IMPACT OF EXCHANGE RATE AND INFLATION ON CAPITAL ALLOCATION TO AGRICULTURE IN NIGERIA

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ABSTRACT

This study examined the impact of exchange rate and inflation on capital allocation to agriculture in Nigeria. The data for this was elicited from the publication of the central bank of Nigeria and Nigerian Bureau of statistics from 1975-2012. The study employed trend analysis, multiple regression analysis and correlation analysis. Decomposition Method was used with additive and multiplicative Model to identify the trend cycle and seasonal analysis in the variables. The OLS regression estimate was used to examine the effect of exchange rate and inflationon the capital allocation to agriculture in Nigeria. The Pearson correlation was used to examine the nature of the relationship between the variables. From the analysis, the exchange rate and capital allocation to agriculture is expected to increase in the near future while the inflation rate is expected to decrease in the near future. It was observed that the exchange rate has a positive effect on capital allocation while inflation has a negative effect on the capital allocation to the agriculture sector. It is therefore recommended that policy makers should check the increasing inflation rate, maintain a favorable exchange rate and increase agricultural capital allocation in order to enhance agriculture productivity and food security.

KEYWORDS: *Exchange rate, Inflation, Capital allocation, Agriculture, Nigeria.*

INTRODUCTION
Exchange rate is an important macroeconomic policy instrument. Changes in exchange rates have powerful effects on tradable and non-tradable of countries concerned through effects of relative prices of goods and services. The importance of exchange rates in influencing inflation rates cannot be overemphasized and this makes policy makers worry about the behaviour of both nominal and real exchange rates and also have active interest in their determination **Bobai et al,(2013)**. Also Obadan, (2007) opined that the choice of an exchange rate regime coupled with the right level of the exchange rate tends to be perhaps the most critical decision in an open economy because of the impact of the exchange rate on economic performance, resource allocation, the wealth of citizens, standard of living, income distribution, the balance of payment and other economic aggregates.

Food and Agricultural Organisation (FAO) recommends that 25 per cent of government capital budget be allocated to agricultural development. This has not been achieved by the various administrations in Nigeria, thereby affecting government programmes and policies for the sector (Iganiga and

Unemhili, 2011). Nigeria has also consistently failed to reach the 10 per cent agriculture budget standard of the Maputo declaration, which has led to negative implications for food security (Ochigbo, 2012).

In Nigeria, agriculture remains the mainstay of the economy since it is the largest sector in terms of its share in employment (Philip, Nkonya, Pender and Oni 2009). In an effort to diversify her oil base economy, Nigeria is placing much emphasis on financing other sectors most especially agricultural sector, since agriculture has the potential to stimulate economic growth through provision of raw materials, food, jobs and increased financial stability. The present government of President Jonathan in Nigeria has embarked on an agricultural transformation agenda that, as spelt out by Tijani (2011), involves value chains of prioritized commodities that would provide more income to farmers, processors, and marketers; and provide opportunities for both local and foreign direct investment into the agricultural sector; thereby ensuring food security, poverty reduction and job and wealth creation. Therefore, the agricultural agenda is invariably aimed at enhancing economic growth in Nigeria, and this call for the assessment of the relationship between government expenditure in financing agriculture and economic growth and its implication for the transformation agenda of Nigeria.

Several factors have been identified to enhance or retard growth in the agricultural sector. These factors include education (Huffman 1949; Pudasaini 1983; Aheam et al. 1998; Weir 1999), infrastructure (Querioz and Gaultam 1992; Gopinath and Roe 1997; Yee et al. 2000 and Venk Atachalam 2003) and inflation (Johnson 1980; Bullard and Keating 1995; Andres and Hernando 1997; Gokal and Hanif 2004). Others are credit to the sector and rainfall.

Therefore, despite myriad impact studies that have been undertaken to understand the relationship between government expenditure and exchange rate regimes together with inflation in Nigeria, it is worth noting that most of these studies disaggregate the sectors of the economy from the few sector-specific studies, with none of the sectors specific studies solely addressing agricultural. In view of the foregoing, this study was designed to carry out a sector-specific study on the impact of exchange rate and inflation on allocation to agricultural sector of Nigeria.

Methodology

This study was carried out in Nigeria and it used principally secondary data obtained from the Central Bank of Nigeria and Bureau of Statistics for a period 1975–2015. The study employed time series analysis, multiple regression analysis and correlation analysis. Decomposition Method was used with additive and multiplicative Model to identify trend cycle and seasonal analysis.

Decomposition procedures are used in time series to describe the trend and seasonal factors in a time series. One of the main objectives for decomposition is to estimate seasonal effects that can be used to create and present seasonally adjusted values. A seasonally adjusted value removes the seasonal effect from a value so that trends can be seen more clearly.

The multiple regression analysis is stated as;

$$y = b_0 + b_1 x_1 + b_2 x_2 + e_i$$

$Y =$ *capital allocation to the agricultural sector*
$x_1 = $ *inflation rate*
$x_2 = $ *exchange rate*
$e = $ *error term*
$b = $ *coefficients*

The Pearson correlation analysis is stated as
$rxy = n \quad x y) (x)(y)/$

$(n x^2(x)^2)(ny^2 - (y)^2$

r = correlation coefficient
y = capital allocation to the agricultural sector
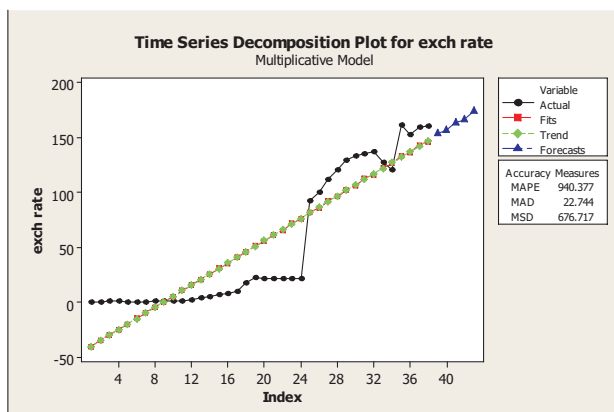$x_1 =$ inflation rate
$x_2 =$ exchange rate

Results and Discussion
Trend analysis

The results consider the trend in the exchange rate, inflation and capital allocation to the agricultural sector. Chart 1 which presents the trend in the exchange rate of the nation from 1975-2015 indicates that the exchange rate of Nigeria maintained a stable trend from 1975 -1987, his finding is consistent with the findings of Bobai et al (2013) that prior to the oil boom of the early 80's that the Naira exchange rate was stable. The exchange rates experienced a marginal increase in 1991 and sharp increase in 1999. The exchange rate of Nigeria was found to maintain a linear positive trend. The Mean Absolute Percentage Error (MAPE) which measures the rate of accuracy of the fitted time series indicates the fitted time series 940.377 accurate, the Mean Absolute Deviation (MAD) which expresses accuracy in the same unit of the data indicates 22.74 accuracy while, Mean Squared Deviation (MSD) indicates that the trend is 676.717 accurate. The trend suggests an increase in the exchange rate in the near future.

## Chart : trend analysis of exchange rate

Source: CBN statistical bulletin various issues

Chart 2 which presents the trend analysis of the inflation rate of Nigeria from 1975-2015, indicates a negative linear trend. The actual value of the inflation rate indicates that a zigzag pattern, which show that the inflation rate in Nigeria have not been stable. The inflation rate was found to reach its peak in 1995; this is still in line with the findings of Bobai et al (2013), where they found that the Structural Adjustment Program led to hyper inflation. The Mean Absolute Percentage Error (MAPE) which measures the rate of accuracy of the fitted time series indicates the fitted time series 92.598 accurate, the Mean Absolute Deviation (MAD) which expresses accuracy in the same unit of the data indicates 12.993 accurate while Mean Squared Deviation (MSD) indicates that the model is 301.775 accurate. The trends suggest a decrease in the inflation rate of Nigeria in the near future.

Chart 2: trend analysis of inflation rate
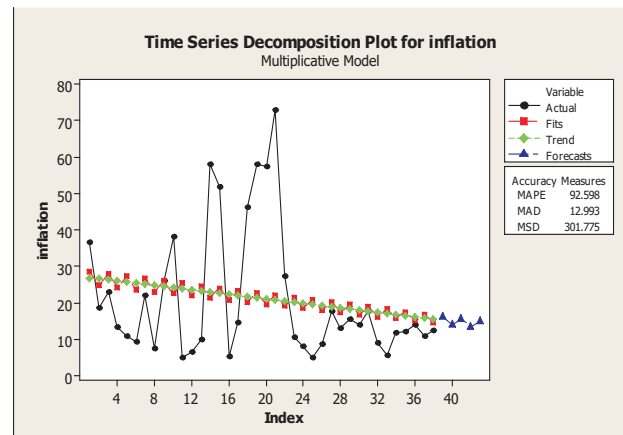
Source: CBN statistical bulletin various issues

Chart 3 presents the trend in the capital allocation to the agricultural sector of Nigeria from 1975 – 2015. The capital allocation to the agricultural sector was low and relatively stable from 1975- 1999. The capital allocation to the agricultural sector was high in 2007 and dropped in 2011. The trend of the capital allocation was positive and linear and the capital allocation is expected to increase in the near future. The Mean Absolute Percentage Error (MAPE) which measures the rate of accuracy of the fitted time series indicates the fitted time series 7008 accurate, the Mean Absolute Deviation (MAD) which expresses accuracy in the same unit of the data indicates 10852 accuracy while, Mean Squared Deviation (MSD) indicates that the model is 2079 accurate.

Chart 3: trend analysis of capital allocation to the agricultural sector
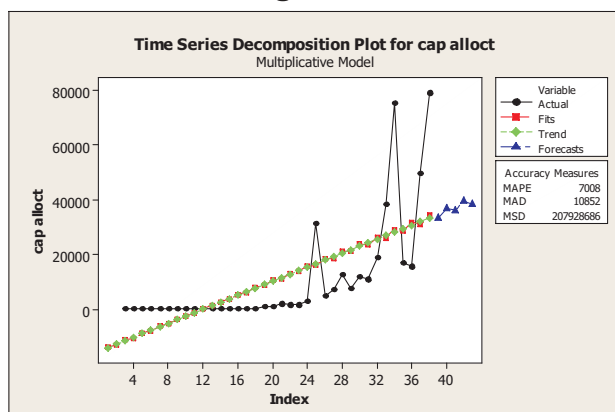
Source: CBN statistical bulletin various issues

The impact of exchange rate and inflation rate on the capital allocation to agricultural sector

The regression model is statistically fit and significant at 1 percent, indicating that the null hypothesis of no significant effect was rejected. The R square value indicates that 47.4 percent of the total variation in the dependent variable was accounted for by the independent variables included in the model.

Exchange rate was statistically significant at 1 percent and positive related to capital allocated to the agricultural sector. This implies that an increase in the exchange rate of naira to the dollar will result to an increase in the capital allocation to the agricultural sector. A favourable exchange rate implies that the demand for the Naira has increased due to increased export and gross domestic product (Oyejide, 1986). The inflation rate was statistically insignificant but with a negative coefficient. By implication the increase in the inflation rate results to a decrease in the capital allocation to the agricultural sector by 6.9 percent while an increase in the exchange rate result to a 21.2 percent increase in the capital allocation to the agricultural sector.

The regression equation result is:
Cap alloct = 281 - 69 inflation + 212 exch rate
(0.06) (-0.47) (4.98)

S = 14951.5   R-Sq = 47.4%   R-Sq(adj) = 44.2%
F= 14.85

The correlation between capital allocation to the agricultural sector, inflation rate and exchange rate.

The result of the Pearson correlation between the capital allocation to the agricultural sector, inflation and exchange rate indicates a weak negative significant (10%) relationship between inflation rate and the capital allocated to the agricultural sector. An increase in the inflation rate will lead to a decrease in the capital allocated to the agricultural sector. The correlation coefficient between exchange rate and the capital allocation to the agricultural sector was a strong positive significant (1%) relationship. An increase in the exchange rate results to an increase in the capital allocation to the agricultural sector while the correlation between exchange rate and inflation had a weak negative significant (10%) relationship indicating that an increase in the exchange rate results to a decrease in the inflation rate.

The Correlate examination is:

capalloct   inflation
inflation   -0.281
**   0.097**
exch rate   0.686   -0.334
**   0.000   0.040**
Cell Contents: Pearson correlation
**   P-Value**

Component analysis for inflation rate, exchange rate and capital allocation to agricultural sector.

Chart 4 indicates original data, seasonally adjusted data, detrended data and combined seasonally adjusted and detrended data for inflation rate. Analysis of the seasonality in the annual inflation rate indicates that the annual inflation rate increases after every seven years and this is as a result of what may be described as the period of change in the political terrain of the nation, as the political office holders

have a maximum of eight years in office. The inflation rate was the highest in 1996, and a subsequent decrease through 2005.
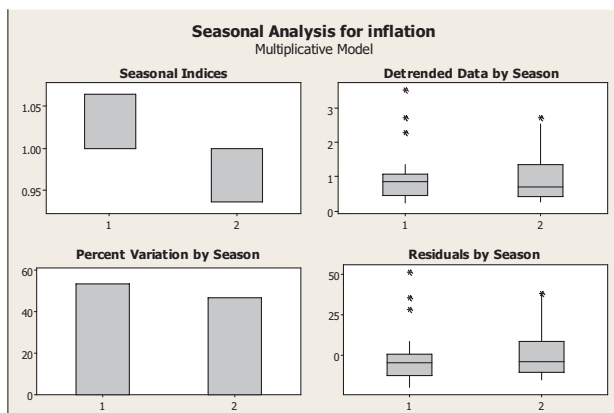
Chart 4: component analysis for inflation
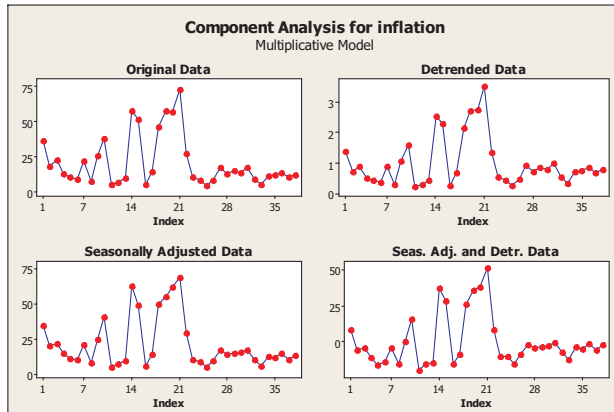
Source: CBN statistical bulletin various issues

The result of the seasonal indices in chart 5 shows the pattern of the inflation rate from 1975 -2015. This indicates that the rate of inflation have been high from 1992-2015.
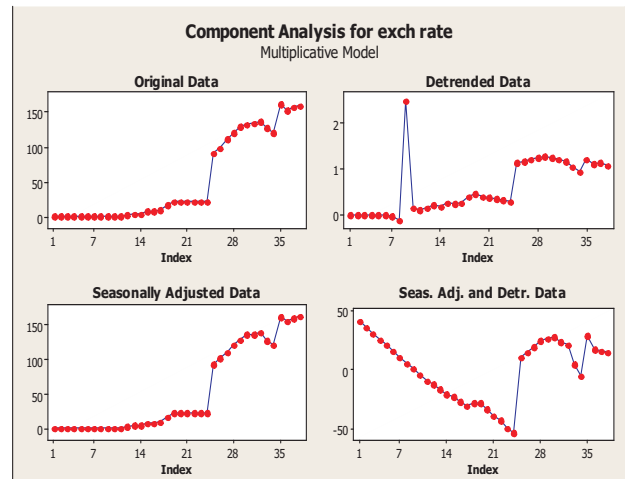
Chart 5: seasonal analysis for inflation

Source: CBN statistical bulletin various issues

Chart 6 indicates original data, seasonally adjusted data, detrended data and combined seasonally adjusted and detrended data for exchange rate. The seasonality analysis indicated that the annual exchange rate increased from 1999.
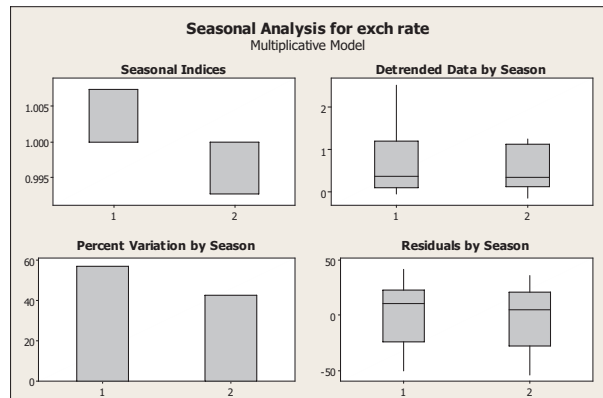
Chart 6: component analysis for exchange rate

Source: CBN statistical bulletin various issues

The seasonality indices in chart 7 show the pattern of the exchange rate within the period of the study. The seasonality indices indicates that the exchange rate was higher from 1975-1992.

Chart 7: seasonality analysis for exchange rate

Source: CBN statistical bulletin various issues

Chart 8 indicates original data, seasonally adjusted data, detrended data and combined seasonally adjusted and detrended data for capital allocation to the agricultural sector. The seasonal adjusted data indicates that the capital allocation to the agricultural sector experienced a major increase from 1999 with the recent democratic dispensation.
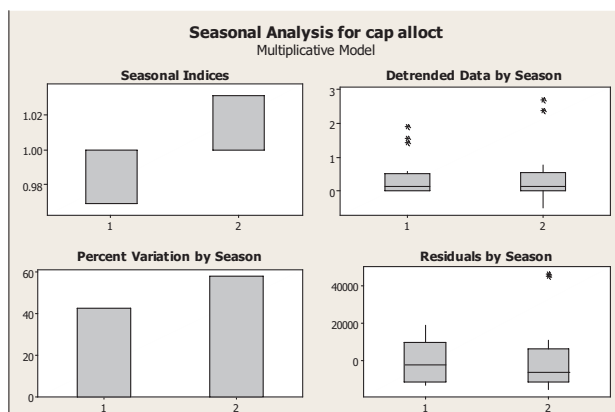
Chart 8: component analysis for capital allocation
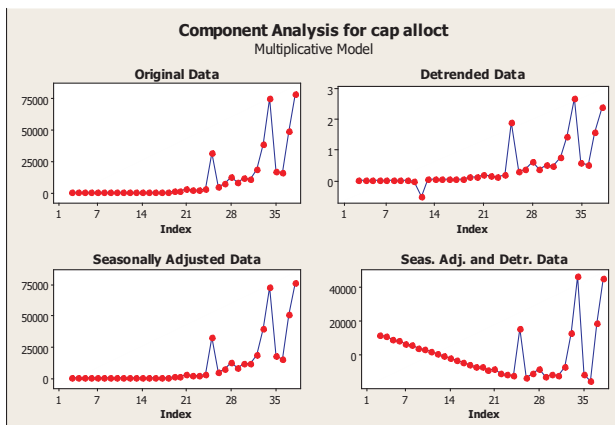
Source: CBN statistical bulletin various issues

The seasonality indices of chart 9 present the pattern of the capital allocation to the agricultural sector and it shows that it was higher from 1992-2013.

Chart : seasonal analysis for capital allocation

Source: CBN statistical bulletin various issues

CONCLUSION

In conclusion it was observed that the exchange rate had a positive effect on capital allocated to the agricultural sector while inflation had a negative effect on capital allocation. Finally, from the results of the empirical study, the following recommendations are proposed to encourage and improve the exchange rate stability in Nigeria. There is the need to put in place appropriate policies and strategies that will ensure the maintenance of a very stable inflation rate as this has been an important factor influencing exchange rate. The government should direct it expenditure to the key productive sectors of the economy such as agriculture and

manufacturing this will go a long way in increasing the production of goods and services thereby stabilizing theprices and consequently exchange rate. The issue of country's budget should be adequately addressed as more of the country's budget is recurrent than capital. It is not healthy for a country with 70% recurrent expenditure because it shows that, the country' expenditure is more of consumption than investment which will definitely spark up inflation rate in the country. Further efforts should therefore be geared towards reducing prime lending rate in such a manner that it would boost the credit facilities through the reduction of inflation rate and exchange rate stability for the productivity in the country.

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