EFFECT OF WORKING CAPITAL MANAGEMENT ON THE FINANCIAL PERFORMANCE OF AGRIBUSINESS FIRMS IN NIGERIA: A PANEL DATA APPROACH

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ABSTRACT

Internal financial inadequacy remains the bane of the sustainability of the food and agricultural industry in Nigeria. Since this industry contributes remarkably to food security, job creation and poverty reduction among the teeming population of Nigeria, it is imperative to evaluate the effect of working capital management on the financial performance of agribusiness firms in Nigeria. Panel data were collected from the annual reports of the selected firms, which were published on the website of the Nigerian Stock Exchange. Working capital management was proxied by accounts receivable, accounts payable, and cost of sales while financial performance was proxied by turnover. Data were obtained for 11 firms for 10 years, making 110 firm-years. Data were analysed using descriptive statistics, compound annual growth rate, pre-estimation tests like Levin-Lin Chu (LLC) and Pedroni cointegration, and panel data regression. The results showed that the series were I(1) and exhibited a long-run relationship. Furthermore, the growth rates of accounts payable (11.36%), cost of sales (9.34%), turnover (8.17%), and accounts receivable (4.22%) were positive. Hausman's specification recommended the fixed effects model. The F-statistic (20.57) was statistically significant ($p<0.01$) while the R^2 (0.8039) was reasonably high. In addition, the t-ratios of cost of sales (6.96) and accounts payable (2.25) were statistically significant at 1% and 5% levels, respectively. The study recommended increasing the cost of sales for the firms' products to reach a wider audience but cautiously not to hurt the firms' liquidity position; accounts payable should be increased but the government's financial policy intervention should augment the short-term financial deficit of the firms in the food industry for sustainable food security, employment generation and poverty reduction.

Keywords: receivable, payable, sales, panel data, growth rate

INTRODUCTION

The difference between short-term assets (cash, bank balance, receivables, marketable securities) and short-term liabilities (creditors, payables, bank overdraft) constitute working capital (Senthilnathan, 2020). It is the part of the firm's capital which is required for the daily operational activities of the firm. Working capital deals with the short-term financing of firms. Consequently, it is a measure of the liquidity of the firm (Enow & Brijlal, 2014).

Hence, the efficient management of short-term assets and liabilities is crucial for the sustainability of firms in any given industry (Aldubhani *et al.*, 2022). Enow & Brijlal (2014) indicated that working capital management ensures that a firm can access adequate funds required for day-to-day operational expenses. Ali & Ali (2014) added that working capital management is a crucial constituent of corporate finance because it has a direct effect on the profitability and liquidity of firms. While firms aim at achieving optimum profit levels, it is equally necessary to preserve the liquidity of the firms. This is the centerpiece of corporate finance.

Corporate finance encompasses three major areas such as capital budgeting, capital structure and working capital management. Capital budgeting and capital structure decisions relate to long-term financing or investments as well as the returns. Working capital management focuses on the management of short-term financing and investment decisions of the firm (Azila *et al.*, 2021). Working capital management encompasses the decisions and policies of the management as they affect the size and effectiveness of both short-term assets and liabilities (Akoto *et al.*, 2013). It is a managerial financial strategy that maintains efficient levels of current assets and current liabilities to ensure that a firm has adequate cash flow to meet short-term obligations. The objective here is to forestall excessive or insufficient working capital which have negative implications for the financial health of a firm. Pham *et al.* (2020) maintained that increased levels of current assets lead to excessive profits in its total short-term investments, while on the other hand, relatively few current assets make the firm vulnerable to financial difficulties and increase the firm's exposure to liquidity risk.

Financial performance is a monetary measure of the outcome of the effective utilization of firms resource (Abebe, 2022; Mohamed, 2017; Racheal *et al.*, 2017). Firms target maximum output from a given set of resources. Several proxies can be used for financial performance. Examples include return on asset, return on equity, and return on investment and sales (Tsigas & Ehui, 2006; Vătavu, 2015; Yusuf, 2014). Substantial financial performance, such as overall turnover or sales is often the outcome of investing in capital projects (Anene *et al.*, 2023) either as a vendor or vendee. In capital projects, funds are usually inadequate to meet short-term obligations. Coupled with inadequate equity capital, firms resort to financing strategies to escape the hassles of the short-term. These strategies, otherwise known as the standard measures of the effectiveness of the management of working capital, include cash conversion cycle, accounts receivable, accounts payables, inventory days and cost of sales (Azila *et al.*, 2021; Kiarie, 2012), which firms deploy to remain afloat.

Accounts receivable are mostly applicable when firms make supplies with the intent of obtaining future payment (Hassan *et al.*, 2017). It is a credit policy which comprises the monitoring and controlling of the application and observance of credit conditions (Aldubhani *et al.*, 2022). On the other hand, payments for supplies are often deferred due to insufficient liquidity. The accounts payable comprise trade credit and accrued expenses that ensure continuous availability of finance for firms' operations (Aldubhani *et al.*, 2022). Thus, firms strive to strike a balance between accounts receivable and payable to achieve the primary objectives of working capital management like profitability, turnover sales and liquidity.

Financially related issues are bedevilling agribusiness firms in contemporary times. For instance, tight monetary policy measures are strangulating firms in Nigeria. In addition, the ineffectiveness of working capital management can translate to corporate bankruptcy (Mache & Omodero, 2021). From a similar perspective, Mengstie *et al.* (2024) emphasized that unless firms manage their working capital efficiently, they would be unable to respond timely to unanticipated economic challenges.

In response to these challenges, firms have to evolve strategies to enhance their resilience to the rising cost of capital, increased cost of sales and the rising cost of production of goods and services. Owing to the indispensability of agribusiness to Nigeria's economy, this study intends to provide an update on the nexus between working capital management and the financial performance of listed agribusiness firms in Nigeria. Consequently, the objectives of this paper were to evaluate the growth rate of critical working capital management dimensions and turnover of the selected firms, ascertain the existence of a long-run relationship between working capital management and the financial performance of the selected firms; as well as determine the effect of working capital management on firm financial performance.

Accounts receivable and payable as well as inventory days have been measured in the number of days by some researchers (Anene *et al.*, 2023; Aldubhani *et al.*, 2022; Azila *et al.*, 2021; Björkman & Hillergren, 2014). However, this study adopted the rare approach of measuring accounts receivable and payable in terms of actual amounts involved. Whereas the measurement of the financial performance of firms to working capital management has relied on such measures as return on assets, return on equity, operating profit margin and return on capital employed, the current study expanded the literature to the adoption of turnover as the measure of financial performance of the firms. This study provokes policy response to financial management among agribusiness firms. Also, the study empirically informs the management of agro-firms on the long-run relationship between working capital and financial performance.

Theoretical Framework

Three theories were reviewed to guide the study. These include pecking order theory, tradeoff theory and transaction cost theory.

Pecking order theory: From the perspective of corporate finance, the pecking order theory postulates that firms exhaust their internal investment financing before resorting to external financing sources. The theory, which was postulated by Stewart C. Myers and Nicolas Majluf in 1984, is aimed at providing a financial model for firms to prioritize their financing and capital structure decisions (Chesang & Ayuma, 2016; Mboi *et al.*, 2018; Uremadu, 2018). For instance, the issuance of equity is the least preferred type of financing, due to asymmetric information. Accounts payable is preferred to equity issues because it contains lower information costs (Achode & Rotich, 2016). The reason is that issuing equity dilutes ownership as it requires sharing control with new shareholders. The financing hierarchy starts from internal financing (e.g. retained earnings, internally generated funds) to debt (e.g. bank loans, issuing of bonds) and issuance of equity. The theory assumes asymmetric information. Hence, the managers of a firm are better informed about the prospects, risk and value of the firm than outsiders, including other investors (Vijayakumaran, 2018).

Tradeoff theory: The trade-off theory of financial leverage was first formulated by Kraus and Litzenberger in 1973. It holds that a company chooses how much debt finance and equity finance to use by balancing the costs and benefits. The trade-off theory describes how firms choose their optimal capital structure. The theory emphasizes the trade-off between benefits and costs of payables as a debt instrument (Achode & Rotich, 2016; Nawi, 2015; Sule, 2021). Thus, the increase in accounts payable level would increase the cost of bankruptcy, financial distress and agency, hence decrease the value or sales of the business organisation.

Transaction cost theory: The theory suggests that conducting transactions is a costly endeavour and different modes of organizing transactions entail different costs (Rindfleisch, 2020). Transaction costs refer to the expenses which firms incur when they buy or sell their goods or services (Ahlering, 2004). These costs are different from the cost of the good or service itself. The costs represent the labour expended in bringing a product to the market or advertisement. An example of transaction costs is the brokers' commissions, which are the differences between the price the dealer pays for a security and the price the buyer pays. Others are commissions paid to professionals such as real estate agents. When these costs are not properly managed, effective or commiserate with respective returns, the firms can lose sales or turnover.

METHODOLOGY

Nigeria was the study area. Emphasis was on agricultural firms that were listed on the Nigerian Stock Exchange. The criteria for the selection of firms were involvement in the agro-business sector. Out of the 26 firms that were initially identified, 11 of them had complete information on the variables for the study. Furthermore, the selection of the period of 10 years from 2012 to 2021 was based on the availability of information for every selected year. Thus, the nature of the study is that of a balanced panel as suggested by Chiang (2008), Gujarati & Porter (2009), Forte *et al.* (2013) and Ahakiri (2018).

Panel data for the study were collected from the annual reports of the selected firms, which were published on the website of the Nigerian Stock Exchange. Working capital management was proxied by accounts receivable, accounts payable, and cost of sales, while financial performance was represented by turnover. Data were collected from 11 registered firms for 10 years, making 110 firm-years.

Data were analysed using descriptive statistics, compound annual growth rate and panel data regression. Panel data stationarity tests using Levin-Lin Chu (LLC) and Pedroni cointegration were carried out prior to the regression. The models were specified as follows:

Compound annual growth rate:

$$CAGR = \left(\frac{V_n}{V_0}\right)^{\frac{1}{n}} - 1$$

Where:
CAGR = Compound Annual Growth Rate
$\mathbf{V_n}$ = the ending value
$\mathbf{V_0}$ = the beginning value
n = the number of periods

Panel data regression:

$$lntnv_{it} = \beta_0 + \beta_1 acrcv_{it} + \beta_2 acpay_{it} + \beta_3 cos_{it} + \varepsilon_{it}$$

where,
lntnv = log of annual turnover
lnacrcv = log of accounts receivable
lnacpay = log of accounts payable
lncos = log of cost of sales
i = panel data notation for cross-sectional data
t = time series notation.

RESULTS AND DISCUSSION

Compound Annual Growth Rate

The results of the analysis of the Compound Annual Growth Rate are presented in Table 1. The results reveal that accounts payable had the highest growth rate (11.36%). This implies that short-term trade credit is highly and increasingly relevant in the agribusiness sector. Reliance on trade credit also indicates a low level of financial health or stability in the short term as equity financing appears to be increasingly inadequate. This assertion assumes that firms resort to credit when their equity is inadequate because credit comes with a cost which affects profitability and efficiency.

The cost of sales (9.34%) was also found to be on the rise as well. The increasing cost of sales could be attributed to macroeconomic policies on inflation, exchange rate and interest rate. Most importantly, the observed rising CGR for cost of sales could be attributed to the unstable cost of energy which is most palpable in the haulage sector. This is because Nigeria has for long witnessed a road-driven economy, so much so that any little increase in the cost of fuel/energy exhibits a widespread effect on the food sector.

It is also interesting to observe that the CGR for turnover (8.17%) was also on the rise. This is a further attestation to the vibrant nature of the food business in Nigeria. The food business thrives because of the rising population and the indispensability of food. In addition, as more Nigerians move into formal employment, dependence on processed and ready-to-eat foods also rises (Akpokodje *et al.*, 2003; Ogbanje *et al.*, 2023). The working capital management variable with the least CGR was accounts receivable (4.22%).

Table 1: Compound Growth Rate

Variable	vn	v0	n	CGR (%)
Turnover	201,000.00	84,700.00	11	8.17
Accounts receivable	12,200.00	7,746.51	11	4.22
Accounts payable	54,200.00	16,600.00	11	11.36
Cost of sales	150,000.00	56,200.00	11	9.34

Source: Author's computation (2024)

Working capital management (WCM)

The result of the analysis of WCM is presented in Table 2. The result revealed that the mean accounts receivable (Nm) was N12,900.00. This means that on average, firms made supplies worth about N12.9 billion for which they were not paid immediately. Agro-products are in high demand for both human and industrial consumption or utilization. In the short term, accounts receivables are veritable sources of financing.

Also, receivables enable customers to access quality products even in the absence of funds. However, high receivables as shown in this study could cripple the production and sustainability of firms that do not have a large capital base or debt-financing. Agegnew (2019) added that uncollectible accounts receivables can distort cash inflow for the firm.

The results further show that mean accounts payable for the period stood at N30.30 billion. This figure represents the average amount of money which the selected firms owed their clients for services rendered to the former. In other words, the amount represents obligations owed to suppliers and creditors that must be settled within the short term. This figure also represents the volume of trade credit that was available and utilized by the selected firms within the period under review.

The results in Table 2 also show that an average of N87.60 was expended as the cost of sales in the agribusiness industry within the period under review. This implies that the firms spent a colossal amount of money in the process of selling their products. Cost of sales may include cost of advertisement, cost of distribution or transportation of goods to customers, and other marketing charges. Companies could spend less amount of money on sales if their products are collected at source by distributors. This would reduce variable costs and increase profitability.

The results additionally indicated that the accounts payable was greater than the accounts receivable. This means that if both accounts receivable and payable were fully collected and paid respectively, the firms would still be in deficit of about N17.4 billion. In other words, the accounts receivable, if collectible, would settle only 42,57% of the accounts payable. Coupled with the high cost of sales, the results in Table 2 depict an unfavourable management of short-term financing.

Table 2: Working capital management

Working capital management	Account receivable (Nb)	Account payable (Nb)	Cost of sales (Nb)
Minimum	40.021	179.032	108.433
Maximum	87.90	226,000.00	665,000.00
Mean	12.90	30.30	87.60
Coefficient of variation	1.27	1.35	1.35

Source: Author's computation in EViews 9.

Performance of agribusiness firms

The analysis of the financial performance of agribusiness firms is presented in Table 3. The mean turnover of the firms was N123,000.00 for the selected firms within the period under review. This is a measure of the demand for the products of the firms in the agribusiness sector. It also attests to the lucrative nature of the business of food. This result validates the empirical reports and assertions of researchers that agriculture is the mainstay of Nigeria's economy. Juxtaposing the mean turnover with the cost of sales, the cost-turnover ratio (0.0007) which represents the cost incurred on advertising and marketing to the resultant turnover was very low. This is an indication of higher efficiency and profitability, implying that low cost was incurred to achieve the same volume of sales.

Table 3: Performance of agribusiness firms

	Turnover (Nb)
Minimum	22.66
Maximum	772,000.00
Mean	123,000.00
Coefficient of variation	1.19

Source: Author's computation in EViews 9.

Correlation

In Table 4, the results of the correlation matrix show that the correlation coefficient between any two variables in the study was positive, indicating that they moved in the same direction. The coefficient was highest for the correlation between turnover and cost of sales (0.9699) and least between accounts receivable and cost of sales (0.4752). Thus, the possibility of multicollinearity was minimal.

Table 4: Correlation

Variables in the model	**Turnover**	**Accounts receivable**	**Accounts payable**	**Cost of sales**
Turnover	1			
Accounts receivable	0.542	1		
Accounts payable	0.8123	0.6021	1	
Cost of sales	0.9699	0.4752	0.6975	1

Source: Author's computation in EViews 9.

Levin-Lin-Chu unit-root test for the variables in the study

The analysis of the unit-roots test using the Levin-Lin-Chu approach is presented in Table 5. The results show that the adjusted *t* for every variable was statistically insignificant at levels, implying the presence of units in the variables, which is undesirable for any meaningful regression result. However, the variables were stationary at the first difference, indicating the absence of units and desirability for reliable regression results. In other words, the regression results would no longer be spurious or produce misleading estimates.

Table 5: Levin-Lin-Chu unit-root test for the variables in the study

	Levels		1st difference	
Series	Unadjusted t	Adjusted t	Unadjusted t	Adjusted t
lntvr	-1.3831	1.2923	-13.4287	-7.9578***
lnacrcv	-6.2334	-2.569	-9.6164	-5.1457***
lnacpay	-2.7849	1.0171	-13.6219	-10.7988***
lncos	-1.7733	0.1106	-13.8337	-9.9985***

Source: Author's computation in EViews 9.

Pedroni test for cointegration

The results of the Pedroni test for cointegration in Table 6 included three dimensions namely, Modified Phillips-Perron, Phillips-Perron and Augmented Dickey-Fuller tests. The t-statistics (2.668, 4.024 and 6.568) for the three dimensions of Pedroni's test respectively were statistically significant ($p<0.01$). In other words, all panels were cointegrated. Thus, a long-run relationship among the variables was inferred. In the long run, accounts receivable, accounts payable and cost of sales would retain their relevance to turnover as far as short-term financing of agribusiness firms in Nigeria is concerned.

Table 6: Pedroni test for Cointegration

Pedroni cointegration test parameters	**Statistic**	**P-value**
Modified Phillips-Perron t	2.6680	0.0038
Phillips-Perron t	-4.0241	0.0000
Augmented Dickey-Fuller t	-6.5687	0.0000

Ho: No cointegration Number of panels = 11
Ha: All panels are cointegrated Number of periods = 9
Cointegrating vector: Panel specific
Panel means: Included Kernel: Bartlett
Time trend: Not included Lags: 1.00 (Newey-West)
AR parameter: Panel-specific Augmented lags: 1

	Statistic	p-value
Modified Phillips-Perron t	2.6680	0.0038
Phillips-Perron t	-4.0241	0.0000
Augmented Dickey-Fuller t	-6.5687	0.0000

Source: Author's computation in EViews 9.

Nexus of working capital management and firm performance (Fixed and Random effects)

The analysis of the fixed and random effects of working capital management on firm performance is presented in Table 7. Hausman's specification test was conducted to guide the selection of the fixed or random effects model. The null hypothesis is that the random effects (RE) is the preferred model. However, the statistical significance ($p<0.05$) of the Chi-square statistic (8.07) for Hausman's specification test recommended the rejection of the RE for the fixed effects (FE) model. Hence, the estimation of the fixed effects held sway for the study. This decision was in line with Kalita & India (2013) and Olaoye & Dada (2021). The FE model provides for the individual-specific effects to be correlated with the regressors. Put differently, the individual-specific effects are the leftover variations in the dependent variable that cannot be explained by the regressors (Kalita & India, 2013).

In the FE model, the F-statistic (20.57) was statistically significant ($p<0.01$). Thus, the study rejected the null hypothesis that working capital management has no significant effect on the financial performance of agribusiness firms. Firms in Nigeria have always required short-term financing such as trade credits. Their inability to rely wholly on equity financing is the reason that empirical works on agriculture are replete with inadequate credit. It was for this reason that agricultural financing policy intervention has orchestrated the marshalling of humongous funding for the sector.

The coefficient of determination, represented by the R-square for the FE model was 0.8039. This implied that the selected working capital management indicators accounted for 80.39 percent of the variations in the dependent variable (turnover) of the firms. Variables outside the model would be responsible for the rest 19.61%. This finding underscores the high relevance of the selected variables to firms' financial performance.

The results further show that the t-ratio (2.25) of accounts payable was statistically significant ($p<0.05$). This implied that accounts payable had significant effect on the financial performance of agribusiness firms in Nigeria. The coefficient (0.12) was positively signed, indicating that a 10 percent increase in accounts payable would increase the financial performance of the firms by 1.2 units. Where equity financing is deficient, firms resort to external or debt financing such as collecting goods and services for payment at a future date. Proper management of accounts payable is of utmost importance to basic financial health and performance of a firm. It is an indication of good credit management in both large and small business organizations.

The result validates Achode & Rotich (2016) that the financial performance of firms in the manufacturing sector was dependent on external financing. The result of this study is also in line with Mburu & Warui (2023) those who found a positive and statistically significant ($p<0.01$) correlation ($r = 0.774$) between financial success and the management of accounts payable of Microfinance Institutions in Kenya. Further, the result is similar to Nwakaego & Ikechukwu (2016) that accounts receivable had positive and statistically significant effects on the profitability ratio of Industrial/Domestic Manufacturing Companies in Nigeria. Anorue & Ugwoke (2022) emphasized that trade credit can be an effective technique for growing businesses because accounts payable terms reduce the liquidity strain which a prompt payment would impose. This financing model reduces a company's capital needs. However, the result is at variance with Ikechukwu & Nwakaego (2015) that accounts payable ratio had negative and significant effect with the profitability ratio of food and beverages manufacturing companies in Nigeria.

The result in Table 7 further revealed that the t-ratio (6.96) of cost of sales was statistically significant ($p<0.01$). Since the coefficient (0.70) was positive, the result implies that a 10 percent increase would raise the financial performance of the firms by 7.0 units. This result is contrary to the *apriori* that an increase in the cost of sales would detract from financial performance. However, a properly managed sales cost implies greater consumer outreach which can raise the market share of a firm, thus translating to more sales and higher turnover as indicated in the transaction cost theory.

Table 7: Nexus of working capital management and firm performance (Fixed and Random effects)

	Fixed effect			Random effect		
	Coefficient	Standard error	t-ratio	Coefficient	Standard error	t-ratio
Constant	4.15	1.75	2.37	3.43	1.38	2.48
lnacrcv1	-0.03	0.05	-0.56	-0.02	0.05	-0.5
lnacpay	0.12	0.05	2.25**	0.13	0.05	2.5**
lncos1	0.70	0.10	6.96***	0.72	0.08	8.69***
R-square	0.8039			0.8048		
F(3,96)	20.57***					
Prob>F	0.0001					
Wald chi2(3)				110.85***		
Prob>chi2				0.0001		

Source: Author's computation in EViews 9.

Hausman (fixed random) specification test
Test: Ho: difference in coefficients not systematic
$Chi^2(3) = (b-B)'[(V\_b-V\_B)^{(-1)}](b-B) = 8.07$
$Prob>chi^2 = 0.0446$

This result conforms with Adeyemi & Esangbedo (2023) that sales and distribution cost had a moderate to high positive association with revenue as well as a very high positive association with the gross margin of firms in Nigeria's Consumer Goods Sector. The result also validated Konak (2015) who found that marketing expenses positively and significantly affected the financial performance of the textile industry. Yushang *et al.* (2020) also found that the cost of inventories had a positive influence on the profitability of manufacturing firms in Zimbabwe.

CONCLUSION AND RECOMMENDATIONS

The study assessed the effect of working capital management on the financial performance of agribusiness firms in Nigeria. From the findings of the study, it was concluded that the liabilities (payable) of the firms grew at a higher rate than their assets (receivable) in the short term. This implies that the financial health of the firms was in jeopardy and unsustainable. A rising debt profile of the sector discourages investment, with adverse consequences for food security. The result also implies that the firms relied more on debt financing as forecasted by the Pecking order theory, utilizing the concept of other people's money, within the period under review. Where the cost of capital rises more than the return on investment, the firms are endangered financially in the short term. This result further suggests substantial government neglect, notwithstanding the critical roles of the sector in sustaining food security, employment and poverty reduction.

Working capital management has been reaffirmed as a veritable tool for the financial performance of firms in the agribusiness sector. In particular, the rising cost of sales translated to more turnover. One implication of this finding is that the firms are yet to assert themselves in the market in a manner that their products and services could command demand with minimal effort, thus confounding transaction cost theory. Should the firms rely on the rising cost of sales, profitability can dwindle. The concept of OPM has proven to increase the turnover of firms. Relying on debt financing to augment the shortfall in production cost has enabled the firms to generate more earnings.

The study found that accounts payable had a greater growth rate than other working capital management dimensions. Thus, the study suggested that the firms should make concerted efforts to balance payables with receivables for robust short-term financial management.

Cost of sale had a positive and significant effect on the turnover of the firms. Thus, it was recommended that firms in the agribusiness sector should increase the tempo of their marketing strategies to reach the target audience so as to generate more sales. A note of caution is, however, imperative to safeguard the goal of maximum profit.

Accounts payable had a positive and significant effect on financial performance. Hence, the study suggested that firms maintain debt financing to ensure increased turnover. However, the firms should be wary of the cost of capital and safeguard their profitable profile and essence. In addition, government financial policy intervention should effectively increase focus on the short-term financing of the firms in this industry to improve the capital structure of the firms and guarantee the availability of their services to the nation.

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