

Empirical Link between Macroeconomic Policy Variables and the Performance of Quoted Agro-Based Firms in Nigeria

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Abstract

This paper modeled the determinants of quoted agro-based firm's performance equation in Nigeria. Time series data employed in the analysis covered the period 2000-2012 and was obtained from Central bank of Nigeria. Data were analyzed using the Ordinary Least Square (OLS) regression technique. To ascertain for stationarity, Augmented Dickey Fuller (ADF) unit root test was conducted on the variables. Result revealed that while Energy consumption per capita (ENR_t), Install Capacity Utilization Rate (ICU_t), Total Commercial Bank credit to Small Scale Industries ($TCBC_t$), exerted significant positive impact on agro-based performance, exchange rate (EXR_t) impacted negatively on agro-based performance. This underscores the need to pursue policies that would improve energy production in the country, ensure proper funding of the sector and stabilizes exchange rate as the way out.

Keywords: agro-based firms; macroeconomic variables and performance

1. Introduction

The current problem of poverty and unemployment has undermined the capacity of the economy and Small and Medium Scale Enterprises are seen as mechanism for intervention to addressing these long term problem of the economy (UNDP, 2011). This accounts for the growing concern for the development of a strong small and medium scale sector as an engine for growth and development. Small Scale Industries are increasingly becoming the most vital part of the economy (Christianson, 2004). In Asia, China's economy was largely driven by Small Scale Industries; the Philippines also invested in small scale businesses too (Gungen, 2003). In Western Europe, Small Scale Industries accounted for 99.8% of all enterprises and 66.2% of employment in 2004 (Christianson, 2004). Also in the U.S, small businesses represent more than 99.7 percent of all employers, employ more than half of the private sector employees, pays about 44.5 percent of total private pay roll, generate 60-80 percent non-farm private GDP and supplied 22.8 percent of total values of Federal private contracts in 2001 (Gramlich, 1999). In terms of the number of enterprises,

it represents about 90 percent of the Industrial sector of Nigeria but ironically contributes a minute one percent to Gross Domestic Product (GDP) (NIPC, 2002).

Undoubtedly, agro-based firms are integral part of Small Scale Enterprises. They are critical tools for conflict mitigation and have proven to be useful in fostering recovery through vocational trainings, job creation, re-opening of businesses and livelihood rehabilitation (NBS/FMARD, 2012). For agro-based firms to thrive, the operation of extension services, provision of other appropriate support system to the extension services and enabling environment is indispensable (Onwumere & Ige, 2010). This in addition to its profitability would ensure full maximization of their potentials. The profitability of agro-based firm is important for several reasons. First, they are sources of employment for the teeming population. CBN (1990) reported that Small Scale agro-based Enterprises have higher capacity to generate employment in Nigeria than large enterprises. Also, as reported by Ojiambo (1995) and Madlay (1995), agro-based firms increase employment choices available to individuals through better extension services, education, trainings, health, nutrition. Secondly, they are major foreign exchange earners to the economy. For instance, early manufacturing activities before Independence were limited to semi-processing of primary agricultural products. Agro-based firms that dominated the manufacturing platform were vegetable oil extraction, refining plant, starch making, tobacco, pottery, raffia craft, mat making, wood carving and saw milling (Eze, 2007). During this period, precisely in 1960, Nigeria had 60% of global oil palm export, 20-30% of global groundnut export and 15% of global cocoa export, respectively (CBN, 2011). Lastly, in Nigeria, for instance, the rural farmer and her household who supplies the bulk of resources used by agro firms depends mostly on these firms for their wages, employment, processed products and other basic infrastructure that are rendered through backward integration as well as Corporate social responsibilities. Since the number of people engaged by agro-based firms is both directly and indirectly substantial, the profitability of agro firms would have a positive multiplier effect on the farmer, his household and the entire economy. Hence, no meaningful growth can occur in the economy without the profitability of agro-based firms. As a result of their enormous contribution to the growth and development of several economies, they are aptly referred to as “the engine of growth and catalyst of socioeconomic transformation of any country” (Onwumere, 2008).

In spite of these laudable potential of agro-based firms, this important sector of the economy has been neglected since the oil boom days (Ogen, 2007). For instance, according to the Report on the Third Nigerian Economic Summit (1996), there are about 650 agro-based firms in Nigeria, with all of them operating below 30 percent capacity. Most of them were forced to scale down their operation or close down due to high capital or production costs as well as low returns on investment (Folawewo & Olakojo, 2010). A peep into Table 1 which presents the trend in Profit after Tax (PAT) of selected agro quoted firms in Nigeria between 2004 and 2010 revealed that the firms were characterized by fluctuating and declining profit after tax. From the table 1, Profit after Tax of P.S Madrides and FTN cocoa increases from ₦ 17,931 and ₦ 4,983 in 2004 to ₦ 34,856 and ₦ 96,027 in 2008 and fell to ₦ 8,520 and ₦ 63,649 in 2010. For Livestock feeds and Cadbury, Profit after Tax increases from ₦ 4,983 and ₦ 1,207,344 in 2004 to ₦ 238,167 and ₦ 1,401,333 in 2005 and fell again to ₦ 28,304 and ₦ 1,180,587 in 2010. For UTC Limited, Profit after Tax increases from ₦ -74,115 in 2004 to ₦ 93,251 in 2008 and fell to ₦ 79,802 in 2010. Apart from Okumu oil, Presco Plc and Nestle Food Plc who's Profit after Tax increases from ₦ 664,342, ₦ 606,432 and ₦ 3,935,495 in 2004 to ₦ 1,629,456, ₦ 1,093,030 and ₦ 12,602,109 in 2010, others have been recording a fluctuating trend. This translates itself into declining earnings per share (EPS) as visible in Table 2. As presented in the Table 2, apart from Livestock feeds, Okumu oil and UTC where earning per share (EPS) increased from -20kobo, 209 kobo and -7 kobo in 2004 to 2.49 kobo, 342 kobo and 6 kobo in 2010, others such as P. S Madrides, Presco Plc, Cadbury and Nestle Food Plc showed declining trend. This is capable of having a negative multiplier effect on the farmer's wages and his household who produces the bulk of resources used by the agro-based firms. Beyond this, majority

of these firms would either go into liquidation or downsize their staff strength, thereby further compounding the unemployment problem and depriving the country of the huge foreign exchange that would have accrued to the government through exportation of agro based products.

Other reasons adduced for the poor performance of agro-based firms in Nigeria are: poor access to finance (Onwumere, 2008; Ajakaiye, 1985), unplanned capital structure (Bassey, Asinya, & Amba, 2014b). Apart from the aforementioned factors, the performance of agro-based firms is also subject to the effect of macroeconomic stability such as volume of credit to the sector, install capacity utilization rate, Inflation rate etc. Numerous studies have been carried out on firm performances in Nigeria (Bassey, Asinya, & Amba, 2014a; Bassey *et al.*, 2014b; Chinaemerem & Anthony, 2012; Akeem, Edwin, kiyanjui, & kayoed, 2014). However, not much has been done on the performance of agro-based firms in Nigeria. Therefore, considering the enormous role of agro-based firms in the economic development of several countries of the world, this study assesses the impact of macroeconomic policy variables on the performance of agro-based firms in Nigeria.

Table1. Trend in Profit after Tax of selected Quoted Agro based firms in Nigeria 2004 – 2010 (Naira)

Firm/Year	2004	2005	2006	2007	2008	2009	2010
P.S Madrides	17,931	17,190	8,368	6,206	34,856	21,342	y
FTN cocoa	4,983	4,834	16,310	142,770	196,027	259,659	63,649
L/S Feeds	4,983	238,167	748,424	36,670	45,741	29,948	28,304
Multi-Trex	-	222,040	(135,594)	146,404	557,650	(347,684)	224,863
Okumu oil	664,342	701,307	395,731	139,794	1,207,460	549,524	1,629,456
Presco Plc	606,342	340,682	216,870	37,251	814,633	239,427	1,093,030
Cadbury	1,207,344	1,401,333	(4,665,167)	(721,305)	(2,689,742)	(1,239,571)	1,180,587
Nestle Foods	3,935,495	5,303,128	5,660,329	5,441,899	8,331,599	9,783,578	12,602,109
UTC	(74,115)	82,651	52,561	37,565	93,251	74,768	79,802

Note: Figures in brackets signifies losses; y signify delisted

Source: Computed from the Nigerian Stock Exchange Fact Book (2011)

Table 2. Trend in Earning per Share for selected listed Agro based firms in Nigeria 2004 – 2010 (Kobo)

Firm/Year	2004	2005	2006	2007	2008	2009	2010
P.S Madrides	44	43	20.9	15.5	76.9	53.4	y
Livestock	(20)	(20)	62.37	0.69	2.89	3.81	2.49
Multi-Trex	0	1110	41	73	18.6	(9.3)	6.04
Okumu oil	209	221	124	29	253	115	342
Presco Plc	121	68	43	7	81	24	110
Cadbury	255	246	(424)	(66)	(244)	84	38
Nestle Foods	726	1004	1071	879	126	148	191
UTC	(7)	7	5	3	8	6	6

Note: Figures in brackets signifies negative earnings per share; y signifies delisted

Sources: Computed from the Nigerian Stock Exchange Fact Book (2011)

2. Methodology

2.1. Data Collection

Secondary data collected from a sample of eighteen agro-based firms that has been listed in the Nigeria Stock Exchange for the period 2002-2012 was used for the study. The selected agro-based

firms were; Nigerian Breweries, UAC of Nigeria Plc, Guinness Nigeria Plc, Okumu oil, Chelleram Plc, Nestle food Plc, Cadbury Nigerian Plc, Flour Mills Plc, Presco Nigeria Plc, International Breweries Plc, Livestock feeds Plc, Okitipupa Plc, Ferdinand Oil Mills Plc, Champion breweries Plc, Ellah lakes Plc, P. S Madrides, Afprint Plc and UTC Plc respectively.

Data were obtained from the Nigerian Stock Exchange Fact Book and Annual Statements of Accounts of the sampled firms. Data on the macroeconomic policy variables were obtained from various issues of the Central Bank of Nigeria Statistical Bulletin, Annual Report and Statements of Account of Central Bank of Nigeria (CBN) of various years. The selected agro-based firms were; Nigerian Breweries, UAC of Nigeria Plc, Guinness Nigeria Plc, Okumu oil, Chelleram Plc, Nestle food Plc, Cadbury Nigerian Plc, Flour Mills Plc, Presco Nigeria Plc, FTN cocoa processors, Livestock feeds Plc, Okitipupa Plc, Big treat, Champion breweries Plc, Ellah lakes Plc, P. S Madrides, Afprint Plc and UTC Plc respectively.

2.2. Model Specification

The research employed econometric model of Ordinary Least Square (OLS) regression analysis to analyze those variables that affect the performance of agro listed firms in Nigeria. The generalized form of the multiple regression models is specified as:

$$Y = \alpha + \sum \beta X + e \quad (1)$$

Where

- Y = Profitability of the firms and represents the dependent variable in the model;
- α is the constant intercept of the equation;
- β represents the coefficients for the explanatory variables in the estimated model;
- X is the vector of explanatory variables in the estimation model;
- e is the error term;
- Σ is the summation sign.

Accordingly, we express profitability as a function of macroeconomic policy variables in our model as;

$$FPM_t = f (ENR_t, GEXP_t, ICU_t, TCBC_t, IFR_t, EXR_t, EXTD_t) + \mu \quad (2)$$

It is stated econometrically in line with the method of Smirlock (1985) and Al-Karasneh, Cadle, and Ford (2000) as follows:

$$\begin{aligned} \text{LogFPM}_t = & b_0 + b_1 \text{logENR}_t + b_2 \text{logGEXP}_t + b_3 \text{logICU}_t + b_4 \text{logTCBC}_t + \\ & b_5 \text{IFR}_t + b_6 \text{EXR}_t + \text{EXD}_t + \mu \end{aligned} \quad (3)$$

Where

- FPM_t = Firm performance measured as Net Profit after Tax of agro-based firm in period t;
- ENR_t = Index of energy consumption (1990=constant) proxy for infrastructure availability t;
- $GEXP_t$ = Government capital expenditure on agricultural sector in period t (Million naira);
- ICU_t = Install capacity utilization rates of manufacturing sector in period t;
- $TCBC_t$ = Total commercial bank credit to small and medium scale enterprises in period t;
- IFR_t = Inflation volatility measured as annual inflation rates (%) in period t;
- EXR_t = nominal exchange rate of ₦/\$ in period t;
- $EXTD_t$ = External debt as a ratio of GDP in period t;
- μ = Stochastic error term.

2.3. Estimation Procedure

Analysis was carried out using Econometric software (E-View 7.1). The estimation procedure employed was:

(i). Unit Root Test

It has been known that a large number of time series data use in econometric analysis are non-stationary meaning they have the tendency to either decrease or increase over time. Engle and Granger (1987) and Philips (1986) averred that such data if use for regression analysis would lead to spurious regression. Regressions involving stationary variables in levels often display order serial correlation resulting in spurious results. Therefore, in order to test for stationarity of the variables, an Augmented Dickey Fuller (ADF) test was used to carry out the unit root. The ADF test minimizes autocorrelation in the error term since it involves the first difference in lags and captures additional dynamics left out by the DF thereby ensuring that the error term is distributed as white noise. The test formula for ADF is shown as;

$$\Delta Y_t = \alpha + \rho Y_{t-1} + \sum_{i=1}^j Y \Delta Y_{t-i} + U_t \quad (4)$$

Here the lag length j chosen for ADF ensure U_t is empirical white noise. The significance of ρ is tested against the null that $\rho = 0$ based on the t statistics obtained from the OLS estimated in equation (3). If the null hypothesis of non stationarity cannot be rejected, the variables are difference till they become stationary, that is, till the existence of a unit root is rejected. The next step was to carry out a granger causality test, the procedure which is discussed below.

3. Findings and Discussion

3.1. Unit Root Test for Variables Use in the Analysis

In order to ascertain the stationarity of variables employed in the study, The ADF test was carried out. The test statistics for each variable in level and first difference are presented in Table 3. Result revealed that while government expenditure, inflation rate and external debt were stationary at levels, energy consumption per capita, Install capacity utilization rate, Total commercial Bank credit to agro-based firms and Exchange rate were stationary at first difference.

Table 3. Result of Unit Root test for variables used for the Analysis

Variable	Augmented Dickey- Fuller		OT
	Level	First Difference	
Ln FPM _t	-4.021**	-	1(0)
Ln ENR _t	-2.054	-5.582***	1(1)
Ln GEXP _t	-4.936***	-	1(0)
Ln ICU _t	-1.478	-4.922***	1(1)
Ln TCBC _t	-1.223	6.930***	1(1)
Ln IFRT _t	-3.585**	-	1(0)
Ln EXR _t	-2.236	5.265** *	1(1)
Ln EXTD _t	-3.647**	-	1(0)
1%	4.20	4.21	
5%	-3.51	-3.52	

Note: OT means order of integration. Critical values (CV) are defined at 1% and 5% significant levels and asterisks

** ,*** represent 5% and 1% significance levels. Variables are as defined in equation (3)

3.2. Testing for the Short and Long-Run Relationship

After ascertaining the stationarity of the variables, an attempt was made to carry out a cointegration test and estimate the error correction model. This was, however, not possible because of the small number of observation, so we proceeded to carry out the Ordinary Least Square (OLS) regression analysis, the result which is reported in section 3.3 below

3.3. Regression Result of Determinants of Profitability

In Table 4 the result of the diagnostic test carried out to ascertain the effect of the explanatory variables on the performance of agro-based firms in Nigeria is presented. The model revealed the R^2 value of 0.6864, showing that the specified explanatory variables explain about 68.64 percent of the adjusted total variation in the profitability of the sampled agro-based firms. Fstat value of 49.51 is significant at 1 percent level of probability level, denoting the goodness of fit of the estimated equation. Also, the Durbin Watson statistics of 1.996 indicates the absence of autocorrelation in the estimated equation. The Normality (9.64) and RESET (3.81) tests were significant showing that the functional form is not mis-specified. It also shows the appropriateness of the OLS regression technique adopted. The Durbin Watson (DW) statistics (1.996) close to two shows the absence of serial auto correlation in the model.

Result revealed that the coefficient for Energy consumption per capita which was used as a proxy for availability of infrastructure has a significant negative correlation with the performance of agro-based firms. From the result, unit increase in energy used by agro-based firms in production will increase their performance by 8.445 units. This shows the importance of electricity in agro-based production. This result is at variance with Akpan, Vincent, and Bassey (2012) in the cassava subsector.

The coefficient for install capacity utilization rates (ICU_t) exerted a significant positive impact on the performance of agro-based firms at the 5% level. This entails that increasing the install capacity utilization rate of agro-based firms by 1 unit will increase their performance by 17.561 units. This finding is in order because increase in capacity utilization would invariably increase the output of agro-based investors. Bassey *et al.* (2014a) and Akpan *et al.* (2012) reported similar results on their study in Industrial and cassava subsector respectively.

The coefficient for total commercial bank credit to Small Scale Industries (TCBC_t) shows a positive and significant relationship with agro-based performance at the conventional 5% level of probability. This shows that increasing credit to agro-based sector would increase their performance by 0.2472. Omojimite (2012) reported a positive significant relationship between credit and agricultural sector performance while Obamuyi, Edun, and Kayode (2012) obtained similar results in the manufacturing sector of Nigeria. However, Bassey *et al.* (2014a) reported a contrary result in his study on industrial output in Nigeria. Olutunla and Obamuyi (2008) also found interdependence between small and medium enterprises profitability and bank loans.

The exchange rate coefficient (EXR_t) was negative and significant at the 5 percent level. This implies that an increase in exchange rate would decrease the performance of agro-based firm. This is expected because a rise in price of foreign currency against their domestic counterpart would in addition to reducing productivity increase the domestic prices of imported goods. This finding is consistent with those of Ehinomen and Oladipo (2012) and Bassey *et al.* (2014a) on their studies on manufacturing and industrial sectors of Nigeria, respectively.

The coefficients for inflation rate (INF) and government capital expenditure (GEXP) were insignificantly related to agro-based performances respectively. With respect to the sign of coefficients, while inflation rate had a negative relationship, that of government expenditure exhibited a positive relationship with agro-based firm's performance. The negative relationship of inflation rate is expected in that firms tend to produce less during inflationary periods that are

characterized by high cost of raw material. Narayan, Narayan, and Smyth (2009) and Andreou, Pelloni, and Sensier (2008) reported similar findings between inflation rate and agricultural performance in Nigeria. Also, the positive and non-significant relationship of government expenditure shows that government expenditure in the agro-based sector has not been encouraged. Bassey *et al.* (2014a) and Bassey *et al.* (2014b) on their studies in industrial and small scale sectors of Nigeria reported similar findings.

Table 4. OLS regression result for relationship between agro-based firm's profit and some Macroeconomic Policy variables in Nigeria

Variable	Estimate coefficient	Standard Error	t-statistics
Constant	-39.197	62.264	0.6295
LogENR _t	8.445	4.432	1.905*
LogGXP _t	1.1452	0.8126	1.409
LogICU _t	17.561	6.674	2.631**
Log TCBC _t	0.2472	0.0592	4.176***
LogIFR _t	-1.7035	2.0361	-0.8366
LogEXR _t	-1,8251	0.7619	-2.395**
EXDT _t	-0.1963	0.1771	-1.1084

Diagnostic statistics

$R^2 = 0.6864$

Adjusted $R^2 = 0.6635$

DW = 1.996

Fcal = 49.51

Akaike Criterion = 196.84

Schwartz Criterion = 243.15

Hanan-Quinon Criterion= 212.44

Dependent Variable: PROF

Note: Asteriks, ***, ** and * represent 1%, 5% and 10 % . Variables are as defined in equation (3)

4. Conclusion

In this paper the impact of macroeconomic policy variables on the performance of agro-based firms has been analyzed. From the findings, the performance of the sector has been positive and significantly influenced by Energy consumption per capita, install capacity utilization rate, total commercial bank credit to the economy, while exchange rate impacted negatively on agro-based performance. However, inflation rate and government expenditure fails to significantly explain the variation in agro-based performance. The failure of government expenditure in explaining the variation in agro-based performance point to the fact that government involvement in the sector in terms of funding has not been satisfactory. Hence, the paper concludes that the major macroeconomic factors that positively affected the performance of the agro-based firms under investigation were energy consumption per capita, install capacity utilization rate and total commercial bank credit to the economy.

5. Recommendations

Based on the findings of the study the following policy recommendations are offered:

- (i) There is need to adopt measures that would improve the energy production in the country. This will enhance the capacity utilization rates of agro-based firms and the economy in

- general. Measures such as improvement in the erratic power supply and reduction in electricity tariff can be of help. The recent privatization of the power sector was a welcome development but attention should be directed towards reducing the high tariffs and crazy monthly bills charged by the electricity suppliers.
- (ii) Also, proper funding of the sector should be carried out by government. Financial institutions should be called upon to supplement government effort. This can be achieved through timely disbursement of credit to the sector at reduced interest rates. The recent move by Central Bank of Nigeria to create a pool of low interest, long term funds to agro-investors is a right step in the right direction. However, specialized units with effective monitoring procedure should be establish in banks to monitor and ensure that such funds allocated to agro-based sector under the scheme through the participatory banks are disbursed to beneficiaries timely and at the Central Bank of Nigeria approve rates and condition.
 - (iii) Lastly, policies that would promote macroeconomic stability should be pursued. Such policies should be directed towards stabilizing the exchange rate and keeping inflation under control. The recent devaluation of naira against the dollar is capable of impacting negatively on the economy and should be addressed

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