

## **WORKING CAPITAL MANAGEMENT POLICY AND CORPORATE PROFITABILITY OF NIGERIAN QUOTED COMPANIES: A SECTORAL ANALYSIS**

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### **ABSTRACT**

This research was intended to analyse the relationship between working capital management policy and corporate profitability in Nigerian quoted companies. Based on the data of 107 quoted companies spread across 23 sectors for the 2003-2007 period, averages and product-moment correlation coefficients were computed based on measures of net current assets ratio (NCAR), return on assets (ROA) and net profit margin (NPM). The Loveday Likelihood Test was adopted to establish the minimum value for the correlation to be most likely using sectoral data points.

On the average all the sectors adopted an aggressive working capital management strategy by relying heavily on current liabilities for financing their working capital needs. It was also found that the adoption of this strategy produced negative profitability in most of the sectors. The results also show strong positive correlation between NCAR and selected measures of profitability. It is recommended that companies would maximize profitability and add value by adopting the conservative working capital management strategy (i.e investing more in current assets) provided the operating environment and money markets are robust.

**KEYWORDS:** Working Capital, Profitability, Quoted Companies, Sectoral Approach

### **INTRODUCTION**

Business success depends heavily on the ability of the financial managers to effectively manage receivables, inventory, and payables (Filbeck and Krueger, 2005). A firm may choose an aggressive working capital management policy with a low level of current assets as a percentage of total assets, or it may also be used for the financial decisions of the firm in the form of high level of current liabilities as a percentage of total liabilities (Afza and Nazir, 2007). An optimal level of working capital is a balance between risk and efficiency.

A popular measure of working capital management (WCM) is the cash conversion cycle (CCC), which is defined as the sum of days of sales outstanding (average collection period) and days of sales in inventory less days of payables outstanding (Keown *et al* 2003). The longer this time lag, the larger the investment in working capital. A longer cash conversion cycle might increase profitability because it leads to higher sales.

However, corporate profitability might also decrease with the cash conversion cycle, if the costs of higher investment in working capital is higher and rises faster than the benefits of holding more inventories and granting more trade credit to customers (Deloof, 2003). The dilemma in working management is to achieve the desirable trade-off between liquidity and profitability (Smith, 1980; Eljelly, 2004, Rehman and Nasr, 2007).

In the literature, there is a debate on the risk-return trade off among different working capital policies (see Pinches, 1992; Brigham and Erhardt, 2004; Gitman, 2005; Moyer *et al.*, 2005; Vishnani and Shah, 2007). More aggressive working capital policies are associated with higher return and risk, while conservative working capital policies are associated with lower risk and return (Gardner *et al.*, 1986; Weinraub and Visscher, 1998).

Some research studies have been undertaken exclusively on the impact of working capital management practices of both large and small firms in India, UK US and Belgium using either a survey-based approach (Burns and Walker, 1991; Peel and Wilson, 1996) to identify the push factors for firms to adopt good working capital practices or econometric analysis to investigate the association between working capital management and profitability (Shin and Soenen, 1998, Anand, 2001; Deloof, 2003).

Other things remaining the same, it is hypothesized in the corporate finance literature, that the greater the firm's investment in current assets, the greater is its liquidity. As a means of increasing its liquidity the firm may choose to invest additional funds in cash and/or marketable securities. Such action involves a trade off, however, since such assets can earn little or no return. The firm finds that it can reduce its risks of illiquidity only by reducing its overall return in invested funds and vice versa. The risk-return trade-off involved in holding more cash and marketable securities, therefore, is one of added liquidity versus reduced profitability.

It is also hypothesized that other things remaining the same, the greater a firm's reliance upon short-term debt or current liabilities in financing its asset investments, the lower will be its liquidity. On the other hand, the use of current liabilities offers some very real advantages to the user in that they can be less costly than long-term financing and they provide the firm with a flexible means of financing its fluctuating needs for assets. It is also hypothesized that the risk-return tradeoff here involves an increased risk of illiquidity versus increased profitability.

The major hypothesis in this study is:

**There is no Strong Association between Net Current Assets Ratio (NCAR) and Selected Measures of Profitability**

## **REVIEW OF RELEVANT LITERATURE**

The works of Shin and Soenen (1998) have employed net-trade cycle (NTC) as a measure of working capital management. The NTC is used because it can be an easy device for estimating the additional financing needs with regards to working capital, expressed as a function of the projected sales growth. Using a COMPUSTAT sample of 58,985 firms covering the period 1985-1994, Shin and Soenen found a strong negative relation between the length of the firm's net-trade cycle (NTC) and its profitability. In addition, shorter NTCs are associated with higher risk-adjusted stock returns.

Lyroutidi and Lazaridis (2000) have used data from the Greek food industry and found a significantly positive relationship between the cash conversion cycle (CCC) and the traditional liquidity measures of current and quick ratios. The cash conversion cycle also related positively with the return on assets and the net profit margin, but had no linear relationship with the leverage ratios. Conversely, the current and quick ratios had negative relationship with the debt-to-equity ratio, and a positive relationship with the times interest earned ratio. Finally, there is no difference between the liquidity ratios of large and small firms. The study by Peel *et al.* (2000) reveals that small firms tend to have a relatively high proportion of current assets, less liquidity, exhibit volatile cash flows and a high reliance on short-term debt.

Howorth and Westhead (2003) suggest that small firms tend to focus on some areas of working capital management where they can expect to improve marginal returns.

Deloof (2003) has analyzed a sample of 1009 Belgian non-financial firms for the period 1992-1996 and found a negative relation between gross operating income and the number of days accounts receivable, inventories and accounts payable. Hence, managers can create value for their shareholders by reducing the number of days accounts receivable and inventories to a reasonable minimum. Deloof also suggests that less profitable firms wait longer to pay their bills. Lazarichs and Tryfonidis (2006) have studied the relationship between working capital management and corporate profitability of listed companies in the Athens Stock Exchange based on a sample of 131 companies for the period 2001-2004. The results indicated that there was a statistical significance between profitability and the cash conversion cycle.

Chiou *et al* (2006) have analyzed the determinants of working capital and explored how the working capital management of a firm was influenced by the different variables like business indicators, industry effect, operating cash flows, growth opportunity for a firm, firm performance and size of firm. The study reveals consistent results of leverage and operating cash flow for both net liquid balance and working capital requirements while variables like business indicator, industry effect, growth opportunities, performance of firm were unable to produce consistent conclusions for net liquid balance and working capital requirements of firms.

**Table 1: Working Capital Management Component Definitions**

	<b>Component</b>	<b>Equation</b>
1	Days Sales Outstanding (DSO)	Receivables/(Sales/365)
2	Days Inventory Outstanding (DIO)	Inventories/(Sales/365)
3	Days Payable Outstanding (DPO)	Payables/(Sales/365)
4	Days Working Capital (DWC)	DSO + DIO-DPO
5	Current Ratio (CR)	Current Assets/Current Liabilities
6	Cash Conversion Efficiency (CCC)	Cash flow from operations/Sales
7	Income to Total Assets (IA)	(Operating income + depreciation)/Total Assets
8	Income to Sales (IS)	(Operating income + depreciation)/Sales

**Source:** Ganesan, V. (2007), "An Analysis of Working Capital Management Efficiency in Telecommunications Equipment Industry", *Rivier Academic Journal*, 3(2): 1-10

Raheman (2006) has studied the impact of the different variables of working capital management including Average Collection Period (ACP), Inventory Turnover in Days (ITID), Average Payment Period (APP), and Cash Conversion Cycle (CCC) on the Net Operating Profitability (NOP) of firms and concluded that there is a strong negative relationship between above-average working capital ratios and profitability of firms.

Ganesan (2007) has analyzed a sample of 349 telecommunication equipment companies in USA for the 2001-2007 period, and found evidence that though "days working capital" is negatively related to profitability, it is not significantly impacting the profitability of firms in the telecommunication equipment industry. Results of empirical analysis show that there is statistical evidence for a strong relationship between the firm's profitability and its working capital management efficiency (Shin and Soenene, 1998). However, the study undertaken based on the data from CFO magazine on the rankings of firms on WCM efficiency reveals that the measures of WCM efficiency vary across different industries (Filbeck *et al*, 2007). Ganesan has outlined the measures of working capital used in several studies (Table 1).

Raheman and Nasr (2007) show that there is a strong negative relationship between variables of working capital management and profitability of the firm. It means that as the cash conversion cycle increases, it will lead to decreasing

profitability of the firm and managers can create a positive value for the shareholders by reducing the cash conversion cycle to a possible minimum level. They also find a negative relationship between liquidity and profitability, including a significant relationship between debt used by the firm and profitability. Padachi (2006) finds an increasing trend in the short-term component of working capital financing.

Samiloglu and Demirgunes (2008) have analyzed a sample of manufacturing firms listed on the Istanbul Stock Exchange (ISE) for the 1998-2007 period and found that accounts receivable period, inventory period and leverage affect firm profitability negatively; while growth in sales affects firm profitability positively. Singh and Pandey (2008) study the working capital components and the impact of working capital management on profitability of Hindalco Industries Limited for the period 1990-2007. The results show that current ratio, liquid ratio, receivables turnover ratio and working capital to total assets ratio had statistically significant impact on the profitability of Hindalco Industries Limited.

Nazir and Afza (2008) have used external and internal factors to explore the determinants of working capital requirements of a firm. Internal factors are operating cycle, operating cash flows, leverage, size, return on assets (ROA), Tobin's q and growth while industry dummy and level of economic activity are external macroeconomic factors. They found that operating cycle, leverage, return on assets (ROA) and Tobin's q had an influence on the working capital requirements significantly.

The study also reveals that working capital management practices are also related to industry and different industries are following different working capital requirements. Falope and Ajilore (2009) have found a significantly negative relationship between net operating profitability and the average collection period, inventory turnover in days, average period and cash conversion cycle, for a sample of 50 firms listed on the Nigerian Stock Exchange (NSE). Furthermore, the study found no significant variations in the effects of working capital management between large and small firms.

Uyar (2009) has examined industry benchmarks for the cash conversion cycle (CCC) of merchandising and manufacturing companies and found that merchandising firms have shorter cash conversion cycle than manufacturing companies. The study also indicates a significantly shorter negative correlation between the length of CCC and firm size, in terms of both net sales and total assets. The study further shows significantly negative correlation between the length of CCC and firm profitability.

Ramachandran and Janakiraman (2009) have found a negative relationship between earnings before interest and taxes (EBIT) and the cash conversion cycle (CCC). The study reveals that operational EBIT dictates how to manage the working capital of the firm. Further, it was found that lower gross EBIT was associated with an increase in the accounts payable days. The study concludes that less profitable firms wait longer to pay their bills, taking advantage of credit period granted by their suppliers, while positive relationship between average receivable days and firm's EBIT suggests profitable firms will pursue a decrease of their accounts receivable days in an attempt to reduce their cash gap in CCC.

Afza and Nazir (2009) have investigated the traditional relationship between working capital management policies and a firm's profitability for a sample for 204 non-financial firms listed on the Karachi Stock Exchange (KSE) for the period 1998-2005. The study had significant differences among their working capital requirements and financing policies across different industries. Moreover, regression results find a negative relationship between the profitability of firms and

degree of aggressiveness of working capital investment and financing policies. Afza and Nazir suggest that managers could create value if they adopt a conservative approach towards working capital investment and financing policies.

Dong and Su (2010) have used secondary data collected from listed firms in Vietnam stock market for the period 2006-2008 and found a strong negative relationship between profitability, measured through gross operating profit, and the cash conversion cycle. Therefore, the managers can create a positive value for the shareholders by handling the adequate cash conversion cycle and keeping each different component to an optimal level. The works of Nengi *et al* (2010) based on Indian manufacturing companies for the 2002-2003 to 2007-2008 periods indicate that current assets to total assets, total debtors to total assets and inventory days have significantly negative effects on firm profitability.

Bhunja and Das (2012) examined the relationship between WCM and profitability of Indian private sector small-medium steel companies from 2003 to 2010 and found an insignificant relationship between working capital cycle and profitability. Multiple regression tests confirm a lower degree of association between WCM and profitability. However, the works of Mousavi and Jari (2012) show a significantly positive relationship between WCM and corporate performance using the financial statements data of 56 companies quoted on the Tehran Stock Exchange.

Barine (2012) has compared working capital costs and returns of 22 firms quoted on the Nigerian Stock Exchange (NSE) and found that the costs of working capital exceeded the returns on working capital investment within the period studied. Sial and Chaudhry (2012) have studied 100 Pakistani manufacturing companies listed on the Karachi Stock Exchange for the period 1998-2008.

The results show that there is a strong negative relationship between liquidity and profitability. It is also argued that managers can create a positive value for the shareholders by reducing the cash conversion cycle to a possible minimum level. Quayyum (2012) studied corporations listed on the Dhaka Stock Exchange from 2005 to 2009 and found that most of the industries show a significant level of relationship between profitability indices and selected working capital indices. The study also shows that the significance level of the relationship varies from industry to industry.

## DATA SOURCES AND RESEARCH METHODOLOGY

The data for this research were generated from the published accounts of 107 Nigerian quoted companies for the period 2003-2007. The net current assets ratio (NCAR) was computed from the financial averages of the respective companies spread across 23 sectors. The net current assets ratio (NCAR) is obtained by dividing net current assets/liabilities by total assets multiplied by 100%. Average values of NCAR were aggregated year by year for the purpose of our study.

In this context, a positive NCAR implies a conservative working capital policy while a negative NCAR implies an aggressive working capital policy. Under the conservative working capital policy the company invests more in current assets to finance its short-term liquidity needs. Under the aggressive working capital policy it invests more in current liabilities to finance its temporary liquidity needs. The two critical measures of profitability adopted in this study are return on assets (ROA) and net profit margin (NPM).

The calculated averages of NCA, ROA and NPM were imputed into coefficient of correlation ( $r_{xy}$ ) by product-moments as in the equation below:

$$r_{xy} = S_{xy}/(S_x S_y)$$

where  $S_{xy}$  = covariance of x and y

$S_x$  = standard deviation of x

$S_y$  = standard deviation of y

**Table 2: Loveday's Correlation Likelihood Test**

No. of Pairs of Values of x and y from which $r_{xy}$ is Calculated	Minimum Value of $r_{xy}$ for Correlation to be Likely
5	0.88
6	0.82
7	0.76
8	0.71
9	0.67
10	0.64
11	0.61
12	0.58
13	0.56
14	0.54
15	0.52
16	0.50
18	0.47
20	0.45
40	0.31
80	0.22
100	0.20

**Source:** Loveday, R. (1970), *Statistics A First Course*, (London: Cambridge University Press) Page 63.

The first level of analysis involves determining the number and percentages of companies with positive and negative NCARs and determining their corresponding profitability. This enables us to establish descriptively if change in working capital policy actually matters. The second level of analysis involves comparative correlation analysis across the 23 sectors studied. A two-stage average correlation coefficient ( $r^*$  &  $r^{**}$ ) is determined for companies with positive and negative NCARs. The Loveday's Likelihood Test is used to determine minimum value of  $r_{xy}$  for correlation to be likely (Loveday, 1970). The average sectoral correlation coefficients would be analyzed for companies with positive and negative NCARs.

## EMPIRICAL RESULTS AND DISCUSSIONS

The results in Table 3 show the sectoral performance of working capital policies and the corresponding profitability figures. A total of 9 sectors or 39.13% of the sectors reflected positive net current asset ratios (NCARs). However, the average profitability ratios for these companies and sectors with positive NCARs are – 0.44% (ROA) and – 49.71 (NPM). The sectors reflecting negative NCARs are 14 or 60.87%, still with negative profitability of -112.82 (ROTA) and -74.64 (NPM).

Overall, all the companies and sectors recorded an average negative net current assets ratio (NCAR) of -96.32% and negative profitability of -68.84% (ROA) and -64.88% (NPM). The value of negative NCARs is largely accounted for by companies in the maritime (-1021.39%), chemical & paints (-586.75), engineering technology (-251.99%), machinery

(marketing) (-144.57%) and petroleum (marketing) -117.86%. These sectors financed their liquidity needs aggressively by building up over time their investment in current liabilities.

The value of positive NCARs was accounted for largely by companies in the construction, commercial and health care sectors. These companies maximized their investments in current assets over time, and hence adopted the conservative working capital policy. Most of the sectors however adopted the aggressive working capital strategy by investing more in current liabilities to finance short-term financing needs.

A few sectors (21.7%) manifested positive profitability indices by adopting either conservative or aggressive working capital management policy. Companies in the industrial/domestic products sector revealed positive profitability values of 7.68% (ROA) and 0.97 (NPM), with a positive net current assets ratio (NCAR) of 7.89% in the period studied. The agricultural sector on the average adopted NCAR of -11.2% to record positive profitability of 8.48% (ROA) and 13.40% (NPM). The conglomerates sector with a negative NCAR of -16.19 recorded ROA of 8.92% and NPM of 3.23%. the real estate sector with NCAR of -15.47% recorded average positive profitability ratios of 6.19% (ROA) and 23.95% (NPM). The Hotel and Tourism sector also shows positive profitability indices (ROA 1.14%, NPM 2.08%) with NCAR of -58.20%. With NCAR of 22.94%, the Food/Beverages and Tobacco sector shows positive profitability ratios of 14.91% (ROA) and 6.09% (NPM).

The results in Table 4 show the product-moment correlation coefficients between NCAR and ROA ( $r^*$ ), NCAR and NPM ( $r^{**}$ ), with the Loveday's Likelihood Test scores in brackets. The data points guided us in the allocation of the Likelihood test scores. In terms of  $r^*$ , 16 out of 23 sectors (69.6%) showed strong correlations between net current assets ratio (NCAR) and return on assets (ROA), since the computed correlation coefficients are greater than the Loveday's Likelihood Test scores. Specifically, 15 out of the 23 sectors (65.2%) showed strong positive correlation between NCAR and ROA. However, the agricultural sector shows a strong inverse correlation coefficient of -0.97 for 15 data points.

The second product-moment correlation coefficient ( $r^{**}$ ) shows strong correlation between net current assets ratio (NCAR) and net profit margin (NPM) for 15 out of 23 sectors (65.2%). However, the agricultural and textile sectors continued to show strong inverse correlation, while the remaining 13 show strong positive correlation. In all the remaining companies, we find weak correlation between NCAR and selected measures of profitability. In terms of  $r^*$  and  $r^{**}$ , all the coefficients in this category fell below the specified likelihood test scores.

**Table 3: Sectoral Performance Indicators (2003-2007)**

S/No	Sector	No. of Companies	Net Current Assets Ratio (NCAR) %	Return on Asset (ROA) %	Net Profit Margin (NPM) %
1	Agriculture	3	-11.2	8.48	13.40
2	Automobile & Tyre	5	4.45	-3.62	-358.48
3	Breweries	6	-53.67	-41.62	-259.49
4	Building Materials	6	-61.20	-40.66	-35.79
5	Commercial/Services	1	43.81	-5.56	-2.24
6	Computer & Office Equipment	3	-32.84	-16.89	-8.85
7	Chemical & Paints	7	-586.75	-617.28	-4.30
8	Conglomerates	9	-16.19	8.92	3.23
9	Construction	6	123.87	-19.81	-16.99
10	Emerging Markets	9	3.71	-6.62	-41.09
11	Petroleum (Marketing)	7	-11.86	8.14	-2.81
12	Engineering Technology	3	-251.99	-806.99	-731.34

**Table 3: Contd.,**

13	Textiles	4	-27.17	4.51	1.22
14	Printing/Publishing	4	10.67	6.89	-34.65
15	Health Care	7	25.79	-1.67	2.31
16	Machinery (Marketing)	1	-144.57	-61.15	-2.48
17	Industrial/Domestic Product	7	7.89	7.68	0.97
18	Food/Beverages & Tobacco	8	22.94	14.91	6.09
19	Packaging	7	12.57	3.86	-3.34
20	Footwear	1	-72.52	-28	-53.37
21	Real Estate	1	-15.47	6.19	23.95
22	Maritime	1	-1021.39	-4.22	9.64
23	Hotel & Tourism	1	-58.20	1.14	<b>2.08</b>
<b>Averages</b>		<b>107</b>	<b>-96.32</b>	<b>-68.84</b>	<b>-64.88</b>

Number & percentage of sectors with positive Net Current Assets Ratio (NCAR): 9 (39.13%)

Average profitability ratios of companies with positive NCARs: ROA = -0.44, NPM = -49.71

Number & percentage of sectors with negative NCARs: 14 (60.87%)

Average profitability ratios of companies with negative NCARs: ROA = -112.82, NPM = -74.64

**Source:** Author's computation based on published financial statements and the Nigerian Stock Exchange Factbook (2003-2007)

**Table 4: Correlation between Net Current Assets Ratio and Selected Measures of Profitability: Loveday's Likelihood Test**

S/No	Sector	Data Points	r*	r**
1	Agriculture	15	-0.97 (0.52)	-0.63 (0.52)
2	Automobile	25	0.14 (0.45)	0.85 (0.45)
3	Breweries	30	0.89 (0.45)	0.32 (0.45)
4	Building Materials	30	0.95 (0.45)	0.98 (0.45)
5	Commercial/Services	5	-0.16 (0.88)	-0.22 (0.88)
6	Computer & Office Equipment	15	0.92 (0.52)	0.12 (0.52)
7	Chemical and Paints	35	0.99 (0.45)	0.26 (0.45)
8	Conglomerates	45	0.39 (0.31)	0.49 (0.31)
9	Construction	30	0.81 (0.45)	0.79 (0.45)
10	Emerging Markets	45	0.84 (0.31)	0.39 (0.31)
11	Petroleum (Marketing)	35	0.19 (0.45)	0.69 (0.45)
12	Engineering Technology	15	0.99 (0.52)	0.99 (0.52)
13	Textiles	20	-0.37 (0.45)	-0.71 (0.45)
14	Printing and Publishing	20	0.86 (0.45)	0.90 (0.45)
15	Health Care	35	0.85 (0.45)	0.66 (0.45)
16	Machinery (Marketing)	5	0.97 (0.88)	0.47 (0.88)
17	Industrial & Domestic Products	35	0.82 (0.45)	0.61 (0.45)
18	Food/Beverages/Tobacco	40	0.67 (0.31)	0.75 (0.31)
19	Packaging	35	0.48 (0.45)	0.25 (0.45)
20	Footwear	5	0.39 (0.88)	-0.01 (0.88)
21	Real Estate	5	0.61(0.88)	0.94 (0.88)
22	Maritime	5	0.88 (0.88)	0.87 (0.88)
23	Hotel & Tourism	5	0.17 (0.88)	-0.19 (0.88)

r\*: Correlation between Net Current Asset Ratio (NCAR) and Return on Asset (ROA)

r\*\*: Correlation between Net Current Asset Ratio (NCAR) and Net Profit Margin (NPM)

Loveday's Likelihood Test scores are in brackets

## CONCLUSIONS AND MANAGERIAL IMPLICATIONS

The results show that on the average all the quoted companies and sectors studied for the 2003-2007 period adopted an aggressive working capital strategy (negative NCARs) which produced negative profitability. However, a few of the sectors that recorded positive NCARs or conservative working capital strategy also showed negative profitability.

Most of the sectors show strong positive correlation between net current asset ratio (NCAR) and selected measures of profitability.

Apparently the companies and sectors would increase value by adopting a conservative working capital management strategy through building their investments in current assets (cash and marketable securities). The heavy reliance of the sectors on current liabilities (short-term bank borrowing) has continued to hurt profitability in a stressed business environment. Company Finance Officers (CFOs) must be versatile with their companies' internal operations as well as the workings of the money markets to maximize value with an optimal working capital policy.

Based on our results and conclusions, an optimal working capital policy chooses between aggressive and conservative working capital management strategies subject to maximum value creation and timing of cash flows. The major constraints to a thriving conservative working capital management strategy, that is, building investments in current assets, could be a harsh business environment and a distressed money market. Under these circumstances, most companies would be forced to rely heavily on the rather more expensive aggressive working capital management strategy. However, the wrong timing in financing assets with short-term liabilities coupled with a constrained cash flow position could generate both illiquidity and negative profitability.

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