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## **Working Capital Management and Corporate Profitability: Evidence from Panel Data Analysis of Selected Quoted Companies in Nigeria**

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**Abstract:** The study aimed to provide empirical evidence about the effects of working capital management on profitability performance for a panel made up of a sample of Nigerian quoted non-financial firms for the period 1996-2005. The study utilized panel data econometrics in a pooled regression, where time-series and cross-sectional observations were combined and estimated. The study found a significant negative relationship between net operating profitability and the average collection period, inventory turnover in days, average payment period and cash conversion cycle for a sample of fifty Nigerian firms listed on the Nigerian Stock Exchange. Furthermore, the study found no significant variations in the effects of working capital management between large and small firms. These results suggest that managers can create value for their shareholders if the firms manage their working capital in more efficient ways by reducing the number of days accounts receivable and inventories to a reasonable minimum.

**Key words:** Working capital, corporate performance, panel data, Nigeria

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### **INTRODUCTION**

Working capital refers to the firm's investment in short-term assets. Padachi (2006) emphasized that the management of working capital is important to the financial health of businesses of all sizes. This importance is hinged on many reasons, first, the amounts invested in working capital are often high in proportion to the total assets employed and so it is vital that these amounts are used in an efficient way. Second, the management of working capital directly affects the liquidity and the profitability of the corporate firm and consequently its net worth (Smith, 1980). Working capital management therefore aims at maintaining a balance between liquidity and profitability while conducting the day-to-day operations of a business concern.

The effects of working capital management on corporate performance have been a focus of substantial amount of empirical research for many years (Shin and Soenen, 1998; Deloof, 2003; Lazaridis and Tryfonidis, 2006; Filbeck and Krueger, 2005). These studies have concentrated on large firms operating within a well developed money and capital markets of developed economies. Findings from these studies becomes difficult to generalize for relatively small sized firms in Nigeria that operates within a rather rudimentary financial markets, where firms mostly rely heavily on owner financing, trade credit and short term bank

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loans to finance their needed investment in working capital (Chittenden *et al.*, 1998; Saccurato, 1994). Specific research studies exclusively on the impact of working capital management on corporate profitability in developing countries, especially in poor Sub Saharan African (SSA) countries remained altogether an ignored area of empirical research. These we argue are serious shortcomings of existing literature and the current study fills the gap for Nigerian economy. In the context of the foregoing, the objective of this study is to provide empirical evidence about the effects of working capital management on profitability performance for a panel made up of a sample of Nigerian quoted firms for the period 1996-2005.

Existing literature characterized working capital management as an area largely lacking in theoretical perspective (Van Horne, 1977). More specifically, the limited general theory which does pertain to working capital management (like capital budgeting), emanates from the finance literature and focuses on the relationship between risk and profitability (Smith, 1980).

Beaumont and Begemann (1997) emphasized that the major concepts of the working capital management are profitability and liquidity. They point out that there exists a trade-off between profitability and liquidity. Thus, the relationship between profitability and working capital helps understand the relationship between profitability and liquidity, the dual goals of the working capital management. Although, there seems to be that the scholars who have written on this relationship have not completely synthesized their various hunches into a theory, there is noticeable consistency in the use of few guiding concepts in working capital management literature. These concepts constitutes what is here labeled the theoretical framework-after all, a theory is a supposedly tenable explanation about a relationship.

The operating cycle theory looks explicitly at one side of working capital that of current asset account and therefore gives income statement measures of firm's operating activities, that is, about production, distribution and collection. Receivables, for instance, are directly affected by the credit collection policy of the firm and the frequency of converting these receivables into cash matters in the working capital management. By granting the customers more liberal credit policy, the profitability will be increased but at the same time liquidity will be sacrificed. The same analysis goes for other components of current asset account. However, the operating cycle theory tends to be deceptive in that it suggests that current liabilities are not important in the course of firm's operation. Our understanding of payables as the sources of financing the firm's activities can be assailed as a result. Given this inadequacy of the operating cycle theory, it is essential to infuse current liabilities in the picture to enhance our analysis and understanding.

It is the cash conversion cycle theory that has achieved this for us. The theory integrates both sides of working capital. In their seminal paper, Richards and Laughlin (1980) devised this method of working capital as part of a broader framework of analysis known as the working capital cycle. It claims that the method is superior to other forms of working capital analysis that rely on ratio analysis or a decomposition of working capital as claimed above. The CCC is calculated by subtracting the payables deferral period ( $360/\text{annual payables turnover}$ ) from the sum of the inventory conversion period ( $360/\text{annual inventory turnover}$ ) and the receivables conversion period ( $360/\text{annual receivables turnover}$ ). More recently, the number of days per year that appears in the denominator as 360 has been replaced by 365 to improve accuracy. Since, each of these three components is denominated by some number of days, the CCC is also expressed as a number of days. It has been interpreted as a time interval between the cash outlays that arise during the production of output and the cash inflows that result from the sale of the output and the collection of the accounts receivable.

Van Horne (1977) described working capital management as the administration of current assets in the name of cash, marketable securities, receivables and inventories. Working capital management is important because of its effects on the firm's profitability and risk and consequently its value (Smith, 1980). Granting trade credit favors the firm's sales in various ways. Trade credit can act as an effective price cut (Brennan *et al.*, 1988; Petersen and Rajan, 1997). It is an incentive for customers to acquire merchandise at times of low demand (Emery, 1984). It allows customers to check that the merchandise they receive is as agreed (quantity and quality) and to ensure that the services contracted are carried out (Smith, 1980). However, firms that invest heavily in inventory and trade credit can suffer reduced profitability. In addition, larger inventory reduces the risk of a stock-out. Trade credit may stimulate sales because it allows customers to assess product quality before paying (Michael *et al.*, 1993; Deloof and Jegers, 1996). Because suppliers may have significant cost advantages over financial institutions in providing credit to their customers, it can also be an inexpensive source of credit for customers (Petersen and Rajan, 1997). Another component of working capital is accounts payable. Delaying payments to suppliers allows a firm to assess the quality of the products bought and can be an inexpensive and flexible source of financing for the firm.

On the other hand, trade credit is a spontaneous source of financing that reduces the amount required to finance the sums tied up in the inventory and customer accounts. But we should bear in mind that financing from suppliers can have a very high implicit cost if early payment discounts are available. In fact the opportunity cost may exceed 20%, depending on the discount percentage and the discount period granted (Wilner, 2000). Since, money is also locked up in working capital, the greater the investment in current assets, the lower the risk, but also the lower the profitability obtained. In this respect, previous studies have analyzed the high cost of trade credit and found that firms finance themselves with seller credit when they do not have other more economic sources of financing available (Petersen and Rajan, 1994, 1997).

In spite of the touted impact efficient working capital management may have on business survival and growth, not much has been done in the area of the provision of empirical evidence in support of the claims of working capital management on profitability performance of Nigeria companies. Given this paucity of empirical studies, it is hoped that this study will fill a gap and provide useful support for understanding the determinants of corporate performance in Nigeria.

## **MATERIALS AND METHODS**

This study utilized secondary data sources from the Annual Reports and Statement of Accounts of the sampled Nigerian quoted firms for the time period 1996 to 2005. The study also utilized data on the sampled firms from the FACTBOOK, the annual publications of the Nigerian Stock Exchange. Only quoted companies were included in the study because financial information of unquoted companies was not readily available. The study excluded financial and securities sector companies because their financial characteristics and investment in working capital are substantially different from non-financial firms. The study sampled 50 out of the 100 listed non-financial firms. The sample selection was purposive to exclude those with missing data and newly quoted companies.

The choice of variables (regressand and regressor) was primarily guided by previous empirical studies and availability of data. Thus, the variables are defined to be consistent with those of Teruel and Solano (2005) and other empirical literature cited above. The

dependent variable in the study is firm's profitability. It is a complex and extensively discussed variable in empirical literature. There exist various measures of the variable in empirical profitability studies. The most often used in the literature are the return on assets or equity (ROA or ROE). In order to analyze the effects of working capital management on the firm's profitability, we used the return on Assets (ROA) as the dependent variable. Return on assets (ROA) is an indicator of managerial efficiency and it shows how the firm's management converted the institution's assets under their control into earnings. ROA is defined here as net income divided by average book value of assets.

With regards to the independent variables, we measured working capital management by using the number of days accounts receivable, number of days of inventory and number of days accounts payable and the Cash Conversion Cycle (CCC).

#### **Accounts Receivable**

Accounts Receivables are customers who have not yet made payment for goods or services, which the firm has provided. The objective of debtor management is to minimize the time-lapse between completion of sales and receipt of payment. In this respect, number of days Accounts Receivable (AR) is calculated as  $365 \times [\text{accounts receivable/sales}]$ . This variable represents the average number of days that the firm takes to collect payments from its customers.

#### **Inventories**

Inventories are lists of stocks-raw materials, work in progress or finished goods waiting to be consumed in production or to be sold. We calculated the number of days of inventory (INV) as  $365 \times (\text{inventories/purchases})$ . This variable reflects the average number of days of stock held by the firm. Longer storage times represent a greater investment in inventory for a particular level of operations.

#### **Accounts Payable**

Accounts Payables are suppliers whose invoices for goods or services have been processed but who have not yet been paid. Organizations often regard the amount owing to creditors as a source of free credit. The number of days accounts payable (AP) reflects the average time it takes firms to pay their suppliers. We calculated this as  $365 \times [\text{accounts payable/purchases}]$ . The higher the value, the longer firms take to settle their payment commitments to their suppliers.

#### **Cash Conversion Cycle (CCC)**

The Cash Conversion Cycle (CCC) is a proxy for working capital management efficiency. It is the flow of cash from the suppliers to inventory to accounts receivable and back into cash. It is therefore an additive measure of the number of days funds are committed (i.e., tied) to inventories and receivables less the number of day payments are deferred to suppliers. It has been interpreted as a time interval between the cash outlays that arise during the production of output and the cash inflows that result from the sale of the output and the collection of the accounts receivable. The CCC is calculated by subtracting the payables deferral period the sum of the inventory conversion period and the receivables conversion period.

Other variables that are theoretically postulated to affect firm's profitability performance were also considered as control variables in the model. These include the following:

**Size**

Economies of scale is assumed to have positive relationship with the firm's size. Size captures economies of scale and it is believed that as a company becomes large, it is better place to reap economies of scale. However, the impact of firm size on profitability can also be negative. Any positive influence on profits from economies of scale may be partially offset by greater ability to diversify assets resulting in a lower risk and a lower required return in line with the portfolio theory (Evanoff and Fortier, 1988; Michael, 1985). Civelek and Al-Alami (1991) and Ali Abdula (1994) have established this contrary view. Another explanation is that smaller firms are easy to manage in terms of control and coordination. We measured the size (SIZE) as the logarithm of assets.

**Sales Growth**

This ratio is fairly straightforward and is the increase or decrease of the annual sales measured as a percentage. In this study a positive effect from sales growth on the performance measure is assumed.

**Debt**

This indicator is measured by the relationship of long-term debt to total assets and is a proxy for leverage. It is assumed that when external funds are borrowed (e.g., from banks) at a fixed rate, they can be invested in the company and gain a higher interest than the interest paid to the bank. The difference is a net profit for the shareholders and boosts therefore the Return on Equity.

**Economic Cycle**

Since good economic conditions tend to be reflected in a firm's profitability, we controlled for the evolution of the economic cycle using the variable GDPGR, which measures the annual GDP growth.

The Static Model to analyze firms with panel data is as follows:

$$Y_{it} = \beta X_{it} + \eta_i + \lambda_t + \epsilon_{it} \quad \text{With } I = 1, \dots, N \text{ and } t = 1, \dots, T \quad (1)$$

Where:

$y_{it}$  = Return on assets (ROA) of firm I in year t

$X_{it}$  =  $K \times 1$  vector of explanatory variables

$\beta$  =  $K \times 1$  vector of constants

$\eta_i$  = Individual firm effect assumed constant for firm i over t.

$\lambda_t$  = Time specific effect assumed constant for given t over i.

$\epsilon_{it}$  = Time varying disturbance term serially uncorrelated with mean zero and variance 1.

Given the foregoing and following the modeling procedure of Teruel and Solano (2005), we use the following panel regression equations:

$$ROA_{it} = \beta_0 + \beta_1 AR_{it} + \beta_2 SIZE_{it} + \beta_3 SGROW_{it} + \beta_4 DEBT_{it} + \beta_5 GDPGR_{it} + \eta_i + \lambda_t + \epsilon_{it} \quad (2)$$

$$ROA_{it} = \beta_0 + \beta_1 INV_{it} + \beta_2 SIZE_{it} + \beta_3 SGROW_{it} + \beta_4 DEBT_{it} + \beta_5 GDPGR_{it} + \eta_i + \lambda_t + \epsilon_{it} \quad (3)$$

$$ROA_{it} = \beta_0 + \beta_1 AP_{it} + \beta_2 SIZE_{it} + \beta_3 SGROW_{it} + \beta_4 DEBT_{it} + \beta_5 GDPGR_{it} + \eta_i + \lambda_t + \epsilon_{it} \quad (4)$$

$$ROA_{it} = \beta_0 + \beta_1 CCC_{it} + \beta_2 SIZE_{it} + \beta_3 SGROW_{it} + \beta_4 DEBT_{it} + \beta_5 GDPGR_{it} + \eta_i + \lambda_t + \epsilon_{it} \quad (5)$$

where, ROA measures the return on assets, AR the number of days accounts receivable, INV the number of days inventories, AP is the number of days accounts payable, CCC is the cash

conversion cycle, SIZE is the company size, SGROW the sales growth, DEBT the debt level and GDPGR the annual GDP growth.  $\eta_i$  (unobservable heterogeneity) measures the particular characteristics of each firm. The parameters  $\epsilon_{it}$  are time dummy variables that change over time but are equal for all the firms in each of the periods considered.

**RESULTS AND DISCUSSION**

**Descriptive Statistics of Model Data**

Table 1 presents descriptive statistics for 50 Nigerian non-financial firms for a period of ten years from 1996 to 2005 and for a total 694 firms year observations. Descriptive analysis shows the average and standard deviation of the different variables of interest in the study. It also presents the minimum and maximum values of the variables that help in getting a picture about the maximum and minimum values a variable can achieve. The mean value of net operating profitability is 15.59% of total assets and standard deviation is 15.9%. It means that value of the profitability can deviate from mean to both sides by 15.9%. The maximum value for the net operating profitability is 70.64% for a company in a year while the minimum is -63.16%. The cash conversion cycle used as a proxy to check the efficiency in managing working capital is on average 75 days and standard deviation is 49 days. Firms receive payment against sales after an average of 61 days and standard deviation is 47 days. Minimum time taken by a company to collect cash from receivables is 0 day while the maximum time for this purpose is 184 days. It takes an average 53 days to sell inventory with standard deviation of 61 days. Here, maximum time taken by a company to convert inventory into sales is 400 days. Firms wait an average 40 days to pay their purchases with standard deviation of 52 days. Here, minimum time taken by a company is 0 day and maximum time taken for this purpose is 199 days.

**Pearson’s Correlation Analysis**

Table 2 presents the correlation matrix of the dependent and independent variables in order to detect the problem of multicollinearity. The highest range of correlation coefficient is 0.724 between our profitability measure and accounts receivable. This results suggest there are no severe case of multicollinearity in the systems of equations.

Table 1: Descriptive statistics for dependent and explanatory variables

Variables	Obs	Mean	Median	SD	Minimum	Maximum
ROA	694	0.16000	0.15	0.16	-0.630	0.71
AR	694	61.21000	59.34	47.46	0.000	184.56
INV	694	53.72000	40.66	61.47	0.000	400.24
AP	694	39.77000	43.56	51.78	0.000	199.06
CCC	694	75.16000	54.44	49.44	-126.890	421.07
SIZE	694	14.35000	14.39	1.84	9.220	18.37
SGROW	694	1.30280	1.21	0.57	0.082	11.96
DEBT	694	0.32920	0.15	2.59	0.000	2.14
GDPGR	694	0.07215	0.12	0.22	-0.360	0.70

Table 2: Pearson’s rank correlation coefficient between the independent and the dependent variables

Variable	ROA	AR	INV	AP	CCC	SIZE	SGROW	DEBT	GDPGR
ROA	1								
AR	-0.711	1							
INV	-0.724	0.525	1						
AP	-0.515	0.563	0.213	1					
CCC	-0.186	0.237	0.022	0.321	1				
SIZE	0.034	0.113	0.212	-0.101	0.096	1			
SGROW	0.314	0.022	0.124	-0.216	0.130	0.312	1		
DEBT	0.419	0.245	-0.235	0.034	0.029	0.142	0.324	1	
GDPGR	-0.674	0.223	-0.652	0.154	0.173	0.039	0.142	-0.187	1

Pearson's correlation analysis is also used for data to see the relationship between variables such as those between working capital management and profitability. If efficient working capital management increases profitability, one should expect a negative relationship between the measures of working capital management and profitability variable. There is a negative relationship between gross profitability on the one hand and the measures of working capital management on the other hand. This is consistent with the view that the time lag between expenditure for purchases of raw material and the collection of sales of finished goods can be too long and that decreasing this time lag increases profitability.

The correlation results between accounts receivable period and net operating profitability shows a negative coefficient -0.711, at  $\alpha = 1\%$ , this implies that longer average collection period decreases profitability. Correlation results between inventory turnover in days and the net operating Profitability also indicate the same type of result. The correlation coefficient is -0.214. It also indicates that if the firm takes more time in selling inventory, it will adversely affect its profitability. Correlation results among the payable turnover in days or average payment period also indicate the same trend. Here again, the coefficient is negative and highly significant. It means that the less profitable firms wait longer to pay their bills. A negative relationship between number of days accounts payable and profitability is consistent with the view that less profitable firms wait longer to pay their bills. In that case, profitability affects the account payables policy and vice versa. An alternative explanation for a negative relationship between the number of days accounts payable and profitability could be that Nigerian firms wait too long to pay their accounts payable. Speeding up payments to suppliers might increase profitability because firms often receive a substantial discount for prompt payment.

The cash conversion cycle which is a comprehensive measure of working capital management also has a negative coefficient -0.186. It means that if the firm is able to decrease its cash conversion cycle, it can increase its profitability. By analyzing the results we conclude that if the firm is able to reduce these time periods, then the firm is efficient in managing working capital. This efficiency will lead to increasing its profitability. The negative relationships between Cash conversion cycle, Average collection period, Average payment period and Inventory turnover in days with the profitability of companies are consistent with common findings in empirical literature. The results of correlation analysis generally indicate that working capital management very significantly and strongly affect the profitability performance of Nigerian Firms.

### **Working Capital Management and Corporate Profitability: Results from Panel Data Analysis**

We present the result from panel data estimation of the effects of alternative measures of working capital management; viz: number of days accounts receivable (AR), number of days accounts payable (AP), numbers of days inventory (INV) and the cash conversion cycle (CCC) respectively on corporate profitability of Nigerian listed companies.

Estimating models from panel data requires us first to determine whether there is a correlation between the unobservable heterogeneity  $\eta_i$  of each firm and the explanatory variables of the model. If there is a correlation (fixed effects), we would obtain the consistent estimation by means of the within-group estimator. Otherwise (random effects) a more efficient estimator can be achieved by estimating the equation by Generalized Least Squares (GLS). The normal strategy to determine whether the effects are fixed or random is to use the Hausman (1978) test under the null hypothesis  $E(\eta_i/x_{it}) = 0$ . If the null hypothesis is rejected, the effects are considered to be fixed and the model is then estimated by OLS. If the null



hypothesis is accepted, we would have random effects and the model is then estimated by GLS. In this way we achieve a more efficient estimator of  $\beta$ .

The Hausman test conducted for the models in this study shows a significant value (at the one percent level) and therefore suggests the use of fixed effects. Thus in this context to estimate the coefficients, a panel data analysis with fixed effect models is conducted. Table 3 present the results obtained after regressing Eq. 2, 3, 4 and 5, respectively in section 3.

Table 3 presents the estimation results of the effects of working capital management on corporate performance with accounts receivable as a measure of working capital management. The estimation result indicate that the coefficient of accounts receivable is negative and significant, indicating that firms' profitability performance is reduced by 32% point by a day lengthening of the numbers of days it takes debtors to settle their accounts. This result is consistent with several previous empirical studies such as Teruel and Solano (2005) and Deloof (2003). This finding seems to contradict conventional conjecture that lengthening of deadlines for clients to make their payments provides incentives for increased sales and thus profitability. Thus, a more restrictive credit policy potentially improves firms' profitability performance.

Turning to the control variables, contrary to popular thinking, large size turned out to negates generation of profits, suggesting that diseconomies of scale are binding on firms' size among Nigerian firms. Another explanation is that smaller firms are easy to manage in terms of control and coordination. This relationship is statistically significant. Expectedly, the firms' growth variable positively affects profitability. The concept behind this is that many practitioners argue that growth is one of the key elements when it comes to sustainable success. The variable DEBT proxy for the firms' leverage. The estimation indicates profitability performance increases with firms' leverage. As will be expected, since good economic conditions tend to be reflected in a firm's profitability, firms' profitability performance varies with the levels of economic fluctuations.

Table 3 presents the estimation results of the effects of working capital management on corporate performance with accounts payable as a measure of working capital management. The estimation result indicate that the coefficient of accounts payable is positive and significant, indicating that firms' profitability performance is increased by 31% point by a day lengthening of the numbers of days it takes firms to settle their creditors. Contrary to expectation as well as results from numerous existing studies, we observed that there is a positive relationship between profit performance and accounts payables. This

Table 3: Panel data estimates of effects of working capital management on returns on assets

Variables	1	2	3	4
C	34.112 (0.46)	94.525* (3.53)	-0.826 (-0.02)	-157.938* (-2.47)
AR	-0.325* (-1.95)			
AP		0.314* (3.20)		
INV			-0.510* (-2.42)	
CCC				-0.847* (1.96)
SIZE	-17.081* (-2.83)	0.019 (0.21)	-0.161 (-1.11)	0.129 (0.58)
SGROW	0.323* (1.92)	-1.368 (-0.37)	0.048 (0.46)	-0.085 (-0.53)
DEBT	1.293* (3.20)	0.139* (1.63)	0.423 (0.09)	18.701* (2.88)
GDPGR	0.325* (1.96)	0.325* (1.96)	-0.049 (-0.46)	-0.430* (-2.62)
Adjusted R <sup>2</sup>	0.82	0.79	0.65	0.87
DW Statistic	1.56	2.07	2.03	2.00

Dependent variable: ROA, Method: Panel least squares, Sample: 1996-2005, Cross-section included: 50, Total panel (unbalanced) observations: 694. ROA is dependent variable, AR measures No. of days accounts receivable, INV No. of days of inventory, AP No. of days accounts payable, CCC cash conversion cycle, SIZE company size, SGROW sales growth, DEBT financial debt level and GDPGR annual GDP growth. Results obtained using fixed-effects estimation. t-statistic in parentheses. \*Significant at 95% level

result is highly significant and does make economic sense, since the longer a firm delays its payments the higher level of working capital levels it reserves and uses in order to increase profitability. Thus, the more profitable firms wait longer time to pay their bills. Incidentally, all the control variables in this estimated form of the equation turns out insignificant except for the business cycles variable, which as expected indicated a significantly positive relation with corporate profitability performance of Nigerian firms.

Table 3 shows the estimation results of the effects of working capital management on corporate performance with number of days inventory as a measure of working capital management. As expected and in agreement with most existing studies, the estimation results reveals a significant negative relationship between profit and inventory which can be translated that the longer inventory is tied in the less working capital is available, hence lowering of profit. The estimation result indicate that the coefficient of numbers of days inventory are held is negative and significant, indicating that firms' profitability performance is decreases by 51% point by a day lengthening of the numbers of days it takes firms to sell their inventories. Although, most of the control variables of this equation carry appropriate signs, they are not statistically significant.

Table 3 shows the estimation results of the effects of working capital management on corporate performance with the cash conversion cycle as a measure of working capital management. The cash conversion cycle is the comprehensive measure of checking efficiency of working capital management. The coefficient of the cash conversion cycle is negative and statistically significant. Thus, the more profitable firms minimize their cash conversion cycle. The results of the positive effect of a shorter cash conversion cycle are consistent with the results of previous studies. Johnson and Soenen (2003) show that the cash conversion cycle is significantly positive related across all three performance measures (market performance and profitability measures).

Overall, the regression models have good statistical fit with the t values significant for most variables. The adjusted  $R^2$  and R were sufficiently high indicating that the independent variables explained sufficient quantity of the variations in the dependent variables. Durbin Watson Statistic (DW) also reveals the absence of serious auto correlation for all the equations. These test results shows the reliability of our estimated equations in modeling the problem under investigation.

### **Comparison of Working Capital Management in Small and Large Firms**

Here, we explore the possibility of there being differential effects of working capital management between small and large firms. The working capital needs of small firms essentially differ from that of relatively large firms for a number of reasons. Small firms have fewer alternative sources of external finance available, which make them more dependent on short-term finance in general and on trade credit in particular.

For this purpose, the total firms of the sample are partitioned into two based on size, measured as market capitalization. Firms with market capitalization less than 500 million naira are considered as small firms and those above are regarded as large firms. On the basis of this partitioning, large firm consists of 33 firms, while small firms are 17 in numbers. Table 4 and 5 presents summary of estimation results of the effects of working capital management on corporate performance for small sized and large size firms respectively.

A comparison of estimation results of the small and large sized model of working capital management and profit performance indicates that the sign and significance of the relations found among the working capital variables and profit performance is similar to that found in the aggregate model. As found in the aggregate model, small and large firms' return on assets

Table 4: Effect of working capital management on return on assets for small firms

Variables	1	2	3	4
C	-0.231* (-2.04)	-0.799* (-2.18)	1.397* (10.21)	0.110* (4.69)
AR	-0.003* (-1.68)			
AP		-0.020* (-3.26)		
INV			-0.013* (-3.73)	
CCC				-0.003* (-1.96)
SIZE	-1.772 (-0.120)	-0.102* (-2.78)	-0.030* (-3.88)	0.008 (1.04)
SGROW	0.024* (5.07)	0.110* (4.69)	0.017* (2.18)	0.198 (0.88)
DEBT	0.09 (1.09)	0.200* (14.06)	0.008* (2.97)	0.015* (3.98)
GDPGR	-0.038* (-1.95)	-0.044* (-2.14)	0.001 (0.02)	0.001 (0.76)
DW Statistic	2.05	1.97	1.56	2.11

Dependent Variable: ROA, Method: Panel least squares, Sample: 1996 2005, Cross-section included: 17, Total panel (unbalanced) observations: 229. ROA is dependent variable, AR measures No. of days accounts receivable, INV No. of days of inventory, AP No. of days accounts payable, CCC cash conversion cycle, SIZE company size, SGROW sales growth, DEBT financial debt level and GDPGR annual GDP growth. Results obtained using fixed-effects estimation. t-statistic in parentheses. \*Significant at 95%

Table 5: Effect of working capital management on return on assets for large firms

Variables	1	2	3	4
C	1.365* (2.37)	-3.267* (-2.38)	-2.295* (-3.20)	2.76* (2.79)
AR	-0.003* (-2.99)			
AP		6.36* (-12.74)		
INV			-0.140* (-8.58)	
CCC				-0.066* (-5.17)
SIZE	-0.099* (2.23)	-0.023 (-0.36)	0.880* (4.77)	1.86* (3.66)
SGROW	0.072 (1.57)	0.122* (3.75)	-0.109 (-1.28)	-0.130 (-1.78)
DEBT	-2.037 (-1.49)	8.318 (1.60)	2.279 (0.53)	-0.037* (-2.42)
GDPGR	0.065* (3.52)	-1.460* (-6.37)	1.514* (2.67)	-0.090* (-2.85)
DW Statistic	1.67	1.88	2.01	1.86

Dependent Variable: ROA, Method: Panel least squares, Sample: 1996 2005, Cross-section included: 33, Total panel (unbalanced) observations: 465. ROA is dependent variable, AR measures No. of days accounts receivable, INV No. of days of inventory, AP No. of days accounts payable, CCC cash conversion cycle, SIZE company size, SGROW sales growth, DEBT financial debt level and GDPGR annual GDP growth. Results obtained using fixed-effects estimation. t-statistic in parentheses. \*Significant at 95%

is reduced by lengthening the number of days accounts receivable, number of days of inventory, number of days of inventory and the cash conversion cycle. This finding provides contrary evidence to the conjecture that working capital management effects on performance differs between small and large firms as suggested by numerous empirical studies.

Other notable differences in the estimations for small and large sized firms are the differential impact of some of the control variables on the profitability performance of small and large firms. The size of the firm seems in general to have positive effects on profits for large firms with most of the coefficient of the variable in the large firms regression has significantly positive sign. The reverse was observed for the small firms regression. This suggests that size matters in profitability performance of Nigerian companies.

## CONCLUSION

The study set out to provide empirical evidence about the effects of working capital management on profitability for a panel made up of a sample of fifty Nigerian quoted firms for the period 1996-2005. The study found a significant negative relationship between net operating profitability and the average collection period, inventory turnover in days, average payment period and cash conversion cycle for a sample of fifty Nigerian firms listed on the Nigerian Stock Exchange. These results suggest that managers can create value for their shareholders by reducing the number of days accounts receivable and inventories to a

reasonable minimum. The negative relationship between accounts payable and profitability is consistent with the view that less profitable firms wait longer to pay their bills.

Most Nigerian firms have large amounts of cash invested in working capital. It can therefore be expected that the way in which working capital is managed will have a significant impact on profitability of those firms. These findings are generally in confirmation with Deloof (2003), Eljelly (2004) and numerous others, who found a strong negative relationship between the measures of working capital management including the average collection period, inventory turnover in days, average payment period and cash conversion cycle with corporate profitability.

On basis of the above analysis we may further conclude that these results can be further strengthened if the firms manage their working capital in more efficient ways. Management of working capital means management of current assets and current liabilities and financing these current assets. If these firms properly manage their cash, accounts receivables and inventories in a proper way, this will ultimately increase profitability of these companies.

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