

Working Capital Efficiency and Firm Profitability – Nigeria and Kenya

Lucian J. Pitt

Abstract—The primary purpose of this study is to understand the differences in the relationship between working capital management efficiency, working capital investment decisions and working capital finance decisions and the profitability of firms within the context of two African developing economies, Kenya and Nigeria. The study finds that there is a significant difference in the relationship between the firm's profitability and the working capital variables which suggests different challenges for working capital management in each of these countries.

Keywords—Working Capital Management, Working Capital Investment, Working Capital Finance, Profitability, Cash Conversion Cycle.

I. INTRODUCTION

MUCH of the research carried out on the investment decisions that firms make has been focused on investments in long term assets and the financing thereof. Research into the investment in working capital, which are essentially investments in short term assets (current assets) [1] has been neglected for a long time. The research that has been carried out on investment and financing decisions relating to short term assets has been focused mainly on issues pertaining to trade credit. One of the earlier studies that focused on the relationship between effective or efficient working capital management and the profitability of the firms was carried out by Deloof in 2003 [2]. Since then similar studies have been carried out in many countries and amongst these there is a degree of consensus on the importance of sound working capital management practices for the profitability of the firm. These studies have been focused (amongst others) on the developed economies of Belgium [2], the United States of America [3], [4], Australia [4] and the United Kingdom [5] as well as less developed and emerging economies of Greece [6], Pakistan [7] and [8], Jordan [9], Iran [10], Malaysia [11], Thailand [12], India [13] and South Africa [14]. The only other known study of firms in an African country other than South Africa was carried out in Kenya [15] and Nigeria [20]. Whilst research has contributed to a better understanding of working capital management policies which drive the profitability of firms in these countries very little research has gone into understanding the relationship between working capital management policy and profitability in firms within the developing economies of Africa.

This study focuses working capital management practices of listed non-financial firms in Nigeria and Kenya. It attempts

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to understand the relationship between the profitability of the firm, its working capital management efficiency, working capital management investment (WCI) decisions and working capital finance (WCF) decisions. The working WCI and WCF decisions of the firm will have an impact on its liquidity [1], consequently, this study looks at the relationship between the firm's liquidity and profitability as well. Finally, prior studies cite a relationship between the firm's chosen working capital management strategy and the size of the firm [2]–[16]. This may have an impact on the profitability of the firm; this study looks at the relationship between the size of the firm and profitability as well.

The methodology adopted in this study differs from that of [15] and [20]; due to the failure of data to pass the test for normality, this study used non-parametric regression analysis to understand the relationship between profitability of the firm and the chosen working capital variables; [15] and [20] undertook a multiple regression analysis with the latter using a limited set of data (2005-2006).

This study contributes to literature on the relationship between profitability and working capital management efficiency, WCI and WCF through its focus on firms in African developing economies where limited research has been carried out to date. Secondly, it validates the findings of previous studies and highlights the differences in the relationship between Profitability and WCI and profitability and WCF. It compares to the finding of each country to the other as well as to their counterparts in more developed economies. Understanding these similarities / differences may have significant policy implications for managers responsible for working capital policy formulation and implementation. Shareholders seeking to extract optimum value out of their investments and investment managers wishing to understand changes in the risk-reward relationship of the firm's stock (share) may benefit from an understanding of the relationship between the firm's profitability, working capital management efficiency, WCI and WCF.

II. LITERATURE REVIEW

According to Deloof [2], firms may have an optimal level of working capital that maximizes firm value. Success at achieving this optimal level of working capital is a challenge that is faced by financial executives [17]. In trying to achieve an optimal level of investment in working capital the financial executive is required to maintain a balance between risk and profitability [4], [5] and [7]. Stated otherwise, they are to achieve a balance between risk implicit in the WCI and WCF decision to optimize the firm's profitability [8]. Achieving an

optimal balance between the two is important; too much emphasis on lowering risk will come at the expense of profitability [9].

Working capital management policies generally considers the level of investment in current assets and current liabilities. Nazir and Afza [8] look at the ratio of total current assets to total assets as a measure of the extent to which the firm is adopting a conservative or an aggressive working capital investment policy; the lower the ratio of current assets to total assets the more aggressive the firm's working capital investment policy. Similarly, the ratio of current liabilities to total assets gives an indication of the extent to which the firm is adopting a conservative or an aggressive working capital financing policy; the greater the ratio of total current liabilities to total assets the more aggressive the firm's working capital financing policy [8]. Efficient working capital management calls for a balance between the working capital investment and the working capital financing policy such that the firm's profitability and/or shareholder value is maximized.

Prior research records different interpretations of profitability when looking at the relationship between working capital management and the firm's profitability; [2], [3], [6], [9] and [12], refers to gross profit as a measure of profitability whilst [7], [10], [13], [15] refer to net profit as a measure of profitability. References [8], [14], [17] and [18] refer to the return on assets (ROA) as a measure of profitability. The reference to ROA as a measure of profitability is not appropriate where a firm has mainly financial assets on its balance sheet [9] since operating activities will contribute little to the ROA. As an alternative, [8] and [9] refer to Tobin's Q as market-based performance measure in conjunction with one of the afore-mentioned accounting measures of profitability.

In their analysis of the relationship between working capital management and profitability the components of working capital are defined in terms of accounts receivable days (ARD), inventory days (INVD), accounts payable days (APD) and the cash conversion cycle (CCC) [2]-[18]. The first two ratios indicate the length of time funds are tied up in accounts receivable and inventory, respectively. The third ratio indicates the length of time (in days) that the firm takes to pay its creditors. The CCC is an indication of the length of time the firm is out of cash from the time it purchases its stock to the collection of its receivables; it is measured as the $ARD + INVD - APD$. CCC is also used as a proxy for the working capital management efficiency. The ARD, INVD, and the APD are regarded as proxies for the firm's accounts receivables policy, its inventory policy and its accounts payables policy, respectively [15]. The length of the CCC is an indication of working capital management efficiency.

Conventional working capital management theory states that the shorter the time period that the firm's money is tied up in receivables and inventory and the longer the firm takes to pay its creditors, the more cash will be released for profitable re-investment, hence the expected negative relationship between ARD and INVD with the firm's profitability and the expected positive relationship between APD and the firm's profitability. This is equivalent to stating that there is an

expected negative relationship between the CCC and the firm's profitability [1].

The results from empirical studies by [2], [3], [6], [7], [9] and [12], confirms the expected relationship as outlined by [1] and [8] for the management of accounts receivable and inventory. Whilst the findings of the relationship between profitability and ARD by [15] and [3] are in line with expectation, [3] found no significant relationship between profitability and INVD and [15] found a positive relationship, explained as a reduction in the cost of interruption in production emanating from the maintenance high inventory levels. With the exception of [15] all other studies show a negative relationship between APD and profitability; this goes contrary to the expectation as outlined by [1] and [8]. Studies seem to suggest that less profitable firms take longer to pay their debt, implying a different direction of causality to that suggested by [1] and [1]. Contrary to expectation, [3] and [9] found a positive relationship between the CCC and profitability, implying that the market does not punish working capital management inefficiency.

III. RESEARCH METHODOLOGY

The financial data used in this research was obtained from [19], an online database of financial statements of all firms listed on the stock exchange of selected African countries. The original scope of the study covered listed non-financial firms in Botswana, Egypt, Ghana, Kenya, Namibia, Mauritius, Malawi, Nigeria, Tanzania, Uganda, Zambia and Zimbabwe. Zimbabwe was excluded due to concerns with the integrity of data related to the recent hyperinflation in the country and the termination of the use of the Zimbabwe Dollar in favor of the US Dollar. An analysis of data for the remaining countries showed that Nigeria and Kenya had the most reliable data-set. Concerns with data from other countries included too few years of information for some firms, missing information and after a data clean-up, too few companies within the country from which to draw meaningful conclusions. The original sample of non-financial companies in Kenya and Nigeria totaled 118 firms; after the data clean-up the final sample of companies used in this study total 99 firms (68 from Nigeria and 32 from Kenya). The data used in the analysis spanned five years from 2008 to 2012.

In line with prior studies, this study makes use of ratios in its analysis. The ratios used are listed in Table I. In the measure of the firm's profitability the study used the ratio between Earnings before Interest and Tax (EBIT) and Total Assets. EBIT is a preferred measure of earnings since it captures earnings from operations; total assets exclude non-tangible assets for the same reason i.e. to capture returns from operating assets.

Whilst some studies have used sales as a proxy for the size of the firm [2] and [6], this study has chosen to follow the route followed by [8] and used total assets as a proxy for the size of the firm; sales may be better suited to measure growth through changes in sales from one period to the next, as has been done by [2] and [6].

The ratios recorded in Table I was calculated for each of the

99 firms in the sample over the five year period between 2008 and 2012.

TABLE I
RATIOS USED IN THE ANALYSIS

Variable	Measurement	Abbreviation	Variable	Measurement	Abbreviation
Profitability	$\frac{EBIT^1}{Total\ Assets^2}$	Profitability	Current Ratio ³	$\frac{Current\ Assets}{Current\ Liabilities}$	CR
Accounts Receivable Days	$\frac{Accounts\ Receivable}{Sales\ x\ 365\ days}$	ARD	Working Capital Investment	$\frac{Current\ Assets}{Total\ Assets^2}$	WCI
Accounts Payable Days	$\frac{Accounts\ Payable}{Cost\ of\ Sales\ x\ 365\ days}$	APD	Working Capital Finance	$\frac{Current\ Liabilities}{Total\ Assets^3}$	WCF
Accounts Receivable Days	$\frac{Inventory}{Cost\ of\ Sales\ x\ 365\ days}$	INVD	Company Size (Size)	Log Total Assets	SIZE
Cash Conversion Cycle	ARD + INVD - APD	CCC			

¹Earnings Before Interest and Tax

²Total Assets excluding intangibles

³A measure of liquidity

Given the constraint on data availability a regression analysis to determine the relationship between the firm's profitability and its WCI and WCF decision was not feasible; instead the study looks at a correlation between the variables to test the nature of their relationship. To decide which form of correlation (i.e. parametric or non-parametric correlation) would be appropriate for the analysis, the data was subjected to a test for normality. In this regard, Table II details the descriptive characteristics of the distribution of variables for firms in Kenya and Nigeria.

For Kenya, the distribution of values for WCF, SIZE, CCC and WCI is approximately symmetric (skewness between -0.50 and +0.50). The distribution of values for INVD and

profitability is moderately skewed (skewness between -1.0 and -0.50 and +0.50 and +1.0). Finally, the distribution of values for ARD, APD and CR are highly skewed (Skewness less than -1.0 and greater than +1.0)

For Nigeria, the distribution of values for Profitability, WCI and Size are approximately symmetric; the distribution of values for CR is moderately symmetric and the distribution of the values for ARD, APD, INVD, CCC and WCF are highly skewed.

The kurtosis values as detail in Table II do not support the assumption of normal distribution in any of the variables for Kenya or Nigeria.

TABLE II
SKEWNESS AND KURTOSIS STATISTICS OF VARIABLES

	Kenya		Nigeria	
	Skewness	Kurtosis	Skewness	Kurtosis
Profitability	0.70	0.40	0.20	1.02
ARD	1.70	3.53	3.30	13.63
APD	1.50	3.57	5.70	39.04
INVD	1.00	1.33	3.60	19.06
CCC	0.00	1.34	-4.30	31.11
CR	3.80	17.68	0.60	0.18
WCI	0.50	-1.10	0.00	-0.83
SIZE	0.20	-0.70	0.00	-0.60
WCF	0.40	-0.90	1.90	6.23

Table III illustrates the output of the Shapiro-Wilk test for normality of the variables for firms in Kenya and Nigeria. This test suggests that most of the variables used in the analysis failed the test for normality. On the basis of the outcome of these tests, the study opted for a non-parametric test to do determine the correlation between variables; the Spearman Rank Correlation test was chosen.

IV. RESEARCH FINDINGS

The outcome of the Spearman Rank Correlation is illustrated in Tables IV and V for the firms in Kenya and Nigeria respectively. The analysis shows that there is a negative correlation between profitability and the CCC and

profitability and WCI for Kenyan firms. These results are in line with that of [2], [6], [7], [10], [15] and [17]. The results also show a negative association between profitability and WCF which is in line with findings by [8]. The analysis shows a similar result for the relationship between profitability and WCF for Nigerian firms. However in all cases the relationship was not found to be statistically significant.

The relationship between the profitability of the firm and the CCC as well as the profitability of the firm and WCI for Nigerian firms was found to be positive. This goes against the expectation as outlined by [1] and [8], but in the case of CCC, it is in line findings of [3] and [9].

TABLE III
TESTS FOR NORMALITY

	KENYA		NIGERIA	
	Statistic (W)	P-Value	Statistic (W)	P-Value
Profitability	0.93	0.0466*	0.98	0.2875
ARD	0.85	0.0004**	0.65	<0.0001**
APD	0.89	0.0044**	0.44	<0.0001**
INVD	0.95	0.118	0.69	<0.0001**
CCC	0.97	0.4237	0.59	<0.0001**
CR	0.62	<0.0001*	0.96	0.0398*
WCI	0.92	0.0234*	0.98	0.2387
SIZE	0.98	0.6585	0.99	0.6851
WCF	0.95	0.1853	0.86	<0.0001**

H0: $F(Y) = N(\mu, \sigma)$ - The distribution of the population is normal with unspecified mean and standard deviation.

H1: $F(Y) \neq N(\mu, \sigma)$ The distribution of the population is not normal.

*Reject the null hypothesis in favour of the alternative hypothesis at the 5% significance level.

**Reject the null hypothesis in favour of the alternative hypothesis at the 1% significance level.

The expected relationship between the variables that make up the CCC and profitability is that ARD and INVD would be negatively correlated with the profitability of the firm and that the APD would be positively correlated with the profitability of the firm [1]. The results for Kenyan firms show that this expected relationship holds, but this is statistically insignificant. The relationship between profitability and INVD is in contrast with the findings by [15] for Kenyan firms. The positive relationship found between profitability and INVD by [15] for Kenyan firms is interpreted as an attempt by firms to reduce the costs of interruption of production or stock-outs. The difference in the findings of [15] and this study could be due to different data sets used; one before the 2008 financial crisis and the other after this period.

For Nigeria the expected relationship between profitability of the firm and APD and INVD does not hold. However, the relationship between profitability and APD is in line with prior studies [2], [6], [7], [10] and [17]. The positive relationship between profitability and the APD has been explained as a tendency for profitable firms to pay their creditors sooner rather than later and for less profitable firms to delay the payment of their creditors. This brings into question the assumed direction of causality in the theory of efficient working capital management as assumed by [1].

The negative correlation between the firm's profitability and the size of the firm for Kenyan firms goes against expectation and contrasts with findings of other studies [2], [6], [7], [10], [15] and [17]; it also contrasts with the finding of earlier studies on the Kenyan firm [15].

For Nigeria the relationship between profitability of the firms and the size of the firms is in line with prior studies; the finding suggests that there is a positive relationship between the firm's size and its profitability; however, the relationship lacks statistical significance.

Finally, the analysis shows that there is a statistically significant positive relationship between the profitability of the firm and its liquidity (CR) for firms in Nigeria. Conventional theory would suggest that there is a trade-off between liquidity and profitability since liquidity assumes a higher level of investment in working capital (current assets)

relative to outstanding short term debt. Nazir and Afza [8] refer to a low rate of investment in current assets as an aggressive working capital investment policy which is rewarded by higher profits; this re-iterates the expected negative relationship between the profitability of the firm and its liquidity (CR). The relationship between the firm's profitability and liquidity for Kenyan firms is also positive, but this relationship lacks statistical significance.

TABLE IV
SPEARMAN RANK CORRELATION COEFFICIENT (KENYA)

	Profitability	ARD	APD	INVD	CCC	CR	WCI	Size	WCF
Profitability	1.000								
	•								
ARD	-0.127	1.000							
p-value	0.488	•							
APD	0.124	0.422	1.000						
p-value	0.501	0.0161*	•						
INVD	-0.070	0.228	0.146	1.000					
p-value	0.7049	0.2087	0.4256	•					
CCC	-0.151	0.541	-0.252	0.630	1.000				
p-value	0.4105	0.0014**	0.1644	0.0001**	•				
CR	0.172	0.247	-0.227	0.191	0.431	1.000			
p-value	0.348	0.1728	0.2125	0.296	0.0137*	•			
WCI	-0.034	-0.040	-0.303	0.229	0.347	0.010	1.000		
p-value	0.8515	0.8281	0.0921	0.2072	0.0518	0.9571	•		
SIZE	-0.106	-0.022	0.312	-0.212	-0.331	-0.236	-0.296	1.000	
p-value	0.5653	0.9049	0.0822	0.2444	0.0645	0.1941	0.100	•	
WCF	-0.129	-0.276	-0.061	0.058	-0.052	-0.604	0.755	0.079	1.000
p-value	0.4828	0.1262	0.7393	0.7514	0.7788	0.0002**	<0.0001**	0.667	•

H0: The variables are independent.

H1: The variables are not independent.

*Reject the null hypothesis in favour of the alternative hypothesis at the 5% significance level.

**Reject the null hypothesis in favour of the alternative hypothesis at the 1% significance level.

TABLE V
SPEARMAN RANK CORRELATION COEFFICIENT (NIGERIA)

	Profitability	ARD	APD	INVD	CCC	CR	WCI	Size	WCF
Profitability	1.000								
	•								
ARD	-0.490	1.000							
p-value	<0.0001**	•							
APD	-0.395	0.481	1.000						
p-value	0.0010**	<0.0001*	•						
INVD	0.051	-0.049	0.153	1.000					
p-value	0.6817	0.696	0.2152	•					
CCC	0.076	0.357	-0.233	0.550	1.000				
p-value	0.5390	0.0030*	0.0573	<0.0001**	•				
CR	0.260	0.261	-0.169	0.317	0.660	1.000			
p-value	0.0336**	0.0332**	0.1730	0.0090**	<0.0001**	•			
WCI	0.164	0.142	-0.190	0.147	0.349	0.467	1.000		
p-value	0.1855	0.2527	0.1240	0.2339	0.0038**	<0.0001**	•		
SIZE	0.1280	-0.2110	0.0570	-0.0830	-0.2950	-0.345	-0.194	1.000	
p-value	0.3019	0.0869	0.6497	0.5061	0.0152*	0.0042**	0.116	•	
WCF	-0.124	-0.127	-0.044	-0.185	-0.325	-0.551	0.391	0.149	1.000
p-value	0.3133	0.3021	0.7234	0.1317	0.0069**	<0.0001**	0.0010**	0.226	•

H0: The variables are independent.

H1: The variables are not independent.

*Reject the null hypothesis in favour of the alternative hypothesis at the 5% significance level

**Reject the null hypothesis in favour of the alternative hypothesis at the 1% significance level

V. DISCUSSION AND CONCLUSION

There seems to be no statistically significant relationship between the firm's profitability and the WCI, WCF and the CCC for Kenyan firms. The analysis suggest that for Kenyan firms the appropriate working capital management strategy should include attempts to reduce the CCC, this can be accomplished by reducing the ARD and INVD and increasing the APD. The strategy should also focus on reducing the WCI i.e. adopting an aggressive working capital investment policy.

Finally, an increase in the current liabilities, which could be accomplished by a delay in the payments to creditors, will allow the firm to generate better returns for the shareholder.

It seems as if smaller firms in Kenya are more profitable; without further analysis it is difficult to say why this is so, but the current experience is in contrast with findings in prior studies.

Management of working capital seems to be a bigger challenge for Nigerian firms than for Kenyan firms by virtue

of the number of unconventional relationships the variables studied has with the profitability of the firm. The relationship between APD and the profitability of firms in Nigeria would suggest that firms should be trying to pay creditors faster. This contradicts conventional theory that suggest that a longer accounts payable period translates into free credit for the firm and helps to reduce its CCC i.e. its "out-of-cash period". One explanation for this relationship suggests that the direction of causal relationship between accounts payable period and profitability may be from the firm's profitability to the accounts payable period, implying that profitable firms pay off their debts sooner. Once again, without further analysis it will be difficult to suggest the reason behind the relationship within Nigerian firms.

The relationship between the firm's profitability and INVD and profitability and the CCC for Nigerian firm's is also in contrast to convention; the relationship between profitability and the CCC most likely being affected by unconventional relationship between profitability and INVD and profitability and APD. One of the explanations given for the positive correlation between profitability and INVD is that the cost savings that result from avoiding stock-outs exceeds the cost of holding stock for longer periods.

The final unconventional relationship in Nigerian firms is that between profitability and WCI. This relationship assumes that a conservative working capital investment strategy will have a positive impact on the firm's profitability. It goes against conventional theory.

The results of this study highlights a few significant differences in the relationship between profitability and the working capital management variables used in the analysis for firms in Kenya and Nigeria. Greater insight into the reasons behind these difference can only be gained through further analysis which is beyond the scope of this study. However, the result of the study does highlight that firms in developing African countries may have diverse challenges, challenges that may be significantly different to that of their counterparts in more developed countries where economies may be more advanced.

A key limitation of the study is the lack of an analysis of causal relationship between the profitability of the firm and the working capital variables discussed. The constraint of access to reliable data as well as the low number of listed companies on many of the stock exchanges in Africa, hence limited access to information, acts as an impediment to achieving this objective. A second limitation of the study may be that it looks at the firm's performance from 2008 to 2012. There may be an impact from the financial crises of 2008 which is not specifically highlighted in this study. One way of overcoming would is to isolate the 2008 period and any that may be affected thereafter for a separate study which is then compared to a study over an assumed "normal" period. Once again data availability and concerns with integrity of data are significant impediments.

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