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Determinants of Cash Holdings: Evidence from Agricultural Firms Listed 0n Nigeria Stock Exchange

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Abstract *This study ascertained the factors that determine Cash Holdings in listed Agricultural firms in Nigeria. The specific objectives are to ascertain the relationship or otherwise between Growth Opportunities, Leverage, Cash Flow and Cash Holdings (proxied by Cash and Cash Equivalents) of Agricultural firms listed on the floor of Nigeria Stock Exchange from 2008-2017. Ex-post facto research design was used for this study. Secondary data were sourced from the publications of Nigeria stock exchange and annual financial statement of the sampled firms for the studied period. Inferential statistics of the hypotheses were carried out with the aid of E-view 9.0 statistical software using Pearson co-efficient of correlation, Multicollinearity test and Ordinary Least Square (OLS) Regression Analysis. Specific findings of this study showed that Growth Opportunities and Cash Flow exhibited a significant positive relationship with Cash and Cash Equivalents while Leverage exhibited a significant negative relationship with Cash and Cash Equivalents at 5% significance level respectively. It was recommended among others that manufacturing firms in Nigeria should identify and monitor key business drivers (for example, growth opportunities, leverage and cash flow) since they significantly influence cash holdings.*

Key words Growth opportunities, leverage, cash flow, cash holdings

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1. Introduction

Cash is a significant asset for many corporations. Cash is one of the most important figures found within the assets portion in balance sheet of every firm. Cash holding is defined as cash in hand or readily available for investment in physical assets and to distribute to investors (Amahalu and Ezechukwu, 2017). Therefore cash holding is considered to be convertible to cash. Cash in hand and cash in bank, money market and treasury bills, market investment are also considered cash holding (Ferreira and Vilela, 2004). For determination of its factors and importance in working capital different approaches are used. The cost of capital invested in liquid assets is also form of cash holding. The effective profit forgone on holding large cash balance is an opportunity cost to the firm. Keynes (1936) began the financial literature about cash holdings, suggesting two key benefits from allocating cash: i) reduction transaction costs since to make payments firms do not need to liquidate assets and ii) cash is a precious buffer to meet future uncertainty. Accordingly, two main economic theories support the decision of firms to hold cash: the trade-off theory and the financial hierarchy theory, also known by the pecking order theory. Developed by Miller and Orr (1966), the trade-off theory suggests that firms define a target level of cash holdings by trading off the marginal costs and marginal benefits of cash allocation. In the opposite direction, the financial hierarchy theory sustain that there is neither optimal level of cash holdings nor an optimal debt for firms (Myers and Majluf, 1984). Thus, in the presence of asymmetric information companies prefer to finance their new

investments projects first with cash generated internally, second with low risk debt and lastly with equity. In perfect markets with no information asymmetry, taxes, and agency and transaction costs, companies have no need to hold cash, as there are no benefits or costs of allocating cash. When internal cash owned by the firm is not sufficient to meet the needs, the company can obtain external financing at fair prices that do not compromise growth and investment. In such a frictionless world, cash holdings would have no effect on the firm value or shareholder wealth (Opler *et al.*, 2001). Markets are, however, imperfect, and these imperfections cause external financing to be more expensive than internal resources. Therefore, in the real world of imperfect markets, corporate cash holdings are a strategic component of the business capital structure. Firms with peculiar circumstances should decide on their optimal cash holdings level.

1.1. Statement of the Problem

There has been a notable increase in corporate cash holdings levels. For example, recent reports showed that Apple and GM Motors were each holding more cash than the US treasury. But just how much cash is too much and what informs the decision on how much cash a firm should have in hand. This study investigated what determines the levels of cash holdings by Agricultural firms listed on the Nigerian Stock Exchange (NSE). However, studies have shown that Nigerian companies are holding excessive cash for reasons that include unstable political climate, planned offshore investments, anticipated future investments and acquisitions and labor unrests (Ogundipe *et al.*, 2012; Amahalu *et al.*, 2017). Other reasons include anticipated peak selling season, fluctuating interest rates at banks, and increased capital needed to fund expansion plans into other countries. Hence, this study investigates the firm-specific determinants of corporate cash holdings in the Nigerian agricultural industry. Cash holdings come with advantages and disadvantages and firms are expected to hold an optimal level of cash that enhances shareholder value. With corporate cash holdings on the rise, there is a need to know what informs managers of different firms of the optimal levels to maintain. Stakeholders and users of financial information need to know what firm-specific characteristics justify the level of cash holdings. This study seeks to close that gap on the determinants of cash holdings for the firms operating in Nigeria, specifically, Agricultural sector (sectoral gap) which previous studies are yet to explore and for 2008-2017 periods (periodic gap) by employing growth opportunities, leverage and cash flow as specific determinants of cash holdings in the Nigerian agricultural industry. Furthermore, in an attempt to close the gap in literature, this present study employed multicollinearity test; to determine the degree of collinearity between the independent variables of this study, which prior literature failed to apply,

1.2. Objectives of the Study

The major objective of this study is to ascertain the factors that determine cash holdings in agricultural firms in Nigeria between 2008 and 2017. The specific objectives are designed to:

i. Examine the relationship between growth opportunities and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange.

ii. Determine the relationship between leverage and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange.

iii. Assess the relationship between cash flow and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange.

1.3. Research Hypotheses

In order to address the issue raised above, the following were hypothesized:

Ho_1: There is no significant relationship between growth opportunities and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange.

Ho_2: There is no significant relationship between leverage and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange.

Ho_3: There is no significant relationship between cash flow and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange.

2. Literature Review

2.1. Conceptual Review

2.1.1. Growth Opportunities

Growth in the economy results from both savings and improvements in production efficiency. While the former is relatively simple to measure, the latter is hard to measure *a priori*, but one estimate of gains in production efficiency is provided by the stock market. Specifically, high growth firms, those which will undergo gains in production or demand, can be identified by high price/earnings ratios (Amahalu *et al.*, 2016). However a measure of future growth which relies only on price/earnings ratios includes the effect of different risk levels as well as different forecasted efficiency improvements. In more modern financial economics the value of the firm can be separated into the value of its earnings from assets-in-place plus the value of projected future growth, including new products and improved production of current ones. This second portion of a firm's value is the present value of future investment options, commonly referred to as the present value of growth options (PVGO) (Brealey and Stewart, 2000).

2.1.2. Leverage

A leverage ratio is any one of several financial measurements that look at how much capital comes in the form of debt (loans), or assesses the ability of a company to meet its financial obligations. The leverage ratio is important given that companies rely on a mixture of equity and debt to finance their operations and knowing the amount of debt held by a company is useful in evaluating whether it can pay its debts off as they come due. Too much debt can be dangerous for a company and its investors. However, if a company's operations can generate a higher rate of return than the interest rate on its loans, then the debt is helping to fuel growth in profits (Okoye *et al.*, 2016). Nonetheless, uncontrolled debt levels can lead to credit downgrades or worse. On the other hand, too few debts can also raise questions. A reluctance or inability to borrow may be a sign that operating margins are simply too tight. The debt ratio is a financial ratio that measures the extent of a company's leverage. The debt ratio is defined as the ratio of total debt to total assets, expressed as a decimal or percentage. It can be interpreted as the proportion of a company's assets that are financed by debt.

$$\text{Debt Ratio} = \frac{\text{Total Debt}}{\text{Total Assets}} \tag{1}$$

The higher the debt ratio, the more leveraged a company is, implying greater financial risk. At the same time, leverage is an important tool that companies use to grow, and many businesses find sustainable uses for debt (Okoye *et al.*, 2016).

2.1.3. Cash Flow

Cash flow is the net amount of cash and cash-equivalents moving into and out of a business. Positive cash flow indicates that a company's liquid assets are increasing, enabling it to settle debts, reinvest in its business, return money to shareholders, pay expenses and provide a buffer against future financial challenges. Negative cash flow indicates that a company's liquid assets are decreasing. Net cash flow is distinguished from net income, which includes accounts receivable and other items for which payment has not actually been received. Cash flow is used to assess the quality of a company's income, that is, how liquid it is, which can indicate whether the company is positioned to remain solvent (Okoye *et al.*, 2016).

2.1.4. Cash Holdings

Cash holding is that amount of cash set aside by an organization or firm to meet up with its financial need. It is useful to firms in cases when financing through external sources is more expensive than internally generated funds. In a world of perfect capital markets there would be no transaction costs for raising cash, thus holding of liquid assets would be irrelevant and would not affect a firm's value. But markets are far from perfect and transaction costs are relevant. Once capital market imperfections are introduced, firms are not necessarily able to pursue all value-increasing investment opportunities. For instance, capital market frictions increase the cost of outside capital relative to internally generated funds

(Myers and Majluf, 1984). Consequently, some firms that have attractive growth opportunities invest less than the first-best optimum, leading to lower future growth and reduced operating performance and firm value. Hence, cash holdings can be valuable when other sources of funds, including cash flows, are insufficient to satisfy firms' demand for capital. Therefore, these imperfections do exist and are more relevant to firms with a lot of opportunities investment.

2.1.5. Cash and Cash Equivalents (CCE)

Cash and cash equivalents (CCE) are the most liquid current assets found on a business's statement of financial position. Cash equivalents are short-term commitments with temporarily idle cash and easily convertible into a known cash amount (Hermanson, 1998). An investment normally counts to be a cash equivalent when it has a short maturity period of 90 days or even less(if maturity period is more than 90 days (for example, 100 days), then it will not be considered as cash and cash equivalents) from date of acquisition and when it carries an insignificant risk of changes in value. Equity investments mostly are excluded from cash equivalents, unless they are essentially cash equivalents, for instance, if the preferred shares acquired within a short maturity period and with specified recovery date (Denis, 2013).

2.1.6. Growth Opportunities and Cash and Cash Equivalents

Firms with valuable growth opportunities are likely to demand greater funds in the future to finance these investments. However, because the value of those firms is largely determined by their growth opportunities, these firms face larger information asymmetry between managers and investors. In addition, they have higher potential for risk shifting and underinvestment, thus, they incur higher external financing costs due high adverse selection costs (Myers and Majluf, 1984). Furthermore, growth opportunities can hardly be liquidated in the case of bankruptcy and will lose most of their value. Consequently, this type of firm will keep higher cash levels to avoid costs of financial distress and bankruptcy (Drobetz and Grüninger 2007). Therefore, if a company has future valuable investment opportunities, it will try not to run out of cash by the time it needs it (Bigelli and Sánchez-Vidal, 2012). Boyle and Guthrie (2003) show that holding large cash helps to keep potential investment opportunities alive. Therefore, in line with the agency and the trade-off theories, this study expects a positive relationship between cash holdings and growth opportunities, in order not limit or cancel their profitable investment projects.

2.1.7. Leverage and Cash and Cash Equivalents

The pecking order theory states that companies prioritize their sources of financing according to the principle of least effort. This means that companies first use internal financing at startup. When this is depleted, they use debt financing, and when they cannot get any capital anymore through debt financing, they raise capital by looking for external equity. This theory was first suggested by Donaldson (1961) and later on modified by Myers and Majluf (1984). This phenomenon can be explained by the fact that internal financing is the cheapest way to raise additional capital. The access to external financing is often limited for young companies. And even though they are able to attract external financing, they would pay a very expensive price for it. Young companies namely have a higher failure risk (Huyghebaert and Van de Gucht, 2007). Therefore, the possibility for young companies to grow is often limited.

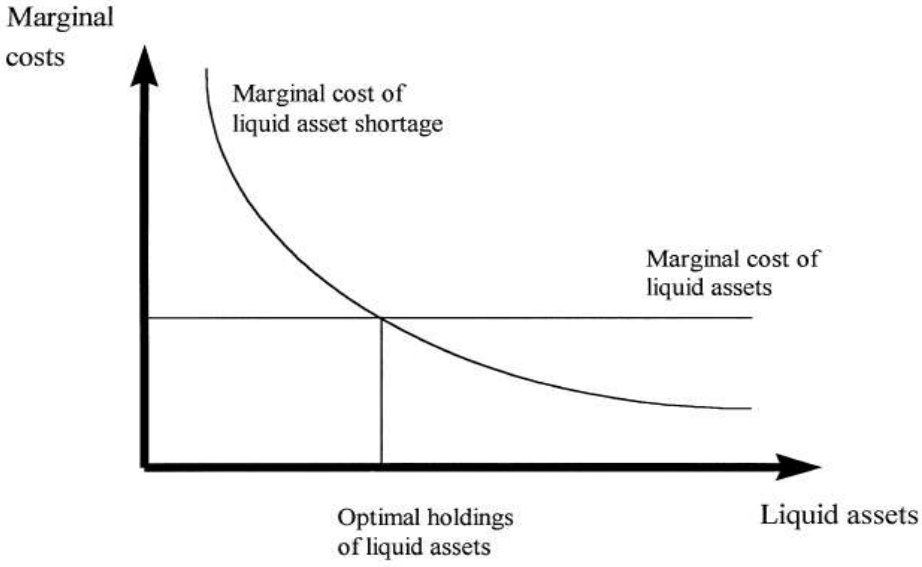
2.1.8. Cash Flow and Cash and Cash Equivalent

Corporate managers of an organization are basically the agents of shareholders, an agent representing a principal, serves the interest of the principal. The issue at hand is that the agent might have other goals and interests than the principal and could act to achieve these at the expense of the principal (Eisenhardt, 1989). Agency problems that might arise between shareholder and manager concerns are also caused by the optimal level of cash holding.

2.2. Conceptual Review

2.2.1. Trade-off Theory

According to the *trade-off* theory, firms tend to establish an optimal cash level and in order to reach that, they weigh the cash holdings' benefits and the cash holdings' costs (Opler *et al.*, 1999; Ferreira and Vilela, 2004). Assuming that a manager's goal is to maximize the shareholders' wealth, they will set the firm's cash holdings in a way that the marginal benefits equal the marginal cost of holding cash. The optimal amount of cash is given by the intersection of the marginal cost of liquid assets curve and the marginal cost of liquid asset shortage curve.



Source: Opler *et al.* (1999)

Figure 1. Optimal holdings of liquid assets

Note: Figure 1 show, under Opler *et al.* (1999) assumptions, that the amount of liquid assets is given by the intersection of the marginal cost of liquid assets and the marginal cost of liquid asset shortage curves. The marginal cost curve of being short of liquid assets is downward sloping and the marginal cost curve of holding liquid assets is assumed to be horizontal. "*With the transaction costs model, the cost of liquid assets is their lower pecuniary expected return; because part of the benefit from holding liquid assets is that they can be more easily converted into cash. There is no reason to think that this cost varies with the amount of liquid assets held. If the firm has a shortage of liquid assets, it can cope with the shortage by either decreasing investment or dividends, or by raising outside funds through security issuances or asset sales. A greater shortage has greater costs, because addressing a larger shortage involves decreasing investment more or raising more outside funds"* (Opler *et al.*, 1999).

Ferreira and Vilela (2004) suggest that the benefits of holding cash include a reduction of the likelihood of financial distress through the fact that cash holdings (i) act as a buffer against unexpected losses, (ii) minimize the costs of raising external funds and (iii) minimize the risks associated with the sale of company's assets in order to maintain the investment policy in case of financial distress. On the other hand, the main cash holding's cost is the opportunity cost associated to the low return of liquid assets. In addition, agency problems between the management team and shareholders may be exacerbated when cash levels are high (Opler *et al.*, 1999). According to the *trade-off* theory, firms reach their own optimal level of cash holdings when the marginal benefit of holding cash is equal to its marginal cost.

2.2.2. Pecking Order Theory

The *pecking order* theory was proposed by Myers (1984) and is based on a asymmetric information theory, proposed by Myers and Majluf (1984), which states that the information asymmetries between managers and shareholders make external financing costly. According to *pecking order* theory, and in a context of asymmetric information between management team (insiders) and financing institutions (outsiders), there is an optimal hierarchy regarding the firm's financing. To minimize asymmetric information costs and financing costs, firms should finance investments with retained earnings, then debt,

and finally with equity. They only use external sources of funding when the first alternative is exhausted. The *pecking order* theory suggests that firms do not have target cash levels, but cash holdings are used as a buffer between retained earnings and investments needs. When current operational cash flows are sufficient to finance new investments, firms repay debt and accumulate cash. In contrast the, if operating cash flows are not enough to finance current investments, firms use the accumulated cash holdings and, if needed, issue debt (Opler *et al.*, 1999).

This study is anchored on the pecking order theory because pecking order theory seeks to explain an optimal financing strategy and takes on capital structure decisions by including the assumptions of asymmetrical information as a significant factor. As a consequence of asymmetrical information, companies follow a certain funding order when determining their financing decisions (Myers and Majluf, 1984). The basis of the pecking order theory is that firms prefer internal funds to external funds, and debt before equity, as this is the least expensive way of financing. The pecking order theory supports holding cash as external funding should be avoided.

2.3. Empirical Review

Gill and Shah (2011) investigated the determinants of cash holding in Canada. A sample of 166 Canadian firms listed on the Toronto Stock Exchange for a period of 3years, from 2008-2010 was selected. This study applied co-relational and non-experimental research design and its results showed that market-to-book ratio, cash flow, networking capital, leverage, firm size, board size and the CEO (chief executive officer) duality significantly influence the cash holding in Canada.

Ogundipe *et al.* (2012) shed light on the empirical relationship between cash holding and firm performance. A sample of 54 Nigerian firms listed on Nigerian Stock Exchange for a period of 15 years (from 1995-2010) was selected. This study applied co-relational research design. The results showed that cash flow, net working capital, leverage, profitability and investment in capital expenditure significantly affect the corporate cash holdings in Nigeria. The study, therefore, contributes to the literature on the factors that determine the corporate cash holdings. The findings may be useful for the financial managers, investors, and financial management consultants.

Abbas and Samran (2013) investigated the determinants of cash holding in non-financial firms of Germany across different firm sizes and industries. Furthermore the data set for the period of 2000 to 2010 for the firm size, log of total assets, EBIT, Capital expenditure percentage of sales, working capital, liquidity (current ratio), and leverage has been taken to study the impact of these on level of corporate cash holdings. It is shown that cash holdings must be analyzed from a dynamic point of view: A strong empirical support was found for the hypothesis of implicit cash targets. Financial determinants influence the corporate cash holdings, but it's not clear which model, the transaction cost model or the managerial opportunism, thesis supports best the empirical findings. The findings of this study are consistent with the predictions of the trade-off theory, pecking order theory, and agency cost theory. The result gave strong evidence that firm size, working capital, and leverage significantly affect the cash holdings decisions of non-financial firms and that are in conformity with the existing literature on the determinants of corporate cash holdings.

Shehriyar and Liaqat (2015) conducted a study on family control and firm cash holding in Pakistan. The study was conducted in the non-financial sector of Pakistan. 100 non-financial firms were selected for the data collection. The data was collected from the annual reports of the list firms from 2008 to 2013. Family ownership, board size, net working capital and firm size are the independent and cash holding as dependent variable of the study. Panel data regression was used in the current study for the data analysis. As per the results of fixed effect model as recommended by the Hausman test; 1) Family ownership has positive and significant effects on firm cash holdings; 2) Board size has positive and insignificant effects on firm cash holdings; 3) Net working capital has negative and insignificant effects on firm cash holdings and 4) Firm size has negative and significant effects on firm cash holdings.

Sulaman *et al.* (2016) explored the determinants of corporate cash holdings of non-financial firms among diverse firm sizes and diverse industries in Pakistan. For our analyses we used a sample of 50 Public Limited companies listed at Karachi Stock Exchange over the period of 2012-2014. The study applied descriptive statistics, co relational and multiple regression line. On behalf of multiple regressions we

conclude that firm size, board size, net working capital and investment significantly affect the corporate cash holdings. Debt structure, leverage and return on asset are non-significant and have negative association with cash holdings.

Amahalu and Ezechukwu (2017) assessed the extent at which cash holding affects financial performance of quoted insurance firms in Nigeria. Three hypotheses were formulated in line with objective of the study; Ex-post facto research design and time-series data were adopted and the data for the study were obtained from fact books, annual reports and account of the quoted insurance companies under study. Pearson coefficient of correlation and multiple regression were applied for the test of the three hypothesis formulated with aid of STATA 13 statistical software. Findings showed that cash holding (proxy by cash to total book value of assets and cash) has a positive and statistical significant effect on financial performance (proxied by Return on Asset, Return on Equity and Tobin's Q) at 5% significant level. Based on these findings, the study recommended among others that insurance companies should adequately mange how they re-invest their resource so as to prevent any form of mismanagement of resource that can guarantee their existence in business.

3. Methodology of Research

3.1. Research Design

This study adopted Ex-Post facto research design. This is because, Ex-Post facto research design involves events that have already taken place in the past. The records that were observed are from 2008-2017, a period of ten years.

3.2. Population of the Study

The population of this study comprised of five (5) agricultural companies listed on the floor of Nigeria Stock Exchange (NSE) as at 31st December, 2017.

3.3. Sample Size and Sampling Method

The five (5) agricultural companies were purposively selected based on the completeness and availability of data for the studied variables and period (2008-2017). They include: Ellah Lakes Plc, FTN Plc, Livestock Feeds Plc, Omatek Ventures Plc and Presco Plc.

3.4. Sources of Data

The study used only secondary data that were extracted from the Annual Reports and statements of Account of the sampled agricultural companies. The data for this study include the turnover, total assets, non-current liability, receivables, payables, inventories, cash, and profit before tax.

3.5. Description of Research Variables

Variables (code)	Proxies (operational definitions)
Independent Variables	
Growth Opportunities (GOP)	Ratio of intangible non-current assets to sales
Leverage (LEV)	Total debt/total assets
Cash Flow (CF)	Ratio of earnings before interest and taxes and interest (EBIT) to total assets
Dependent Variable (Cash Holdings)	
Cash and Cash Equivalent (CCE)	Ratio of cash and cash equivalents dived by total assets
Control Variables	
Net Working Capital (NWC)	current assets – total current liabilities – cash and sach equivalents/total assets
Firm Size (FSZ)	Natural logarithm of total assets

Model Specification

In this study, the independent and dependent variables were used into an equation called ordinary least square regressions to express the model of multiple regressions in equation modified to suit the respective hypotheses.

$$Y = \beta_o + \beta X_1 + \beta X_2 + \beta X_3 + \mu \quad (1)$$

Where,
Y = dependent variable
β_o = the intercept of the regression line
$\beta_1 – \beta_3$ =Coefficients of explanatory variables
μ= error term
The above function linear regression model is modified into the following equations

$$CCE_{it} = \beta_o + \beta_1 GOP_{it} + \beta_2 NWC_{it} + \beta_3 FSZ_{it} + \mu it \quad Ho1 \quad (2)$$

$$CCE_{it} = \beta_o + \beta_1 LEV_{it} + \beta_2 NWC_{it} + \beta_3 FSZ_{it} + \mu it \quad Ho2 \quad (3)$$

$$CCE_{it} = \beta_o + \beta_1 CF_{it} + \beta_2 NWC_{it} + \beta_3 FSZ_{it} + \mu it \quad Ho3 \quad (4)$$

Where;
CCE_{it} = Cash and cash equivalents of firm í in period t
GOP_{it} = Growth Opportunities of firm í in period t
LEV_{it} = Leverage of firm í in period t
CF_{it} = Cash flow of firm í in period t
NWC_{it} = Net working capital of firm í in period t
FSZ_{it} = Firm size of firm í in period t

Decision Rule

The significance of the model was tested at 95 percent confidence level. The p-value of the F-statistic will be used in determining the robustness of the model. In other word, when the p-value is less than 0.05, it will be inferred that the model is significant. Thus, H_1 will be accepted.

4. Data Presentation and Analysis

4.1. Data Presentation

The study panel data were obtained from the publications of annual reports and accounts of the sampled firms from 2008 to 2017.

Table 1. Pearson Correlation Matrix

	CCE	GOP	LEV	CF	NWC	FSZ
CCE	1.0000	0.5148	-0.4531	0.0644	0.0152	0.4188
GOP	0.5148	1.0000	-0.0444	0.4544	-0.4697	0.0599
LEV	-0.4531	-0.0444	1.0000	0.5642	-0.4954	0.6869
CF	0.0644	0.4544	0.5642	1.0000	-0.4149	0.6432
NWC	0.0152	-0.4697	-0.4954	-0.4149	1.0000	-0.5074
FSZ	0.4188	0.0599	0.6869	0.6432	-0.5074	1.0000

Source: E-Views 9.0 correlation output (2019)

The Pearson correlation matrix result in table 1 above shows that CCE positively correlates with the predictor variables with the exception of LEV (-0.4531). However, the predictor variables do not exhibit any problem of multicollinearity. Multicollinearity occurs if there is a strong relationship between two or more independent variables in a regression model (that is, when the degree of relationship between the explanatory variables is more than 0.75). To test whether the level of multicollinearity in the estimated models could be tolerated, Variance Inflation Factor (VIF) was used. The rule of the thumb is that a value of VIF that is less than 10 means that the level of multicollinearity can be tolerated.

4.2. Test of Hypotheses

4.2.1. Hypothesis I

Ho_1: There is no significant relationship between growth opportunities and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange.

H_1: There is significant relationship between growth opportunities and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange.

Table 2. OLS Regression result between the Predictor variables and CCE

Dependent Variable: CCE
Method: Least Squares
Date: 07/11/19 Time: 08:28
Sample: 2008 2017
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.057900	0.102546	3.564629	0.0028
GOP	0.301774	0.190282	4.585931	0.0008
NWC	0.007309	0.156336	3.046749	0.0042
FSZ	0.010946	0.008796	6.244407	0.0000

R-squared	74.68192	Mean dependent var	0.018199
Adjusted R-squared	62.02288	S.D. dependent var	0.011437
S.E. of regression	0.010215	Akaike info criterion	-6.040791
Sum squared resid	0.000626	Schwarz criterion	-5.919757
Log likelihood	34.20395	Hannan-Quinn criter.	-6.173565
F-statistic	11.60756	Durbin-Watson stat	1.134152
Prob(F-statistic)	0.000006		

Source: E-Views Regression Output 9.0 (2019)

Interpretation of Regression Analysis

Table 2 above shows adjusted R^2 which explains the extent to which the independent variable affect the dependent variable. In this case, 0.620 or 62% of the variations in the dependent variable were explained by the independent variable while 0.38 or 38% were affected by other factors outside the model. The adjusted R^2 shows a value more than 50% meaning that GOP is a determinant of cash holdings of quoted agricultural firms in Nigeria. The Durbin – Watson statistic was 1.134152 while the F-Statistic figure was 11.60756 with a P-value of 0.000006. The regression coefficient and significance level shows that t-calculated of GOP has significant influence on CCE of quoted agricultural firms in Nigeria. The t-calculated GOP is 4.585931 and the P-value is 0.0008 shows that GOP is statistically significant to CCE. It shows that an increase in GOP will bring an increase in CCE and vice versa. So, the test outputs described below provide considerable reliability to the results and the emerging simple linear regression equation is as under:

CCE = 0.057900 + 0.301774GOP

Decision

The p-value of the F-statistic (000006) is less than the critical value of 0.05. In this case, the study suggests that the alternative hypothesis (H_1) should be accepted and null hypothesis (H_0) be rejected, which states that there is significant relationship between growth opportunities and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange at 5% level of significance.

4.2.2. Hypothesis II

Ho_2: There is no significant relationship between leverage and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange.

H_2: There is significant relationship between leverage and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange.

Table 3. OLS Regression result between the Predictor variables and CCE

Dependent Variable: CCE
Method: Least Squares
Date: 07/11/19 Time: 08:36
Sample: 2008 2017
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.251445	0.200271	-2.855522	0.0360
LEV	-0.071084	0.102619	-3.692704	0.0014
NWC	0.115183	0.154197	3.746982	0.0011
FSZ	-0.021715	0.052791	-3.411336	0.0031

R-squared	0.801149	Mean dependent var	0.018199
Adjusted R-squared	0.748276	S.D. dependent var	0.011437
S.E. of regression	0.011710	Akaike info criterion	-5.767636
Sum squared resid	0.000823	Schwarz criterion	-5.646602
Log likelihood	32.83818	Hannan-Quinn criter.	-5.900410
F-statistic	10.86842	Durbin-Watson stat	1.335783
Prob(F-statistic)	0.000012		

Source: E-Views Regression Output 9.0 (2019)

Interpretation of Regression Analysis

Table 3 above shows adjusted R^2 which explains the extent to which the independent variable affect the dependent variable. In this case, 0.748 or 74.8% of the variations in the dependent variable were explained by the independent variable while 0.252 or 25.2% were affected by other factors outside the model. The adjusted R^2 shows a value more than 50% meaning that LEV is a determinant of cash holdings of quoted agricultural firms in Nigeria. The Durbin – Watson statistic was 1.335783 while the F-Statistic figure was 10.86842 with a P-value of 0.000012. The regression coefficient and significance level shows that t-calculated of LEV has significant influence on CCE of quoted agricultural firms in Nigeria, though, negatively. The t-calculated LEV is -3.692704 and the P-value is 0.0014 shows that LEV is statistically significant to CCE. It shows that a decrease in LEV will bring an increase in CCE and vice versa. So, the test outputs described below provide considerable reliability to the results and the emerging simple linear regression equation is as under:

CCE = -0.251445 - 0.071084LEV

Decision

The p-value of the F-statistic (0.000012) is less than the critical value of 0.05. In this case, the study suggests that the alternative hypothesis (H1) should be accepted and null hypothesis (H0) be rejected, which states that there is significant relationship between leverage and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange at 5% level of significance.

4.2.3. Hypothesis III

Ho_3: There is no significant relationship between cash flow and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange.

H_3: There is significant relationship between cash flow and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange.

Table 4. OLS Regression result between the Predictor variables and CCE

Dependent Variable: CCE
Method: Least Squares
Date: 07/11/19 Time: 08:38
Sample: 2008 2017
Included observations: 10

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.187274	0.104779	5.787326	0.0000
CF	0.162209	0.126021	5.287163	0.0000
NWC	0.094619	0.143038	3.661490	0.0016
FSZ	0.021900	0.010814	6.025168	0.0000

R-squared	0.808572	Mean dependent var	0.018199
Adjusted R-squared	0.712858	S.D. dependent var	0.011437
S.E. of regression	0.010772	Akaike info criterion	-5.934533
Sum squared resid	0.000696	Schwarz criterion	-5.813499
Log likelihood	33.67267	Hannan-Quinn criter.	-6.067307
F-statistic	21.81646	Durbin-Watson stat	1.860956
Prob(F-statistic)	0.000000		

Source: E-Views Regression Output 9.0, 2019

Interpretation of Regression Analysis

Table 4 above shows adjusted R^2 which explains the extent to which the independent variable affect the dependent variable. In this case, 0.713 or 71.3% of the variations in the dependent variable were explained by the independent variable while 0.287 or 28.7% were affected by other factors outside the model. The adjusted R^2 shows a value more than 50% meaning that CF is a determinant of cash holdings of quoted agricultural firms in Nigeria. The Durbin – Watson statistic was 1.860956 while the F-Statistic figure was 21.81646 with a P-value of 0.000000. The regression coefficient and significance level shows that t-calculated of CF has significant influence on CCE of quoted agricultural firms in Nigeria. The t-calculated CF is 5.287163 and the P-value is 0.0000 shows that CF is statistically significant to CCE. It shows that an increase in CF will bring an increase in CCE and vice versa. So, the test outputs described below provide considerable reliability to the results and the emerging simple linear regression equation is as under:

CCE = 0.187274 + 0.162209CF

Decision

The p-value of the F-statistic (0.000000) is less than the critical value of 0.05. In this case, the study suggests that the alternative hypothesis (H_1) should be accepted and null hypothesis (H_0) be rejected, which states that there is significant relationship between cash flow and cash and cash equivalents of agricultural firms listed on Nigeria Stock Exchange at 5% level of significance.

5. Summary of Findings, Conclusions and Recommendations

5.1. Summary of Findings

Based on the analysis of data, the following findings were made:

1. There is a significant positive relationship between cash and cash equivalents and growth opportunities of Agricultural firms listed on Nigeria Stock Exchange at 5% level of significance.
2. There is a significant negative relationship between cash and cash equivalents and leverage of Agricultural firms listed on Nigeria Stock Exchange at 5% level of significance.
3. There is a significant positive relationship between cash and cash equivalents and cash flow of Agricultural firms listed on Nigeria Stock Exchange at 5% level of significance.

5.2. Conclusions

The study ascertained the factors that influences cash holdings in the manufacturing sector with a focus on Agricultural industry for a ten year period covering from 2008 to 2017. This study used a sample of five (5) Agricultural firms listed on NSE to conduct the study with panel data during the period 2008-2017. In order to do this, the study empirically tested three hypotheses. The results obtained showed that there is a significant positive relationship between cash and cash equivalents and growth opportunities; significant negative relationship between cash and cash equivalents and leverage and a significant positive relationship between cash and cash equivalents and cash flow at 5% level of significance respectively.

5.3. Recommendations

In line with the findings and conclusions, the following recommendations were made:

1. Since growth opportunities was found significant in determining cash holdings, manufacturing firms in Nigeria should identify and monitor key business drivers (e.g. growth opportunities, leverage and cash flow) within the framework of analysis.
2. In order to reverse the inverse relationship between leverage and cash holdings, manufacturing firms in Nigeria should control their debt levels to avoid credit downgrades.
3. Managers should adopt optimum liquidity model for maximum return on investment, survival, stability, growth and development of manufacturing system in Nigeria.

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