Macroeconomic factors, firm characteristics and financial performance

A study of selected quoted manufacturing firms in Nigeria

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Abstract
Purpose – The purpose of this paper is to explore the interrelationship between macroeconomic factors, firm characteristics and financial performance of quoted manufacturing firms in Nigeria. Specifically, the study investigates the effect of interest rate, inflation rate, exchange rate and the gross domestic product (GDP) growth rate, while the firm characteristics were size, leverage and liquidity. The dependent variable financial performance is measured as return on assets (ROA).

Design/methodology/approach – The study used the ex post facto research design. The population comprised all quoted manufacturing firms on the Nigerian Stock Exchange. The sample was restricted to companies in the consumer goods sector, selected using non-probability sampling method. The study used multiple linear regression as the method of validating the hypotheses.

Findings – The study finds no significant effect for interest rate and exchange rate, but a significant effect for inflation rate and GDP growth rate on ROA. Second, the firm characteristics showed that firm size, leverage and liquidity were significant.

Practical implications – The study has implications for regulators and policy makers in formulating policy decisions. In addition, managers may better understand the interplay between macroeconomic factors, firm characteristics and profitability of firms.

Originality/value – Few studies have addressed the interplay of macroeconomic factors and firm characteristics in determining the profitability of manufacturing firms in the country and developing countries in general.

Keywords Nigeria, Financial performance, Manufacturing firms, Firm characteristics, Macroeconomic

Paper type Research paper

1. Background of the study
Micro and macroeconomic factors affect the performance of a firm. Microeconomic factors exist within the company and under the control of management; they include product, organizational culture, leadership, manufacturing (quality), demand and factors of production (Broadstock et al., 2011; Adidu and Olanye, 2006). Macroeconomic factors exist outside the company and not under the control of management; they include social, environmental, political conditions, suppliers, competitors, government regulations and policies (Adidu and Olanye, 2006). Key economic factors include the Consumer Price Index (CPI), unemployment, gross domestic product (GDP), stock market index, corporate tax rate and interest rates (World Bank Group, 2015; Broadstock et al., 2011). These factors...
(i.e. macro) can pose a positive or negative threat to the performance of a firm. While micro factors are within the control of management, the macro factors are beyond the control of management (Dioha et al., 2018).

This was evidenced from the crises in Latin America, East Asia, Russia and the global financial crisis in 2007 (Issah and Antwi, 2017). And presently, the recession witnessed in Nigeria, which business analysts opined that led to the delisting of some companies, has brought to limelight the implications of macroeconomic factors on corporate performance (Zeitun et al., 2007).

For instance, the monetary policy of a country affects all sectors through the cost of debt and the availability of money/credit, which could affect a firm’s ability to access external sources of fund. Fiscal policies affect a firm’s after tax net cash flow, its cost of capital, and potentially the demand for its products, and survival (Zeitun et al., 2007). Also, increases in the nominal interest rate and inflation rate intensify the aggregate rates of failure or default (Robson, 1996; Davis, 1995; Wadhwani, 1986). In most developing countries, for instance Nigeria, macroeconomic factors, such as hyperinflation and increasing exchange rates, are some of the factors affecting the performance of manufacturing firms (Owolabi, 2017).

However, the performance of a firm is not affected by macroeconomic factors. According to the resource-based view (RBV), the internal attributes of an organization determine its position in the competitive environment (Denizel and Özdemir, 2006). The attributes of a firm’s physical, human and organizational capital enable the firm conceive of and implement strategies that improve its efficiency and effectiveness (Barney, 1991). Industry and corporate specific factors have been shown to be significant determinants of corporate performance (Oyebanji, 2015; Rajkumar, 2014; Akinyomi, 2013; Akintoye, 2008).

The subject of financial performance has received significant attention from scholars (Kaguri, 2013). It has been of primary concern to various stakeholders in all forms of businesses because of its implications on organizational health and ultimate survival. Therefore, its measurement and determining factors have gained increased attention, more especially in developing countries in the area of business and corporate finance literature (Dioha et al., 2018). High performance reflects management effectiveness and efficiency in making use of company’s resources and this, in turn, contributes to the country’s economy at large (Naser and Mokhtar, 2004).

2. Statement of the problem

Firms make several operational and strategic decisions which are usually moderated by the macroeconomic environment; these include financing decision, investing decision and operational decision (Owolabi, 2017). Thus, performance is often gauged from stability in the macro economy, such as exchange rate and inflation rate fluctuations, the CPI, level of government expenditure, interest rates, among others. However, macroeconomic volatility is much higher in developing countries than developed ones (Owolabi, 2017). For instance, the Nigerian economy has shown volatility in exchange rate, inflation, interest rate, among several others (Agu et al., 2014; Ogbole et al., 2011). Analysts opine that growth in the manufacturing sector is hindered negatively from high lending rates, which invariably is responsible for high cost of production (Rasheed, 2010).

Studies have extensively examined the effect of macroeconomic factors on firm performance in developed countries (Barakat et al., 2016; Broadstock et al., 2011; Kandir, 2008; Stock and Watson, 2008; Ibrahim and Aziz, 2003). However, there is little empirical evidence how macroeconomic variables impact on the performance of manufacturing firms in Nigeria (Owolabi, 2017).

In Nigeria, major macroeconomic indicators have shown significant fluctuations over time, more especially as the country emerges from recession. For instance, inflation rate as measured by the CPI is presently at double-digit level 14.33 as at February 2018.
Exchange rate increased tremendously from to over 300 as at April 2018. In a communiqué issued in April 2018, the Central Bank of Nigeria (CBN) Governor Mr Godwin Emefiele raised its money supply growth forecast for 2018 to 10.98 percent. The CBN had earlier projected a money supply growth of 10.29 percent for 2018 (Vanguard, 2018). The GDP at current basic prices has also steadily increased. Studies have extensively focused on the banking sector (Ogubiyi and Jiejirika, 2014; Osamwonyi and Michael, 2014).

However, survival and growth of firms also depend on interaction of macroeconomic factors and firm characteristics. Using data from nine African countries, Lemma and Negash (2013) found evidence that income level, growth rate and inflation influence the capital structure of firms. However, this is further affected by industry- and firm-specific characteristics. Ghareli and Mohammadi (2016) reported mixed findings for the effect of firm-specific characteristics on financial reporting quality. Studies have also substantiated the effect of firm characteristics on financial performance (Dioha et al., 2018). For instance, firm characteristics such as firm age (Swiss, 2008), firm size (Malik, 2011), liquidity (Dogan, 2013) and leverage (Mule and Mukras, 2015) have been associated with profitability.

The recent study by Foyeke et al. (2015) on a sample of firms from both financial and non-financial sectors in Nigeria revealed a significant positive relationship between financial performance and firm size with the level of corporate governance disclosure. Thus, given the interaction of the two factors in determining performance, there is a need for additional evidence on the joint association between macroeconomic factors, firm characteristics and financial performance in developing countries (Adeoye and Elegunde, 2012). More so, Izedonmi and Abdullahi (2011) have shown that the influence of macroeconomic factors varied from sector to sector. Therefore, there is a need to examine using such firms from the consumer goods sector.

Therefore, the thrust of this study is to examine macroeconomic factors, firm characteristics and financial performance of selected manufacturing companies in Nigeria.

3. Objective of the study
The main objective of the study is to explore the interrelationship between macroeconomic factors, firm characteristics and financial performance of quoted manufacturing firms in Nigeria. The study intends to achieve the following specific objectives:

1. to examine the effect of interest rate on return on assets (ROA) of consumer goods manufacturing firms;
2. to ascertain the effect of inflation rate on ROA of consumer goods firms;
3. to examine the effect of exchange rate on ROA of consumer goods manufacturing firms;
4. to determine the effect of GDP growth rate on ROA of consumer goods manufacturing firms;
5. to examine the effect of firm size on ROA of consumer goods manufacturing firms;
6. to analyze the effect of leverage on ROA of consumer goods manufacturing firms; and
7. to analyze the effect of liquidity on ROA of consumer goods manufacturing firms.

4. Review of related literature
4.1 Conceptual framework
4.1.1 Macroeconomic factor(s). The word “macroeconomics” is derived from the Greek prefix makro meaning “large” and economics, and is a branch of economics which deals with the performance, structure, behavior and decision making of the economy as a whole (Sullivan and Sheffrin, 2003). The macro environment looks at forces surrounding a firm
that have the potential to affect the way it operates (Davis and Powell, 2012). The Institute of Chartered Accountants (ICAN) opined that it can be viewed as a set of factors or conditions that are external to the firm but which can influence the operations of the firm.

The macro environment refers to those conditions and forces which are external to the firm and are beyond the individual business unit, but they all operate within it (Taher et al., 2010). Duncan (1972) opined that the external business environment refers to the totality of factors outside an organization that are taken into consideration by an organization in its decision making. These factors depend largely on the complexity and dynamism of the environment (Duncan, 1972; Dess and Beard, 1984). The external business environment is classified as being stable when it does not show any changes, unstable when it shows relative changes and dynamic when it shows changes continuously (Aguilar, 1967).

Studies have indicated changes in the value of financial assets to be responsive to macroeconomic factors such as inflation rate, exchange rate, interest rates, GDP, money supply, unemployment rate, dividends yields and so forth (Fosu et al., 2014). The study focused on the following selected macroeconomic variables: interest rate, inflation, exchange rate, money supply and GDP (Table I).

4.1.1.1 Interest rate. Crowley defined interest rate as the price a borrower pays for the use of money they borrow from a lender or fee paid on borrowed assets. Ngugi (2001) described interest rate as a price of money that reflects market information regarding expected change in the purchasing power of money or future inflation. Economists argue that interest rate is the price of capital allocation over time; monetarist use the interest rate as an important tool to attract more saving, as increases in the interest rates attract more savings and the decrease in interest rate will encourage investors to look for another investment that will generate more return accordingly (Murungi, 2014). That interest rates are important because they control the flow of money in the economy. High interest rates curb inflation but also slow down the economy. Low interest rates stimulate the economy, but could lead to inflation.

The lending interest rate (percent) in Nigeria was reported at 17.58 percent in 2017, according to the World Bank collection of development indicators, compiled from officially recognized sources. The rate was marginally higher than periods prior. In Nigeria, Acha and Acha (2011) examined the implication of interest rates on savings and investment and reported that interest rate was a poor determinant of savings and investment. While Obamuyi and Olorunfemi (2011) proved that financial reform and interest rates had significant impact on economic growth in Nigeria. At the firm level, Khan and Mahmood (2013) showed that the financial structure of some industry makes firms in that industry more susceptible to interest rates volatilities than others. Mnang'at et al. (2016) found a significant relationship between interest rate and financial performance of micro enterprises in Kenya. Barnor (2014) found a significant negative effect of interest rate on stock market returns of listed firms in Ghana.

<table>
<thead>
<tr>
<th>Year</th>
<th>GDP per capita (USD)</th>
<th>GDP (USD billion)</th>
<th>Money (annual variation in %)</th>
<th>Inflation rate (CPI, annual variation in %)</th>
<th>Exchange rate (vs USD)</th>
<th>Policy interest rate (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>3,082</td>
<td>522</td>
<td>1.3</td>
<td>8.5</td>
<td>155.2</td>
<td>12.00</td>
</tr>
<tr>
<td>2014</td>
<td>3,312</td>
<td>576</td>
<td>20.6</td>
<td>8.1</td>
<td>167.5</td>
<td>13.00</td>
</tr>
<tr>
<td>2015</td>
<td>2,766</td>
<td>494</td>
<td>5.8</td>
<td>9</td>
<td>196.5</td>
<td>11.00</td>
</tr>
<tr>
<td>2016</td>
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<td>405</td>
<td>17.8</td>
<td>15.7</td>
<td>304.5</td>
<td>14.00</td>
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<td>2017</td>
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<td>376</td>
<td>1.7</td>
<td>16.5</td>
<td>305.5</td>
<td>14.00</td>
</tr>
</tbody>
</table>

*Source:* www.focus-economics.com/countries/nigeria

Table I. Selected macroeconomic variables
4.1.1.2 Inflation rate. Jhingan (2002) defined inflation as a persistent rise in the general level of prices. Akers (2014) stated that inflation rate measures changes in the average price level based on a price index. Inflation can be measured in several ways; however, two commonly used measures are the GDP Deflator or a CPI indicator. The GDP Deflator is a broad index of inflation in the economy; the CPI measures changes in the price level of a broad basket of consumer products. The CPI measures average retail prices that consumers pay. A high or increasing CPI indicates existence of inflation. Higher prices tend to reduce overall consumer spending which, in turn, leads to a decrease in GDP while inflation itself is not negative, rapidly increasing rates of inflation signal the possibility of poor macroeconomic health. Economists distinguish between two types of inflation: demand-pull inflation and cost-push inflation. Demand-pull inflation occurs when aggregate demand for goods and services in an economy rises more rapidly than an economy’s productive capacity. Cost-push inflation, on the other hand, occurs when prices of production process inputs increase. Rapid wage increases or rising raw material prices are common causes of this type of inflation.

Inflation rate is primarily measured in Nigeria as the percentage change in the CPI which has the food and core index, to give the headline inflation. The CPI measures the price of the representative food and services components such as food, alcoholic beverages, energy, housing, clothing, transport, health, communication, transport, etc. (Figure 1).

Several studies have shown a negative effect of inflation on economic growth. For instance, the study by Usman and Adejare (2013) in Nigeria reported a negative relationship between market all share index, market volume and GDP with inflation. Similarly, Alimi (2014) reported a deleterious effect of inflation on financial development; proxied as broad definition of money as ratio of GDP; quasi money as share of GDP; and credit to private sector as share of GDP. The study by Djalilov and Piesse (2016) found a negative relationship with profitability of early transition countries and positive relationship in late transition countries.

4.1.1.3 Exchange rate. According to Business Dictionary, exchange rate is the price for which the currency of a country can be exchanged for another country’s currency. Harvey (2012) described exchange rate as the value of two currencies relative to each other. It is the price of one currency expressed in terms of another currency. It is the price at which the currency of one country can be converted to the currency of another. Exchange rates are either fixed or floating. Fixed exchange rates are decided by central banks of a country,
whereas floating exchange rates are decided by the mechanism of market demand and supply (The Economic Times, 2017). Factors that influence exchange rate include: interest rates; inflation rate; trade balance; political stability; internal harmony; general state of economy; and quality of governance.

Martin and Mauer (2003) showed that understanding the impact of foreign exchange risk is a critical element for purposes of firm valuation and risk management. The study by Barnor (2014) found a significant positive effect of exchange rate on stock market returns of listed firms in Ghana.

4.1.1.4 Gross domestic product (GDP). GDP is the total market value of goods and services produced by a country’s economy during a specified period of time. It includes all final goods and services, that is, those that are produced by the economic agents located in that country regardless of their ownership and that are not resold in any form. According to Mwangi (2013), GDP is a most commonly used macroeconomic indicator to measure total economic activity within an economy; its growth rate reflects the state of the economic cycle. It is used throughout the world as the main measure of output and economic activity.

In economics, the final users of goods and services are divided into three main groups: households, businesses and the government. One-way GDP is calculated – known as the expenditure approach – by adding the expenditures made by those three groups of users. Accordingly, GDP is defined by the following formula:

\[ GDP = C + I + G + NX \]

where Consumption \( C \) represents private-consumption expenditures by households and non-profit organizations; Investment \( I \) refers to business expenditures by businesses and home purchases by households; Government spending \( G \) denotes expenditures on goods and services by the government; and Net exports \( NX \) represents a nation’s exports minus its imports. The idea behind the expenditure approach is that the output that is produced in an economy has to be consumed by final users, which are either households, businesses or the government.

Tan and Floros (2012) on a sample of banks in China reported a negative relationship between GDP growth and bank profitability. Sinha and Sharma (2016) also documented a positive relationship between profitability and GDP in India, while Trujillo-Ponce (2013) on a sample of banks in Spain reported a positive impact of GDP growth on ROA and return on equity (ROE).

4.2 Firm characteristics

Zou and Stan (1998) described firm characteristics as a firm’s demographic and managerial variables which, in turn, comprise part of the firm’s internal environment. According to Kogan and Tian (2012), firm characteristics include firm size, leverage, liquidity, sales growth, asset growth and turnover. Others include ownership structure, board characteristics, age of the firm, dividend pay-out, profitability, access to capital markets and growth opportunities (McKnight and Weir, 2008; Subrahmanyam and Titman, 2001):

1. Firm Size has become dominant in empirical corporate finance studies and has been widely established among the most significant variables (Kioko, 2013). Studies, however, document mixed results on the effect of size, while some confirm (Tarawneh, 2006; Sarkaria and Shergill, 2000); others find mixed or no effect at all (Goddard et al., 2006; Mariuzzo et al., 2003). There is a positive significant relationship between size and profitability (Liargovas and Skandalis, 2008; Akhavein et al., 1997; Smirlock, 1985). More recently, Lopez-Valeiras et al. (2016) revealed that the relationship between size and financial performance is negatively mediated by indebtedness.
Leverage refers to the proportion of debt to equity in the capital structure of a firm (Omondi and Muturi, 2013). It strives to measure what portion of the total assets is financed by debt funds. Leverage ratios are used to measure business and financial risks of a firm (Okwoli and Kpelai, 2006). Studies have shown a positive significant relationship between leverage and firm size (Booth et al., 2001; Wald, 1999; Rajan and Zingales, 1995; Marsh, 1982). Leverage is the amount of debt used to finance other capital expenditure that can improve firm financial performance (Lin et al., 2006; Pandey, 2005).

Liquidity refers to the firm’s ability to convert its short-term assets into cash in order to meet its day-to-day operation (Douglas, 2014). Liquidity is used to measure firm’s ability to meet its current maturing liabilities (Okwoli and Kpelai, 2006). Liargovas and Skandalis (2008) opined that firms can use liquid asset to finance its activities and investment when external finance is not available. According to Katchova and Enlow (2013), liquidity ratios measure the firm’s ability to pay off its short-term debt obligations. Examples are the current ratio and quick ratio, which measure the health of a firm in the short run.

Sales growth refers to increase in sales over a specific period of time. Sustainable growth is defined as the annual percentage growth in sales that is consistent with the firm’s financial policies (Pandey, 2005). The amount a company derives from sales compared to a previous, corresponding period of time in which the latter sales exceed the former. Several studies such as Omondi and Muturi (2013) and Rehana et al. (2012) measure sales growth as the current year sales minus prior year sales and dividing by prior year sales.

4.3 Financial performance
Performance is multi-faceted, and the appropriate measure selected to assess corporate performance depends on the type of organization evaluated, and the objectives to be achieved through that evaluation (Kaguri, 2013). Firm performance encompasses three specific areas: financial performance (profits, ROA, return on investment, etc.); product market performance (sales, market share, etc.); and shareholder return (total shareholder return, economic value added) (Richard et al., 2009).

Lebans and Euske (2006) provided a set of definitions to illustrate the concept of performance:

- performance is a set of financial and non-financial indicators which offer information on the degree of achieving of objectives and results; and
- performance is dynamic, requiring judgment and by using a causal model that describes how current actions may affect future results.

There are two kinds of performance: financial performance and non-financial performance. Company’s performance is evaluated in three dimensions. The first dimension is company’s productivity, or processing inputs into outputs efficiently. The second is profitability dimension, or the level of which company’s earnings are bigger than its costs. The third dimension is market premium, or the level of which company’s market value is exceeding its book value (Walker, 2001).

According to Mutende et al. (2017), financial performance refers to a firm’s ability to achieve planned financial results as measured against its intended outputs. Financial performance is usually measured using financial ratios, such as ROE, ROA, return on capital, return on sales (ROS) and operating margin (Gilchris, 2013). Ratios provide a broader understanding of a company’s performance, since they are calculated from
information obtained from financial statements of a company. Thus, the emphasis of financial performance is mostly on variables related directly to financial report. The categories of ratios include: liquidity, activity, profitability, debt or solvency:

1. Liquidity ratios: measure the availability of cash to pay debt.
2. Activity ratios: measure how quickly a firm converts non-cash assets to cash.
3. Debt ratios: measure the firm's ability to pay long-term debt.
4. Profitability ratios: measure the firm use of its assets to generate the acceptable rate of return.
5. Market ratios: measure investors' response to owning a firm's stock and the cost of stock. They are concerned with the return on investment for shareholders.

4.4 Theoretical framework
The study is anchored on systems theory to explain the interaction of the external environment with the performance of the firm; and the RBV to explain how internal factors (firm characteristics) determine the outcome of the firm.

4.4.1 Systems theory. Nwachukwu (2006) defined a system as “a set of interrelated and interdependent parts arranged in a manner that produces a united whole.” Kühn (1974) considered a system as “any pattern whose elements are related in sufficiently regular way to justify attention.” Kühn (1974) extended the theory to include the fact that the knowledge of a part of a system facilitates the knowledge of another part. A system can either be controlled (cybernetic) or uncontrolled. A controlled system sensed information (detector), applies rules to take decision on what is sensed (selector) and makes some transaction or communication between the system (effector). According to Kühn (1974), the aim of decision (communication and transaction) between systems is to achieve equilibrium. A system can either be a closed system in which case interactions occur only between elements within the system and not with any system outside it, or an open system where interactions occur both within the system and outside it. Closed systems tend toward negative entropy with the likelihood of decaying due to the absence of exchanges with outside systems.

According to Laszlo and Krippner (1998), “Systems theory promises to offer a powerful conceptual approach for grasping the interrelation of human beings and the associated cognitive structures and processes specific to them in both society and nature.” It is “concerned with the holistic and integrative exploration of phenomena and events.” The term conveys “a complex of interacting components together with the relationships among them that permit the identification of a boundary-maintaining entity or process.” The general systems theory aims at looking at the entire world as a composite of co-existing, interacting and interrelating elements. This is not to undermine or downplay the value of studying units, subsystems or even systems within a larger context (a reductionist approach) as is done in specialization, but to place all disciplines within proper perspective of the whole.

4.4.2 Resource-based view (RBV). The RBV posits a link between firms' internal resources and performance (Denizel and Özdemir, 2006). According to RBV, the competitive advantage of a firm can be built on a firm's resources (Bharadwaj et al., 1993; Hunt, 1999) that meet some important conditions such as value, heterogeneity, rareness, durability, imperfect mobility, unsubstitutability, imperfect imitability and ex ante limits to competition (Cater, 2001). Barney (1991) further observed that a little amount of heterogeneity should certainly exist within different firms in order to be able to explain the observed performance differences between firms. Otherwise, all firms possessing identical resources would
conceive of and implement the same strategies and could only improve their effectiveness and efficiency to the same extent, ending up with no sustained competitive advantage or performance superiority (Denizel and Özdemir, 2006).

Lately, the RBV has focused on the relationship with environmental threats and opportunities (Barney, 1986, 1996; Mahoney and Pandian, 1992).

RBV lists four necessary attributes of firm resources that can generate sustained competitive advantages as follows:

(1) Being valuable (enabling a firm to conceive of and implement strategies that will improve its effectiveness and efficiency).

(2) Being rare (By this assertion RBV does not dismiss the importance of valuable but common resources. However, it claims that such resources can help to ensure a firm’s survival but cannot lead to competitive superiority for the firm).

(3) Being imperfectly imitable (due to unique historical conditions; causal ambiguity between the competitive advantage and the resource giving rise to it; and social complexity of the resource generating competitive advantage).

(4) Absence of strategically equivalent substitutes.

4.5 Review of empirical studies
4.5.1 Macroeconomic factors and firm performance. Issah and Antwi (2017) investigated the role of macroeconomic variables on firm’s performance in the UK. Multiple regression was used to analyze the data. They studied a total of 59 macroeconomic variables, subjected to principal component analysis for variable reduction. The full sample model showed adjusted $R^2$ value of 0.91, and the following variables were significant: lagged ROA; adjusted unemployment rate; benchmarked unit labor costs; real GDP and exchange rate. And five out of the six studied industries had significant $F$-values.

Owolabi (2017) examined the relationship between economic characteristics and financial performance in Nigeria. The economic characteristics were: government expenditure, inflation, interest rate and exchange rate. The sample comprised 31 manufacturing firms listed on the Nigeria Stock Exchange. The duration of the study was from 2010 to 2014. The effect of government expenditure, inflation, interest rate and exchange rate on EPS and ROA was not significant. Interest rate was significant for only ROE, while all the variables (government expenditure, inflation, interest rate and exchange rate) were significant for Tobin’s Q.

Mwangi and Wekesa (2017) examined the influence of economic factors on firm performance in Kenya. They study used a descriptive research design, and the sample comprised 74 staff working in Kenya Airways Finance Department. The economic factors were interest rate and taxation; the dependent variables of the study were efficiency and growth. The study used primary data. They used multiple regression technique in testing the hypotheses. They found that economic factors had significant effect on performance.

Rao (2016) examined the relationship between macroeconomic factors and financial performance in Nairobi. The sample comprised five firms listed under the energy and petroleum sector of the Nairobi Stock Exchange. The study was from 2004 to 2015. The study found a significant negative effect of interest rate and oil price on financial performance. However, GDP growth, exchange rate and inflation rate were not significant.

Otambo (2016) examined the effect of macroeconomic variables on financial performance of banks in Kenya. The duration of the study was from 2006 to 2015. ROA was used to measure financial performance while quarterly interest rates, quarterly exchange rates (USD/KSH), quarterly GDP and quarterly inflation rates were used to measure interest rates,
exchange rates, GDP and inflation rates. The study found that interest rates and exchange rates affect financial performance negatively while GDP affects financial performance positively. Inflation rates were not significant.

Udu (2015) examined the influence of environmental factors on business operations in Nigeria. The duration of the study was from 1981 to 2013. The variables studied were inflation rate, interest rate, unemployment rate, and exchange rate, and business operations proxied as real GDP was the dependent variable. Ordinary least squares method of analysis was employed to test the hypothesis. The study found that interest rate and unemployment rate were positive and significant.

Gado (2015) examined the impact of macro environment on performance in Nigeria. The sample comprised 20 most capitalized companies. The study used ordinary least squares and correlation. The results showed that collectively the macro-environmental variables have significant and positive impact on performance. Specifically, government expenditure and inflation have a positive impact while exchange and interest rate have a negative impact.

Murungi (2014) examined the relationship between macroeconomic variables and financial performance in Kenya. The sample comprised 46 insurance firms listed on Kenya Stock Exchange. The study duration was from 2009 to 2013. The data were analyzed using multiple regression. The study found that interest rate and GDP were statistically significant. Others such as inflation rate, exchange rate, money supply and size of assets were not statistically significant.

Kiganda (2014) examined the effect of macroeconomic factors on profitability of banks in Kenya. The study focused on Equity Bank. The studied macroeconomic factors were: real GDP, inflation and exchange rate. The study used the Cobb–Douglas production function transformed into natural logarithm and used annual data from 2008 to 2012. The results showed that the macroeconomic factors (real GDP, inflation and exchange rate) have insignificant effect on profitability of Equity Bank at 5 percent level of significance. The study focused on a single bank which limits the generalizability of the findings.

Ogunbiyi and Ihejirika (2014) examined the effect of interest rates on profitability of Deposit Money Banks in Nigeria. They used country-level aggregate annual data over a period of 13 years from 1999 to 2012. They employed multivariate regression analysis. The results showed that maximum lending rate, real interest rate and savings deposit rate have negative and significant effect on profitability of banks as measured by ROA at 5 percent level of significance. However, no significant relationship was found between interest rate and net interest margin of banks.

Osamwonyi and Michael (2014) investigated the impact of macroeconomic variables on profitability of banks in Nigeria from 1990 to 2013. They used pooled ordinary least squares (POLS) regression. The macroeconomic variables were: GDP, interest and inflation rate; profitability was proxied using ROE. The study reported a positive effect of GDP on ROE. Interest rate had a significant negative effect on ROE, while inflation was not significant at all levels of significance.

Enyioko (2012) examined the effect of interest rate policies on performance of banks in Nigeria. The sample comprised 20 banks that emerged from the consolidation exercise of 2004. They applied regression and error correction models to analyze the relationship. The study reported that interest rate policies have not affected the performance of banks significantly.

Izedonmi and Abdullahi (2011) studied the effect of three macroeconomic variables, i.e. inflation, exchange rate and market capitalization on the performance of 20 sectors of the Nigerian Stock Exchange (NSE) for the period 2000–2004. The study reported that the extent to which a factor affected the various sectors varied from one sector to another. Jointly the study found no significant influence of macroeconomic factors on the NSE.
Kandir (2008) investigated the effect of macroeconomic factors on stock returns in Turkey. The sample comprised all non-financial firms listed on the Istanbul Stock Exchange for the period 1997–2005. Macroeconomic variables in the study were: growth rate of industrial production index, change in CPI, growth rate of narrowly defined money supply, change in exchange rate, interest rate, growth rate of international crude oil price and return on the MSCI World Equity Index. Multiple regression was employed in data analysis. The study finds that exchange rate, interest rate and world market return affect all of the portfolio returns, while inflation rate is significant for only 3 of the 12 portfolios. On the other hand, industrial production, money supply and oil prices do not have any significant effect on stock returns.

4.5.2 Firm characteristics and firm performance. Dioha et al. (2018) examined the effect of firm characteristics on profitability in Nigeria. The sample consisted of 18 listed consumer goods companies for the period 2011–2016. Profitability was proxied by ROS, while firm characteristics were proxied by firm age, firm size, sales growth, liquidity and leverage. Multiple regression was used to analyze the data. The study found that size, sales growth and leverage have significant effect on profitability. However, age and liquidity were not significant.

Bist et al. (2017) examined the impact of firm characteristics on financial performance in Nepal. They studied 18 Nepalese insurance companies from 2008 to 2016. Multiple regression was used to analyze the data. The regression analysis showed that the coefficients of leverage and premium growth were positive and significant at 1 percent level. However, the coefficients of diversification, size, liquidity and claim payments were negative and insignificant.

Lasisi et al. (2017) examined the determinants of profitability of listed agricultural companies in Nigeria. The sample comprised four agricultural firms listed on the Nigeria Stock Exchange for the period 2008–2016. The independent variables were leverage, liquidity, sales growth and operating expenses efficiency. They analyzed the panel data using multiple regression technique. The study findings revealed that liquidity and sales growth have a positive and significant effect on profitability (ROE), leverage had a negative and significant effect on profitability, and operating expenses efficiency revealed an insignificant negative effect on the profitability. The study was, however, delimited to firms in the agricultural sector.

Mohammed and Usman (2016) examined the impact of corporate attributes on share price in Nigeria. The sample comprised five listed pharmaceutical firms for a period of 10 years (2004–2013). Multiple regression was used to analyze the data. They found that size, leverage and growth have a positive and significant impact on profitability.

Bhutta and Hasan (2013) examined the impact of firm-specific and macroeconomic factors on profitability of firms in Pakistan. The sample comprised firms listed on the food sector of Karachi Stock Market for the period 2002–2006. The firm-specific factors include debt to equity, tangibility, growth and size, and the macroeconomic factor was food inflation. They found a significant negative relationship between size and profitability, and an insignificant positive relationship between tangibility, growth, food inflation and profitability. Similarly, an insignificant negative relationship is observed between debt to equity ratio and firm profitability.

Chandrapala and Knápková (2013) studied the effect of firm-specific factors on financial performance in Czech Republic. The sample comprised 974 firms over the period 2005–2008, using data from Albertina database. They used pooled and panel designs for the analysis. They found that the firm size and sales growth had significant positive impact on ROA. However, debt ratio and inventory had significant negative impact on ROA.

Kaguri (2013) examined the relationship between firm characteristics and financial performance in Kenya. The sample comprised 17 life insurance companies over the period of
2008–2012. The studied firm characteristics were: size, diversification, leverage, liquidity, age, premium growth and claim experience of life insurance companies in Kenya. Regression analysis was used to analyze the data. All variables were found to be statistically significant.

Mehari and Aemiro (2013) examined firm-specific factors that determine performance in Ethiopia. The sample comprised nine insurance companies for the period 2005–2010. The firm characteristics were: size, leverage, tangibility, loss ratio (risk), premium growth, liquidity and age. Performance was proxied as return on total assets (ROA). The results of regression analysis revealed that size, tangibility and leverage were positive and statistically significant; however, loss ratio (risk) was negative and statistically significant. Premium growth, age and liquidity were statistically non-significant.

Similarly, Sumaira and Amjad (2013) examined determinants of profitability in Pakistan. The sample comprised 31 insurance firms (life and non-life insurance) from 2006 to 2011. The study found that leverage, size and age of the firm were significant determinants of profitability, while sales growth and liquidity were not significant.

Sambasivam and Ayele (2013) studied the performance of insurance companies in Ethiopia. The sample comprised nine listed insurance companies from 2003 to 2011. The firm-specific factors were: age, size, volume of capital, leverage, liquidity, growth and tangibility of assets, while profitability was proxied by ROA. They found that growth, leverage, volume of capital, size and liquidity were significant determinants of performance. While liquidity and leverage are negative, age and tangibility were not significant.

4.5.3 Macroeconomic factors, firm characteristics and firm performance

Rani and Zergaw (2017) examined bank-specific, industry-specific and macroeconomic factors on profitability of Ethiopian commercial banks. Profitability was proxied by ROE and net interest margin. They used secondary data from 2005 to 2015. Multiple regression was used to analyze the data. The study results showed that capital adequacy, management efficiency, earnings and liquidity ratios significantly affected ROE, while net interest margin significantly affected capital adequacy and earnings. The industry-specific variable proxied by industry growth rate had significant impact on net interest margin. All the macroeconomic factors (inflation, GDP, tax rate and exchange rate) had positive but insignificant impact both on ROE and net interest margin.

Ghareli and Mohammadi (2016) studied the effect of macroeconomic factors and firm characteristics on quality of financial reporting in Iran. The macroeconomic factors in the study were exchange rates, inflation rates, interest rates and GDP. The firm characteristics included working capital, size of firm and financial leverage. The sample comprised 91 firms listed on the Tehran Stock Exchange. The duration of the study was from 2005 to 2013. Multiple linear regression and Spearman correlation test were used to test the hypotheses. The results showed that exchange rate, interest rate and leverage were positive and significant, while GDP was negative and significant. Inflation rate was negative but not significant, while firm size was not significant.

Owoputi et al. (2014) examined the impact of bank-specific, industry-specific and macroeconomic factors on profitability of banks in Nigeria. They found that inflation rate was significant for both ROA and ROE. Interest rate was significant for ROA and NIM. The real growth rate of GDP was not significant. Among the bank-specific variables, size was found significant for the profitability measures: ROA, ROE and NIM.

Mirza and Javed (2013) examined macro and micro determinants of financial performance in Pakistan. The sample comprised 60 Pakistani firms listed on Karachi Stock Exchange for the period 2007–2011. The results showed that income per capita was significant and positive, inflation was significant but negative. Firm characteristics showed that debt to equity ratio was significant and positive, both short-term and long-term debt to
total assets was significant and negative. Firm size was significant and positive, while liquidity (current ratio) was significant but negative.

Riaz and Mehar (2013) investigated the impact of bank-specific variables and macroeconomic indicators on profitability of commercial banks in Pakistan from 2006 to 2010. The variables studied were: asset size, credit risk, total deposits to total assets ratio, interest rate (discount rate) and the profitability measures were: ROA and ROE. The sample included all 32 commercial banks. They employed regression for data analysis. They reported a significant impact of the bank-specific variables (asset size, total deposits to total assets and credit risk) and interest rate on ROE, while credit risk and interest rate had a significant impact on ROA.

Kanwal and Nadeem (2013) investigated the impact of macroeconomic variables on profitability of public limited commercial banks in Pakistan for years 2001–2011. They used POLS to examine the effect of three major external factors: inflation rate, real GDP and real interest rate on profitability indicators: ROA, ROE and equity multiplier (EM) ratios in three separate models. The study finds that there is a strong positive relationship of real interest rate with ROA, ROE and EM. Second, real GDP is found to have an insignificant positive effect on ROA, but an insignificant negative impact on ROE and EM. Inflation rate, on the other hand, has a negative link with all three profitability measures.

Charles (2012) investigated the performance of monetary policy on manufacturing sector in Nigeria, using econometrics test procedures. The result indicates that money supply positively affects manufacturing index performance while company lending rate, income tax rate, inflation rate and exchange rate negatively affect the performance of manufacturing sector.

Zeitun et al. (2007) examined macro and microeconomic determinants of corporate performance and failure in Jordan. The sample comprised 167 Jordanian companies from 1989 to 2003. The key macroeconomic indicators studied were nominal interest rate, changes in money supply, production manufacturing index, inflation, exports and availability of credit, including Islamic credit. They found that interest rate negatively and significantly affects firm performance measured by ROA. Both production manufacturing index and growth of Islamic credit facilities positively and significantly affected firm’s performance. The significant microeconomic variables were size, age and total debt to total assets.

5. Methodology
5.1 Research design
Research design refers to the arrangement of conditions for collection and analysis of data in a manner that aims to combine relevance to the research purpose with economy in procedure (Claire et al., 1962). The study made use of ex post facto research design. Kerlinger and Rint (1986) observed that an ex post facto investigation seeks to reveal possible relationships by observing an existing condition or state of affairs and searching back in time for plausible contributing factors. Ex post facto design is deemed appropriate for the study because the study is non-experimental, and seeks to investigate causal relationship between the dependent and independent variables of the study (Owolabi, 2017).

5.2 Population of the study
Population is defined as all the members of a real or hypothetical set of people, events or objects to which a researcher wishes to generalize the results of the study (Borg and Gall, 1989). The population of the study is made up of firms quoted on the floor of the NSE as at end of 2017. The number of firms included in the various sectors on the NSE is shown in Table II.
5.3 Sample size of the study

The study focused on firms in the consumer goods sector of the NSE. The study employed a variant of non-probability sampling, namely, the purposive sampling technique and included all the firms in the consumer goods sector into the sample.

List of consumer goods manufacturing companies (Nigerian Stock Exchange Website, 2017):

1. DN Tyre & Rubber Plc.
2. Champion Breweries Plc.
4. International Breweries Plc.
5. Nigerian Breweries Plc.
6. 7-Up Bottling Company Plc.
7. Dangote Flour Mills Plc.
8. Dangote Sugar Refinery Plc.
13. Union Dicon Salt Plc.
17. Vitafoam Nigeria Plc.
20. McNichols Plc.

<table>
<thead>
<tr>
<th>S no.</th>
<th>Sector</th>
<th>Number of firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Agriculture</td>
<td>5</td>
</tr>
<tr>
<td>2</td>
<td>Consumer goods</td>
<td>21</td>
</tr>
<tr>
<td>3</td>
<td>Conglomerates</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>Financial services</td>
<td>57</td>
</tr>
<tr>
<td>5</td>
<td>Health care</td>
<td>11</td>
</tr>
<tr>
<td>6</td>
<td>ICT</td>
<td>7</td>
</tr>
<tr>
<td>7</td>
<td>Industrial goods</td>
<td>15</td>
</tr>
<tr>
<td>8</td>
<td>Natural resources</td>
<td>4</td>
</tr>
<tr>
<td>9</td>
<td>Oil and gas</td>
<td>12</td>
</tr>
<tr>
<td>10</td>
<td>Services</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>163</td>
</tr>
</tbody>
</table>

5.4 Sources of data
The study employed secondary data. These are described as data previously obtained for purposes other than the present study. The sources utilized include annual financial reports, such as Statement of Comprehensive Income and the Statement of Financial Position, of the selected companies for the period 2011–2017. Secondary data for economic factors were obtained from the Statistical Bulletin of the CBN.

5.5 Technique of data analysis
The study employed multiple linear regression technique. This is a “statistical technique which analyses the relationship between a dependent variable and multiple independent variables by estimating coefficients for the equation on a straight line” (Hair et al., 2006). A multiple linear regression model was used to understand the relationships between the dependent variable and the independent variables (Malhotra and Birks, 2000).

5.5.1 Model specification. The model is stated in its implicit form below as follows:

\[
\text{ROA}_{it} = a + \text{IntR}_{t} + \text{InfR}_{t} + \text{ExcR}_{t} + \text{GDPR}_{t} + \text{Firm Size}_{it} + \text{Leverage}_{it} + \text{Liquidity}_{it} + \mu.
\] (1)

5.5.2 Robustness test

\[
\text{ROE}_{it} = a + \text{IntR}_{t} + \text{InfR}_{t} + \text{ExcR}_{t} + \text{GDPR}_{t} + \text{Firm Size}_{it} + \text{Leverage}_{it} + \text{Liquidity}_{it} + \mu.
\] (2)

5.5.3 Description of variables. The list below presents the description of variables included in the model:

1. Dependent variable:

   - ROA$_{it}$: measured as the proportion of net income to total assets in the period ($t$);
   - ROE$_{it}$: measured as the proportion of net income to total equity in the period ($t$); and
   - NPM$_{it}$: measured as the proportion of net profit to revenue in the period ($t$).

2. Independent variables:

   - IntR$_{t}$: measured as the official lending rate during a year;
   - InfR$_{t}$: measured as the annual change in the CPI;
   - ExcR$_{t}$: measured as the official exchange rate during a year;
   - GDPR$_{t}$: the variable is an indication of economic growth. Measured as the annual change in GDP;
   - Firm Size$_{it}$: measured as the natural logarithm of total assets in the period ($t$);
   - Leverage$_{it}$: measured as the proportion of debt to equity in the period ($t$); and
   - Liquidity$_{it}$: measured as the proportion of debt to equity in the period ($t$).

6. Data analysis
6.1 Descriptive statistics and model results
The descriptive statistics are shown in Table III. The number of observations was 146; while the $p$-value of the Jarque–Bera statistics showed that all variables were not normally distributed. The model’s degree of goodness of fit was estimated and evaluated using...
multiple coefficients denoted by $R^2$ and the adjusted $R^2$. $R^2$ is the square of this measure of correlation and indicates the proportion of the variance in the dependent variable that is explained by the independent variables in the model. However, the disadvantage of $R^2$ is that it tends to over-estimate the success of the model in some cases when applied to the real world, so an adjusted $R^2$ value takes into account the number of variables in the model and the number of observations is used (Ahmed, 2006). The $R^2$ value is 0.28; and the adjusted $R^2$ is 0.24; therefore the independent variables explain approximately 24 percent of the variation in the dependent variable (Table IV).

The $F$-statistic measures the statistical significance of the model; the $F$-value is 7.60 ($p < 0.05$); therefore, the model is statistically significant. The properties of both the standardized and unstandardized regression coefficients were used in assessing each independent variable (Issah and Antwi, 2017). The unstandardized coefficient measures the average change in the dependent variable associated with one unit change of the independent variable, holding other independent variables constant. Standardized

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>SE</th>
<th>t-Statistic</th>
<th>Prob.</th>
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</thead>
<tbody>
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<td>$C$</td>
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<td>0.204524</td>
<td>-1.269880</td>
<td>0.2063</td>
</tr>
<tr>
<td>Int$R_t$</td>
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<td>0.016894</td>
<td>-0.375893</td>
<td>0.7076</td>
</tr>
<tr>
<td>Inr$R_t$</td>
<td>0.009470</td>
<td>0.005263</td>
<td>1.799492</td>
<td>0.0741</td>
</tr>
<tr>
<td>Exc$R_t$</td>
<td>-0.000413</td>
<td>0.000457</td>
<td>-0.902177</td>
<td>0.3685</td>
</tr>
<tr>
<td>GDPR$R_t$</td>
<td>0.015564</td>
<td>0.000908</td>
<td>1.710709</td>
<td>0.0894</td>
</tr>
<tr>
<td>Firm Size$it$</td>
<td>0.013125</td>
<td>0.006829</td>
<td>1.922123</td>
<td>0.0567</td>
</tr>
<tr>
<td>Leverage$it$</td>
<td>0.059902</td>
<td>0.017021</td>
<td>3.390252</td>
<td>0.0006</td>
</tr>
<tr>
<td>Liquidity$it$</td>
<td>0.000678</td>
<td>0.000200</td>
<td>3.351398</td>
<td>0.0009</td>
</tr>
</tbody>
</table>

**Weighted statistics**

- $R^2$: 0.278248
- Adjusted $R^2$: 0.241638
- SE of regression: 0.423122
- $F$-statistic: 7.600210
- Prob. ($F$-statistic): 0.000000

**Unweighted statistics**

- $R$-squared: 0.052610
- Sum squared resid: 34.68503

**Source:** EViews 9

Table III.
Descriptive statistics of variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>SE</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>$C$</td>
<td>-2.359721</td>
<td>0.204524</td>
<td>-1.269880</td>
<td>0.2063</td>
</tr>
<tr>
<td>Int$R_t$</td>
<td>-0.006350</td>
<td>0.016894</td>
<td>-0.375893</td>
<td>0.7076</td>
</tr>
<tr>
<td>Inr$R_t$</td>
<td>0.009470</td>
<td>0.005263</td>
<td>1.799492</td>
<td>0.0741</td>
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<tr>
<td>Exc$R_t$</td>
<td>-0.000413</td>
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<tr>
<td>GDPR$R_t$</td>
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<td>0.0894</td>
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**Weighted statistics**

- $R^2$: 0.278248
- Adjusted $R^2$: 0.241638
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- $F$-statistic: 7.600210
- Prob. ($F$-statistic): 0.000000

**Unweighted statistics**

- $R$-squared: 0.052610
- Sum squared resid: 34.68503

**Source:** EViews 9

Table IV.
Panel EGLS (cross-section weights)
coefficient (also known as beta) measures the contribution of each independent variable on
the dependent variable.

6.1.1 Analysis of H1

H1. There is no significant effect of interest rate on ROA of consumer goods
manufacturing firms.

“List of consumer goods manufacturing companies” showed that interest rate had a
negative but non-significant effect on ROA ($t: -0.375893; p > 0.05$). The study therefore
rejects the alternate hypothesis and accepts the null of “no significant effect of interest rate
on ROA of consumer goods manufacturing firms.”

6.1.2 Analysis of H2

H2. There is no significant effect of inflation rate on ROA of consumer goods
manufacturing firms.

“List of consumer goods manufacturing companies” showed that inflation rate had a
negative but significant effect on ROA ($t: 1.799492; p < 0.10$). The study therefore rejects the
null hypothesis and accepts the alternate of “a significant effect of inflation rate on ROA of
consumer goods manufacturing firms.”

6.1.3 Analysis of H3

H3. There is no significant effect of exchange rate on ROA of consumer goods
manufacturing firms.

“List of consumer goods manufacturing companies” showed that exchange rate had a
negative but non-significant effect on ROA ($t: -0.902177; p > 0.05$). The study therefore
rejects the alternate hypothesis and accepts the null of “no significant effect of exchange rate
on ROA of consumer goods manufacturing firms.”

6.1.4 Analysis of H4

H4. There is no significant effect of GDP growth rate on ROA of consumer goods
manufacturing firms.

“List of consumer goods manufacturing companies” showed that GDP growth rate is
positive and had a significant effect on ROA ($t: 1.710709; p < 0.10$). The study therefore
rejects the null hypothesis and accepts the alternate of “a significant effect of GDP growth
rate on ROA of consumer goods manufacturing firms.”

6.1.5 Analysis of H5

H5. There is no significant effect of firm size on ROA of consumer goods
manufacturing firms.

“List of consumer goods manufacturing companies” showed that firm size is positive and
had a significant effect on ROA ($t: 1.922123; p < 0.10$). The study therefore rejects the null
hypthesis and accepts the alternate of “a significant effect of firm size on ROA of consumer
goods manufacturing firms.”

6.1.6 Analysis of H6

H6. There is no significant effect of leverage on ROA of consumer goods
manufacturing firms.

“List of consumer goods manufacturing companies” showed that leverage is positive and
had a significant effect on ROA ($t: 3.519396; p < 0.05$). The study therefore rejects the null
hypohesis and accepts the alternate of “a significant effect of leverage on ROA of consumer
goods manufacturing firms.”
6.1.7 Analysis of H7

H7. There is no significant effect of liquidity on ROA of consumer goods manufacturing firms.

“List of consumer goods manufacturing companies” showed that liquidity is positive and had a significant effect on ROA ($t: 3.390252; p < 0.05$). The study therefore rejects the null hypothesis and accepts the alternate of “a significant effect of liquidity on ROA of consumer goods manufacturing firms.”

6.2 Discussion of findings

The study explored the interrelatedness of macroeconomic factors, firm characteristics and financial performance. The macroeconomic factors showed inconsistent results; interest rate had negative but non-significant effect, while inflation rate had a negative and significant effect. Exchange rate was negative but non-significant, while GDP growth rate was positive and significant. The mixed results may partially be attributed to the proxy for financial performance used in a study. The study by Issah and Antwi (2017) in the UK found that real GDP and exchange rate were significant. Otambo (2016) in Kenya also reported that GDP positively affected ROA. Inflation rates were not significant. Owolabi (2017) in Nigeria showed that inflation, interest rate and exchange rate had no significant effect on ROA. The interest rate and exchange rate behavior were in line with the present study of non-significant effect. Similarly, Rao (2016) in Nairobi reported a non-significant effect of exchange rate on financial performance. Gado (2015) in Nigeria found a positive effect for inflation while exchange and interest rate had negative effects.

This is contrary to Mwangi and Wekesa’s (2017) study conducted in Kenya, which showed that interest rate had a significant effect on performance. And Rao (2016) in Nairobi reported a significant negative effect of interest rate on financial performance. But the GDP growth and inflation rate were not significant. Otambo (2016) in Kenya also reported a negative effect of interest rates and exchange rates on ROA; inflation rates were not significant.

The study by Udu (2015) in Nigeria which proxied business operations as real GDP found that interest rate had a positive and significant effect on real GDP. On a sample of Deposit Money Banks in Nigeria, Ogunbiyi and Ihejirika (2014) found that real interest rate has negative and significant effect on ROA. Also, Osamwonyi and Michael (2014) who measured profitability using ROE reported a positive effect for GDP and a significant negative effect for interest rate, while inflation was not significant. Contrary to this, Enyioko (2012) found that interest rate has not affected performance of banks significantly. In conclusion, the effect of macroeconomic factors on performance may be sector based. This supports the study by Izedonmi and Abdullahi (2011) that the extent to which a factor affected a particular sector varies from one sector to another.

In other African countries such as Kenya, the study by Murungi (2014) on a sample of insurance firms found that interest rate and GDP had significant effects on performance, while inflation and exchange rates were not statistically significant. This is contrary to the study by Kiganda (2014) conducted in Kenya but with a focus on Equity Bank, which reported that real GDP, inflation and exchange rate had insignificant effect on profitability. Similarly, Kandir (2008) investigating the effect of macroeconomic factors on stock returns in Turkey reported that exchange rate and interest rate affect all the portfolio returns, while inflation rate was significant for 3 out of the 12 portfolios.

The analysis of firm characteristics showed that firm size, leverage and liquidity had positive and significant effect. The study by Dioha et al. (2018) in Nigeria found that size and
leverage have significant effect on profitability; but liquidity was not significant. This is consistent with the study by Bist et al. (2017) in Nepal that showed that leverage had a positive and significant effect; but, size and liquidity were negative and insignificant. Chandrapala and Knápková (2013) in Czech Republic found that firm size has a significant positive impact on ROA. However, contrary to the present study, they found that debt ratio had significant negative impact on ROA.

Using firms from the agricultural sector the study by Lasisi et al. (2017) in Nigeria revealed that liquidity has a positive and significant effect on ROE, but leverage had a negative and significant effect on ROE.

The study by Mohammed and Usman (2016) in Nigeria showed that size and leverage have a positive and significant effect on share price. In Pakistan, the study by Bhutta and Hasan (2013) on firms listed on the food sector of Karachi Stock Market reported a significant negative relationship between size and profitability, and a positive insignificant relationship between food inflation and profitability. Also, debt to equity ratio had insignificant negative relationship.

Studies conducted on other sectors also show similar and mixed findings. Kaguri (2013) on a sample of life insurance companies in Kenya found that size, leverage and liquidity were statistically significant. On a sample of insurance companies in Ethiopia, Mehari and Aemiro (2013) revealed that size and leverage were positive and statistically significant; however, liquidity was statistically non-significant. Similarly, Sumaira and Amjad (2013) in Pakistan found that leverage and size were significant determinants of profitability, while liquidity was not significant. Sambasivam and Ayele (2013) in Ethiopia, which proxied profitability as ROA, found that leverage and liquidity were significant and negative.

The F-statistic which tests the significance of the model was significant ($p < 0.05$). Therefore, jointly macroeconomic factors and firm characteristics interact to determine firm performance. Studies such as Rani and Zergaw (2017) on the banking sector in Ethiopia showed that macroeconomic factors (inflation, GDP and exchange rate) had positive but insignificant impact on ROE. Earnings and liquidity ratios significantly affected ROE. An additional industry-specific variable proxied by industry growth rate had also a significant impact on net interest margin. Also, the study by Owoputi et al. (2014) on banks in Nigeria found that inflation rate was significant for both ROA and ROE. Interest rate was significant for ROA and NIM. The GDP growth rate was not significant. Size was significant for ROA, ROE and NIM. From an Islamic perspective, Zeitun et al. (2007) in Jordan found that interest rate negatively and significantly affects ROA. The significant microeconomic variables were size and total debt to total assets.

Riaz and Mehar (2013) in Pakistan reported a significant impact of asset size and interest rate on ROE; and interest rate had a significant impact on ROA. Kanwal and Nadeem (2013) found that there is a strong positive relationship of real interest rate with ROA, ROE and EM. Second, real GDP is found to have an insignificant positive effect on ROA, but an insignificant negative impact on ROE and EM. Inflation rate, on the other hand, has a negative link with all three profitability measures.

Using samples drawn from manufacturing firms, studies by Ghareli and Mohammadi (2016) on firms in Iran showed that exchange rate, interest rate and leverage had positive and significant effect, while GDP was negative and significant. Inflation rate was negative but not significant, while firm size was not significant. Mirza and Javed (2013) in Pakistan found that inflation was significant but negative. Leverage was significant and positive, firm size was significant and positive, while liquidity (current ratio) was significant but negative. Specifically, Charles (2012) in Nigeria reported a positive relationship between money supply and manufacturing index performance, while inflation rate and exchange rate had negative effect on the performance of manufacturing sector.
7. Conclusion and recommendations

7.1 Conclusion
The study was undertaken to explore the interrelationship between macroeconomic factors, firm characteristics and financial performance of manufacturing firms in Nigeria. Studies have shown that both micro and macro factors interact to determine the financial performance of a firm. While micro factors are under the control of management, the macro factors are outside the company and not under the control of management. The Nigerian economy has shown volatility in macroeconomic factors, such as exchange rate, inflation, interest rate, etc. These have hindered performance of manufacturing firms over time; however, firm performance also depends on interaction of such factors with firm characteristics. As decisions regarding financing and liquidity are purely within the ambit of the manager. This then calls for a need to provide evidence on the joint association between macroeconomic factors, firm characteristics and financial performance in developing countries.

7.2 Recommendations
The study makes the following recommendations:

1. managers should effectively consider interest rates in making borrowing decisions, as this may affect the cost of debt;
2. government should be wary of the prevailing inflation rate because of its negative effect on manufacturing capacity utilization;
3. government should endeavor to maintain a stable exchange rate to enable firms secure the needed resources from foreign countries;
4. the government and regulatory authorities should make sustainable effort at ensuring a sustainable GDP growth rate by providing policies which favor the growth of domestic manufacturing firms;
5. managers should seek efforts at expansion and diversification; this is because of the positive benefits of firm size on growth potential of a firm;
6. the leverage position of a firm should be adequately monitored by managers because a highly geared firm may experience a negative performance over time; and
7. the liquidity posture of a firm should be monitored by managers; emphasis on industry and across firm comparison may be used in monitoring the status of a firm in relation to competitors.

References


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Further reading


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