
QR	0.230*	0.19	0.188	1.00		1.00
	*	8		0		
	-0.065	0.27	-	0.02	1.000	
	R	7	0.122	4		
	QR	0.431*	-	0.06	0.406	1.00
	*	0.10	1.64*	7	*	0
			*			

Source: Researchers summary of result, (2017) from E-view 9.5

Note: \*1% level of significance, \*\*5% level of significance.

The results from table 3 showed that ARR, ICR, CCR are negatively correlated with ROA indicating that increase in any of them will have a negative effect on the profitability of firms. That is to say that a firm with higher collection ratio and higher conversion ratio tends to exhibit low profitability as their money will be tied down in the hands of their customers. By implication this means that managers of industrial firms can increase their profitability by reducing ARR, ICR and CCR. This negative relationship between ARR and ROA imply that increasing firm's receivables ratio lead to a declining profit. So from the above results it can be concluded that firm can

increase its profitability by reducing the time period of accounts receivables, inventory conversion and cash cover ratio. It can be observed also that APR and QR are positively correlated with ROA meaning that an increase in any of them leads to increase in ROA. Since the results revealed positive relationship between APR and ROA, it shows that an increase in APR leads to increase in ROA. Again, the positive relation between ROA and APR means that lagging payments to creditors ensures that firms have enough money to purchase more inventories for resale thus increasing their sales growth and boosting their profits.

**Table 4: Summary of panel regression result**

**Dependent variable: Return on Asset (ROA)**

**Method: Panel least square**

<i>Descriptive Variables</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistics</i>	<i>P-values</i>
Constant	0.4368	0.3255	0.4756	0.0400
ARR	-0.0969	4.2571	3.5820	0.0001
ICR	-0.0456	0.3569	4.1033	0.0311
APR	0.1783	0.8572	2.8781	0.0401
CCR	-0.2873	0.1283	3.7840	0.5601
QR	0.1435	0.7520	2.5090	0.0000
<i>No of observations:</i>	240			
<i>R. Square</i>	0.782			
<i>Adjusted R-Square</i>	0.671			
<i>F- statistics</i>	12.23			
<i>Prob(F-statistics)</i>	0.000			
<i>Durbin-Watson Stat.</i>	1.871			

Source: Researchers summary of result (2017) from E-view 9.5

**Note: \*1% level of significance, \*\*5% level of significance.**

In order to examine the relationship between the dependent variable (return on asset) and the independent variables (ARR, ICR, APR, CCR, QR,), we employed a panel regression analysis since the data had both time series (2007-2016) and cross sectional properties. In Table 4 above, we observed that R-squared and adjusted R-squared values were 0.782 and 0.671 respectively. The value of R-squared which is the coefficient of determination stood at 78.2% which implies that 78.2% of the systematic variations in individual dependent variables were explained in the model while 21.8% were unexplained. Again, the adjusted R-squared stood at 67.1%. This indicates that all the independent variables jointly explain about 67.1% of the systematic variation in ROA of the sampled industrial firms over the 10years period while about 32.9% of the total variations were unaccounted for, hence captured by the stochastic error term. The F-statistics of 12.23 and their P-values showed that all our regression models are generally significant and well specified. Moreover, the Durbin Watson statistic of 1.871 showed that the model is well spread and that there have not been self or auto correlation problem and that error are independent of each other.

In addition to the above, the specific findings from each explanatory variable are provided as follows:

### **Account Receivable Ratio (ARR)**

Based on t-statistics values of ROA and its coefficient, ARR is negative and significant at 1% level which shows that ARR is an important determinant of ROA. It means that a percentage increase in ARR is associated with a 0.0969% decrease in profitability. This negative relationship that exists between ARR and profitability implies that a 1% decrease in the account receivable ratio will generate more profits for industrial firms and is consistent with the trade-off theory and also supported by prior studies of Zakari and Saidi (2016), Bala *et al.*, (2016), Mutaju (2014), Majeed, Makki, Saleem, and Aziz (2013) and Falope and Ajilore (2009) who found account receivables to be negatively related to firm profitability.

### **Inventory Conversion Ratio**

The regression result in table 4 revealed that inventory conversion ratio has negative and significant effect on return on assets. This means that a 1% increase in the ratio of inventory conversion results to 0.0456% decrease in return on assets. The negative relationship found is consistent with the findings of Ubesie and Duru (2016), Sadia *et al.*, (2013), Majeed *et al.*, (2013), Fayez and Wajid (2012), Falope and Ajilore (2009) and Padachi (2006) who also revealed negative and significant effect of inventory conversion ratio on profitability but contradicts the findings of Mutaju (2014) and Charitou *et al.*, (2010) who found

positive relationship between inventory days and profitability.

### **Accounts Payable Ratio**

It can be observed that accounts payable ratio has a positive coefficient value of 0.1783 which is significant at 5%. This implies that a 1% increase in the ratio of accounts payables is associated with an increase in return on asset by 0.1783%. This study is in agreement with the findings of Bala *et al.*, (2016), Ubesie and Duru (2016), Sadia *et al* (2013), Mutaju (2014), Makor and Jagongo (2013) and Raheman *et al.*, (2010) who revealed that accounts payables have positive significant influence on profitability.

### **Cash Cover Ratio**

From table 4 above, we observed that the regression coefficient relating cash cover ratio to return on asset was - 0.2873 thus confirming a negative relationship between the cash cover ratio and firm profitability. This implies that a 1% increase in the cash cover ratio is associated with an increase in return on asset by 0.2873%.

### **Quick Ratio**

From the regression result on table 4, we recorded that quick ratio has a positive coefficient value of 0.1435 which is statistically significant at 1%. This simply means that a 1% increase in quick ratio is associated with a significant increase in ROA by 0.1435%. Our study is consistent with the findings of prior studies like Bala *et al.*, (2016) who found that quick

ratio has positive, strong and significant impact on return on assets but negates the findings of Mutaju (2014) who reported an insignificant relationship between quick ratio and ROA.

**Conclusion and Recommendation**

In conclusion, based on a sample of selected 24 industrial firms from Nigerian Stock Exchange for ten fiscal years from 2007-2016 and using five measures of cash cycle management (ARR, ICR, APR, CCR and QR), the management of industrial firms can improve the performance of their firms by reducing the time frame during which cash is tied down within the firms and also managers can create value by reducing the number of day’s accounts receivables and inventory conversion ratio to a reasonable minimum.

On the basis of the findings and conclusions of the study, the paper recommends among others that:

- Managers should enhance profitability of industrial firms by reducing the number of days of their account receivables i.e the credit period granted to their customers.
- The duration of time that goods are held in inventory should be reduced. This can be done by improving the inventory control process.
- Industrial firms should wait longer in the settlement of their bills since the longer time they take to pay their bills, the better

the performance. This can be done by establishing and improving good relationship with the creditors/suppliers.

- Managers of industrial firms should not emphasize much on the cash cover ratio since it is not statistically significant.
- The management of industrial firms should raise their quick ratio since it directly affects firm profitability.

**Contribution to knowledge**

This study was adapted from the prior studies of (Nazir & Afza, 2009). Consistent with previous studies: The original model is stated below as follows

$$Y = F[X_1, X_2, X_3...X_4.....(1)$$

$$\text{Profitability} = F[\text{ARR, APR, ICR, CCC,}]...(2)$$

This study modified and extended the original model tested by prior studies as follows

$$\text{Profitability} = F[\text{ARR, ICR, APR, CCR, QR,}].....(2)$$

In our model above, we introduced additional two variables such as cash cover ratio (CCR) and Quick Ratio (QR).

Based on the above model, we specify the following regression equation

$$ROA_{it} = \beta_0 + \beta_1 \text{ARR}_{it} + \beta_2 \text{ICR}_{it} + \beta_3 \text{APR}_{it} + \beta_4 \text{CCR}_{it} + \beta_5 \text{QR}_{it} + \epsilon.....(3)$$

The resultant values are as follows:

$$ROA_{it} = \beta_0 + \beta_1 \text{ARR}_{it} (3.5820: 0.0001*) + \beta_2 \text{ICR}_{it} (4.1033: 0.0311**) + \beta_3 \text{APR}_{it} (2.8781: 0.0401**) + \beta_4 \text{CCR}_{it} (3.7840: 0.5601) + \beta_5 \text{QR}_{it} (2.5090: 0.000*) + \epsilon.....(3)$$

**Note: \*1% level of significance, \*\*5% level of significance.**

Thus, we can observe from their values that **cash cover ratio** was not statistically significant in deriving profitability of industrial firms. Our finding is consistent with the findings of Mutaju (2014). We also noticed that **quick ratio** is statistically significant at 1% level of significance with a positive t-value of 2.5090 and supports the findings of Bala *et al.*, (2016) who found that quick ratio has positive, strong and significant impact on return on assets but negates the findings of Mutaju (2014) who reported an insignificant effect.

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