

Aggregate Investment and Macroeconomic Policy Evaluation in Nigeria: Econometric Analysis of the Evidence

David Umoru¹ and Amhed Ede Uwubanmwe²

Abstract

This study evaluated the impact of macroeconomic policy on aggregate investment in Nigeria over the sample period of forty three years. The Granger Two-Step method of co-integration and error correction estimation were adopted in the study. The study ascertained a significant positive impact of monetary policy on investment growth in Nigeria; the investment effect of trade policy is positive but insignificant while that of fiscal policy is absolutely negative and significant. Also, the results suggest that investment in Nigeria is dynamically unstable. Indeed, there is a long-run disequilibrium relationship between the growth of investment and macroeconomic policy in Nigeria. Hence, any short term disturbance in the equilibrating process of investors in relation to changes in the domestic interest rate, total government expenditures, trade openness and the amount of money in circulation will not be restored until probably when the government augments monetary policy with other economic policies such as the exchange rate and fiscal policies effect, if policy is to deliver the expected investment dividend to the Nigerian economy, the role of monetary policy should be optimal and the government ought to be effective in implementing fiscal policy in co-ordination with the CBN implementation of monetary and trade policies.

Keywords: Aggregate investment, macroeconomic policy evaluation, volatility, dynamically unstable, Nigeria.

¹PhD, Department of Economics, Banking & Finance, Faculty of Social & Management Sciences, Benson Idahosa University, Benin City, Nigeria.

²PhD, Department of Banking & Finance, Faculty of Management Sciences, University of Benin, Nigeria.

1 Introduction

World economies are driven by economic policies and the government is at the core of policy formulation. Such formulated policies are in theory and in practical, required to impact positively the economy, that is, on real economic variables such as aggregate investment³ and real GDP. Macroeconomic policy uses a variety of tools to influence outcomes such as the demand for aggregate investment (Ojo, 1992, 1993, 2000; Mishikin, 2001). However, despite various actions adopted by the government in administering macroeconomic policy in Nigeria, there are still restrictions to the efficacy of policy. This is more evident in the wide discrepancy between policy targets and policy outcomes. In fact, the Nigerian government is yet to achieve a range of macroeconomic policy objectives. For example, the growth of aggregate investment in Nigeria is weak in spite of the inflows of foreign direct investment into the country. According to Apata (2007) and Adosoji (2010), the macroeconomic policy implemented in the Nigerian economy over the past years has been detrimental to and inconsistent with the developmental needs of the economy. This worry has exerted pressures on both fiscal and monetary authorities in Nigeria to re-evaluate their policies with the view of finding possible solutions (Iwayemi, 1995; Iyoha, 1998; Michal, 2013). The failure of macroeconomic policy as manifested in structural imbalances in Nigeria partly led to launch of the structural adjustment programme in 1986. The relevant research question to ask is has macroeconomic policy impacted significantly the trend and patterns of investment growth in Nigeria? In view of the foregoing, the study evaluates the impact of three macroeconomic policies namely, monetary policy, fiscal policy and trade policy on real aggregate investment in Nigeria. Section two discusses the trend and patterns of aggregate investment in relation to macroeconomic policy in Nigeria. Section three reviews related studies as regards the role of monetary policy on investment growth. Section four specifies the empirical model. The empirical results are analyzed in section five. Section six concludes the study.

³In the Keynesian phraseology, investment refers to a process of adding to capital equipment. According to Robison, investment is addition to capital. Investment is a flow concept. It encompasses all forms of capital outlay devoted to the procurement and addition to fixed capital assets (Soludo, 1998). To the classical economist, investment is as an activity of the firms while the government provides the enabling environment (Omotor, 2007). In effect, investment is the acquisition of asset such as stocks or bond as found in the stock market. It is therefore a transfer of existing assets. Different types of investment include; fixed inventories and replacement investments. Fixed investment is the investment in building structures and in office equipments. Inventories investment is the investment on stock of goods which have been produced by the firm but are not yet sold; and replacement investment is branch of investment that is made to replace worn out capital goods from their use in production activities.

2 Trends and Patterns of Aggregate Investment and Macroeconomic Policy Evaluation in Nigeria

The Nigerian macroeconomic policy stance has been accommodating in recent time. Most of the parameters for evaluating policy performance include exchange rate stability, favorable balance of payments and trade flows, adequate capital formation, and low inflation. The demand for low inflation is highly desirable given that an economy will always work best with predictable prices. Sort of, the impact of policy is appositely evaluated within an atmosphere of financial stability. For this reason, the stability of the price level becomes the primary goal of macroeconomic policy in every nation. In what follows, low single digit inflation is so envisaged as the practical equal of the stability of price level. According to Sanusi (2013), Nigeria's inflation rate hits 9.5 percent as at end of February, 2013. Being below the Federal Government's target of 12.9 percent, the results of the monetary policy strategy are therefore self-evident (CBN, 2013). Capital formation grew from a negative value of -6.8 percent of GDP in 2008 to 6 percent in 2012. Once the prevailing macroeconomic policy is not friendly, foreign investors do not hesitate to withdraw funds from the domestic economy. The exchange rate volatility of the naira has been maintained at a plus and minus of 3 percent and there has been greater convergence of rates in the foreign exchange market. In 2012, the CBN found it desirable to protect the value of the naira; it reduced the net open positions of banks and introduced limited exchange controls. In fact, there has been an increase in the inflow of portfolio funds, that is, hot money to US\$12 billion (Omotor, 2007; Sanusi, 2012).

Between 1980 through to 1985, total government expenditure growth shows discretion in fiscal stimulus which according to Egwaikhide (2003) attributed to the pooled effects of the tax reforms and policy response to a sharp decline in crude oil prices as put across under the Economic Stabilization Act of 1982. In fact, the Nigerian economy embarked on the course of economic depression in the 1980s given the total collapse of crude oil prices in the international market. In what follows, fiscal deficits became mammoth due to excessive government spending. The peak of the fiscal policy shift was the implementation of the IMF and World Bank forcefully induced SAP in 1986. The SAP of 1986 led to a review in some macroeconomic policy related economic fundamentals. For example, the banking sector became deregulated, the determination of the Naira-US dollar exchange rate became more flexible and the trade sector was indeed liberalized. This led the CBN to broaden its monetary policy indicator. So, rather than set targets for the narrow money stock, the broad money stock became the principal monetary policy target. A case in point is that in 2001, narrow money target was 4.3 percent but rose by 28.1 percent⁴ (Akingtoye, 2006). The same pattern of failure is observed for broad money stock. There has been a problem also hitting the inflation target. There is relatively an ample difference between policy targets and policy outcomes. For example, the target for inflation in 2007 was 7 percent but the performance was about 19 percent. However, despite the increase in the velocity of circulation of money, growth in intermediate aggregates of money supply has been low-keyed, while inflation is yet to be kept relatively under control. Indeed, regardless of the reforms in financial sector, the capability of macroeconomic policy to achieve policy objectives further deteriorated and

⁴ It is particularly noteworthy that the excessive growth of monetary aggregates was often reflected in high and unstable domestic price level, thus lending support to Friedman's proposition that inflation is always and everywhere a monetary phenomenon (Umoru, 2013).

inflationary pressures became intensified (Olaloye and Ikhide, 1995; Soludo, 1998; Guobadia, 2002). These resulted in a deeper collapse in the growth of the real sector of the domestic economy and the snowballing effect on aggregate investment now became a moribund.

Table 1 shows the dissatisfaction with the capability of monetary policy strategy at each stage to achieve its target objectives of price stability and hence minimal inflation. The upshot is that most of the policies pursued culminated in poor macroeconomic outcomes such as aggregate investment as actual performances have in the overall fallen below specified targets. As it were, investment has been generally volatile. According to Oyejide (2002), through the OMO activities, the CBN directly change the level of banks' cash reserves and consequently openly induce changes in the level of interest rates which in turn leads to changes in the terms and availability of credit and ultimately money supply. Due to concern of the adverse effects of high interest rates⁵ on the growth of productive investment in the country, early in 1992 interest rates were deregulated but reversed in 1993 (Nnanna, 2002; Nkoro, 2003). In the main, it would be observed that the problem of the Nigerian economy is that macroeconomic policies have been inconsistent and aggregate investment has been on a lower profile. A succinct profile of the Nigerian economy is also provided in Table 2. What is made evident is the fact that while external debt amounted to US\$8.3 billion, external reserves only amounted to US\$59,686 million. The agony is that the Nigerian economy is been grown by borrowing.

Table 1: Monetary Policy Episodes in Nigeria, 1986 -2011

No	Policy Period	Key Elements of Policy Management
1	Period of Direct Control (Pre-SAP)	direct monetary control prevailed throughout the period prior to the adoption of the structural adjustment programme; key ingredients of the policy framework include: sectoral credit allocation, credit ceilings and cash reserve requirements, administrative fixing of interest and exchange rates and imposition of special deposits. monetary targets were hardly ever realized; Strategy created distortions in resource allocation
2	Period of Indirect Monetary Framework-short-term (1986 –2001)	use of market instruments in monetary management; adoption of monetary targets and instruments over a one-year period for the 1986 – 2001period; Nigerian treasury bills (NTBs) was the main instrument open market operations during the period; complementary instruments included the adoption liquidity ratio, cash reserve requirements, discount window operations, mandatory sales of NTBs, 200% cover of forex demand at the AFEM with NTBs etc.Proactive adjustment of MRR in trying to manage liquidity conditions helped in the deregulation of interest rate policy.
3	Period of Indirect Monetary	a two year period put in place for monetary targets and instruments. the adoption of the time fame is predicated on some guess of a

⁵ An upper limit of 21 percent was imposed on lending rates in 1991

	Framework Medium-term (2002- 2006).	<p>transmission time lag of about 24 months within which monetary policy is expected to affect its ultimate objective.</p> <p>policy was subject to bi-annual reviews.</p> <p>the main instruments of monetary policy management include open market operations, reserve requirements, discount window operations, foreign exchange market intervention as well as the movement of public sector deposits in and out of commercial banks.</p> <ul style="list-style-type: none"> consolidation and recapitalization of banks was introduced to strengthen the financial sector and consolidate the gains of policy. <p>tight exchange rate band of plus/minus 3%</p> <p>two week maintenance period of cash reserve in addition to movement.</p>
4	Post- Banking Consolidation (2006 –2011)	<p>following persistence of excess liquidity in spite of all the above a review became necessary and include: zero tolerance on ways and means advances, gradual rundown of CBN holding of TBs, aggressive liquidity mop-up operations-frequent OMO sales supported by discount window operations, unremunerated reserve requirements, increased coordination between the Bank an the fiscal authorities, restructuring of debt instruments into longer tenor debts, increased deregulation of forex market etc.</p>

Source: Economic Reflections, Vol. B. No. 22, Aug. 2008

Table 2: Nigeria, Brief Profile

Nigeria: Economic Indicators	2004	2005	2006	2007	2008
GDP (US\$ billions)	72.1	103.3	125.8	141.7	179.7
GDP at market prices (N billion)	9,575	13,557	16,187	17,822	21,440
Real GDP growth (%)	6.4	6.5	6.0	6.2	6.8
Consumer price inflation (average %)	15	17.9	8.2	5.4	11.5
Population (million)	134.6	137.5	140.4	143.3	146.3
Exports (US\$ million)	36,890	50,162	59,144	61,800	76,277
Imports (US\$ million)	19442	25639	31113	38787	44880
Current-account balance (US\$ million)	4,319	8,021	13,796	2,197	4,771
Total external debt (US\$ billions)	37.9	22.2	7.7	7.8	8.3
Total International Reserves (US\$ million)	16,956	28,280	42,299	51,334	59,686
Exchange rate (N: US\$) (Local currency is Naira)	132.89	131.27	128.65	125.81	119.28

Source: IMF's International Financial Statistics Yearbook, 2009

3 Empirical Studies on the Investment Effects of Macroeconomic Policy: The Earlier Evidence

The empirical literature on the effect of macroeconomic policy on investment growth abound. Notable in this regard is the empirical work of Jensen, Mercer and Johnson (1996), Tylor (1998), Deutsche (2002), Chatelain and Tiomo (2001), Gaiotti and Generale (2001), Butzen et al., (2001), Valderrama (2001), Lünemann and Mathä (2001), Mojon et al. (2001), Obadan and Odusola (2001), Chirinko and Kalckreuth (2002), Schmitt-Grohe and Uribe (2002), Nkoro (2003), Schmitt-Grohe and Uribe (2004a, 2004b, 2004c). A consensus arrived at in the literature is that monetary contractions also reduce the growth of investment more for highly leveraged firms than for less leveraged firms. In addition, monetary policy has a direct impact on firms' expenses on short-term debt. According to Jensen, Mercer and Johnson (1996), a monetary contraction will increase interest expenses and reduce firms' net cash flows directly. Indeed, monetary contractions are typically associated with declining asset prices which reduce the value of borrowers' collateral. Hence, changes in monetary policy are expected to have stronger effects on investment for highly leveraged firms than for less leveraged firms (Mojon et al., 2001). Macroeconomic policy often fuels spending and investment resulting in higher profits for business. Thus, as stock prices increase, firms find themselves with more capital to invest. This in turn stimulates higher stock prices. In the view of Chatelain et al. (2001), the investment behaviour of small firms does not exhibit significantly higher cash-flow sensitivity than that of large firms, the large magnitude of the cash-flow effect. The study by Deutsche (2002) finds no significant differences between the investment behaviour of large and small firms in Germany. A notable interpretation of his results is the fact that the German financial system can best be described as an house banks⁶.

4 Empirical Model

In this section of the paper, a Bounds model specification of short-run dynamics of investment in relation to macroeconomic policy adjustment in Nigeria is embarked upon. The macroeconomic effect is measured by the effects of monetary policy, fiscal policy and trade policy. Monetary policy, fiscal policy and trade policy are measured by broad money supply and interest rate, total government expenditure and trade openness. The specification in its functional form expresses investment as a function of monetary policy variables:

$$GNV = F(INT, MSS, TGE, PON) \quad (1)$$

Where GNV is the share of aggregate investment in national output in Nigeria, INT is the prime lending rate, MSS is the M₂ broad monetary aggregate, TGE is total government expenditure, PON is measure of trade openness calculated as ratio of the sum of exports and imports to national⁷ output (real GDP) and GDP is a measure of the level of economic

⁶ The term house bank is used to denote a credit institution which enters into a long-term business relationship with a company on the basis of extensive insurance against liquidity shortfalls and sharp fluctuations in refinancing costs.

⁷ National output is measured by *GDP* at current market prices.

activities in the country (Ekpo. The dual logarithmic relationship of the model is thus specified as:

$$\text{LnGNV}_t = \ell_0 + \ell_1 \text{LnINT}_t + \ell_2 \text{LnMSS}_t + \ell_3 \text{LnTGE}_t + \ell_4 \text{LnPON}_t + \mu_t \quad (2)$$

Specifying equation (2) as a dynamic model, that is, an autoregressive distributed lag (ARDL) of the k^{th} order, we have that:

$$\begin{aligned} \text{LnGNV}_t = & \ell_0 + \sum_{j=1}^k \ell_{1j} \text{LnGNV}_{t-j} + \sum_{j=0}^k \ell_{2j} \text{LnINT}_{t-j} + \\ & \sum_{j=0}^k \ell_{3j} \text{LnMSS}_{t-j} + \sum_{j=0}^k \ell_{4j} \text{LnTGE}_{t-j} + \sum_{j=0}^k \ell_{5j} \text{LnPON}_{t-j} + \mu_t \end{aligned} \quad (3)$$

Equation (3) take on lag values at $j = 1$ and $j = 2$ for the explained variable and the explanatory variable respectively. This technicality is required because of the need to include the contemporaneous values that captures the error correction representation which is of the form:

$$\begin{aligned} \Delta \text{LnGNV}_t = & \ell_0 + \sum_{j=1}^{k-1} \ell_{1j} \Delta \text{LnGNV}_{t-j} + \sum_{j=0}^{k-1} \ell_{2j} \Delta \text{LnINT}_{t-j} + \\ & \sum_{j=0}^{k-1} \ell_{3j} \Delta \text{LnMSS}_{t-j} + \sum_{j=0}^{k-1} \ell_{4j} \Delta \text{LnTGE}_{t-j} + \sum_{j=0}^{k-1} \ell_{5j} \Delta \text{LnPON}_{t-j} \\ & - \delta [\text{LnGNV}_{t-1} - \lambda_0 - \lambda_1 \text{LnINT}_{t-1} - \lambda_2 \text{LnMSS}_{t-1} - \lambda_3 \text{LnTGE}_{t-1} - \lambda_4 \text{LnPON}_{t-1}] + \mu_t \end{aligned} \quad (4)$$

The term in square bracket represents the error correction term [ECT], so that we can obtain the reduced form error correction investment model as:

$$\begin{aligned} \Delta \text{LnGNV}_t = & \ell_0 + \sum_{j=1}^{k-1} \ell_{1j} \Delta \text{LnGNV}_{t-j} + \sum_{j=0}^{k-1} \ell_{2j} \Delta \text{LnINT}_{t-j} + \\ & \sum_{j=0}^{k-1} \ell_{3j} \Delta \text{LnMSS}_{t-j} + \sum_{j=0}^{k-1} \ell_{4j} \Delta \text{LnTGE}_{t-j} + \\ & + \sum_{j=0}^{k-1} \ell_{5j} \Delta \text{LnPON}_{t-j} - \delta [\text{ECM}_{t-1}] + \mu_t \end{aligned} \quad (5)$$

Equation (5) captures the short-run dynamics of the growth of aggregate investment in relation to variations in monetary policy in Nigeria. In the ARDL of the k^{th} order, δ is the speed of adjustment, $\ell_0, \ell_1, \ell_2, \ell_3, \ell_4$ and ℓ_5 are the parameters to be estimated. Predominantly, ℓ_0 is the intercept that is, the value which investment would take if every other explanatory variable was equated to zero and μ_t is a well behaved disturbance term. In this paper, we employ the Granger Two-Step co-integration and error correction methodology to evaluate the aggregate investment effects of macroeconomic policy adjustment in Nigeria. As long as the variables in the ARDL model are stationary, a co-

integrating relationship is possibly determined (Gujarati, 2005). Thus, if the growth rate of aggregate investment exceeds its long-run equilibrium value at time $t-1$, the error correction term takes on a positive weight and hence, a positive sign. Accordingly, the required adjustment at time t will be for δ to dampen the effect of such investment growth towards its steady state path. This is the reason why δ must be accorded a negative sign (Maddala, 1998). The time series data on the variables were sourced from the Central Bank of Nigeria's statistical bulletin over the sample period from 1970 through to 2012. The frequency of our data is annual. So, given the time scope and the annual frequency of the data, all variables have forty-three observations.

5 Empirical Analyses of Regression Results

5.1 Unit Root Test Results: The Analysis

Unit root test involves the test of stationarity for variables used in regression analysis. The importance of stationarity of time series used in regression borders on the fact that a non stationary series is not possible to generalize to other time periods apart from the present. This makes forecasting based on such time series to be of little practical value. Moreover, regression of non-stationary time series data on other non-stationary time series data may produce spurious regression [Gujarati (2004)]. Both the Augmented Dickey Fuller [ADF] and the Phillip-Perron [PP] tests for unit roots are employed in the unit root test. For the purpose of brevity, only the first difference results are reported. It may be noted that if results in first differences are stationary, then the time series actually possess unit roots. Table 3 presents result of the unit roots tests in first differences. Considering the ADF tests, the result shows that the ADF test statistics for interest rate, exchange rate and money supply are all greater than the 5 percent critical ADF values. It was found that all the variables of the study exhibit unit root processes. In other words, the variables were all non-stationary at levels but rather stationary at their first difference. In this scenario, the variables are all integrated of order one, $[I(1)]$. This indeed, necessitated the test for co integration. This implies that they are each stationary. The ADF statistics for investment and trade openness are however less than the 5 percent critical value of -3.556 in absolute value. However, a close look at the Phillip-Perron tests of unit roots shows that each variables has statistic values that are greater than the 5 percent critical value of -3.55.1. Thus, based on this result, we would accept the hypothesis that unit roots exists for each of the variables.

Table 3: Unit Root Test Results based on ADF and Phillips-Peron Methods

Variables	ADF Test Statistic	Phillips-Peron Test Statistic	Decision
GNV	-0.4678	-2.6458	I [1]
D(GNV)	-10.904***	-11.675***	
INT	-1.8422	-1.4328	I [1]
D(INT)	-6.4464***	-8.4682***	
MSS	-2.2224	-2.4242	I [1]
D(MSS)	-12.050***	-15.045***	
TGE	-0.2224	-1.2324	I [1]
D(TGE)	-5.8966***	-12.062***	
PON	-1.8888	-2.9862***	I [1]
D(PON)	-15.333***	-24.226***	

ADF critical value @ 1% = -3.658, ADF critical value @ 5% = -2.966,
Phillips-Peron critical value @ 1% = -3.626, Phillips-Peron critical value @ 5% = -2.954
Note: *** (**) denotes significance at the 1% and 5% levels respectively. D indicates the first difference operator.

5.2 Co integration Test Results Analyzed

The results of the co-integration test are reported in Table 4. The Granger two-step co integration procedure is used in this test. Under this approach, we ran an OLS regression and the residuals generated from such estimation were tested for stationarity using the ADF and PP tests statistic(s). From the results, it is seen that the both the ADF and PP test statistic(s) are greater than the one percent critical values. This renders the residuals stationary. Indeed, the result shows stationary residuals with the implication that the variables in the study are co-integrated. In effect, a long run relationship exists between the aggregate investment, interest rate, exchange rate, money supply and the level of economic activities in Nigeria.

Table 4: Co-integration Test Results based on Engle-Granger Two-Step Method

Variable	ADF Test Statistic	Critical Value @ 1%	PP Test Statistic	Critical Value @ 1%
Residual Series(-1)	-5.828***	-3.495	-18.466***	-6.695

*** indicates stationarity at the 1% critical value for both the ADF and PP

5.3 Analysis of Dynamic Results

The error correction model [ECM] is used to analyze the dynamic relationship among the variables in the study. The ECM was subjected to the least squares estimation of the variables in first differences. The dynamic analysis of the result is within the context of one period lagged error term. The error correction results are estimated for both unadjusted and adjusted samples. The results are presented in Table 5. The results of the unadjusted sample are statistically robust considering the goodness of fit of about 0.86.

This indicates that about 86 percent of the systematic variations in investment are explained by the four explanatory variables and the error correction term. The F-statistic, 15.9 easily passes the significance test even at the 1 percent level. Thus, we accept that a significant linear relationship exists between the dependent variable and all the independent variables combined. A close examination of each individual coefficient of the explanatory variables reveals that only the coefficient of fiscal policy exhibits some level of irregularities in terms of sign. The significance test shows that only the coefficients of money supply and interest rate are significant at the one percent level. Although the coefficient of fiscal policy as measured by total government expenditures passes the significance test at the 5 percent level, its effects on investment is negative. The coefficients of other explanatory variables determinately fail the significance test even at the five percent level. The results thus indicate that only money supply has significant positive impact on gross investment in Nigeria. The insignificance of the error correction term in addition to its positive coefficient as obtained in the estimation exercise demand reasoned explanation. This result points to the fact that restoration to equilibrium will not be achieved in the long run whenever a temporary disturbance occurs in the system. In order to obtain more representative relationship, the trade policy variable (openness) was dropped from the model because of its highly insignificant coefficient. This necessitated the error correction estimation of the adjusted sample. Relatively, the empirical results are remarkable. Thus, over 72 percent of total variation in investment is now explained by joint variations in the three explanatory variables. The F-statistic is also high and statistically significant at the one percent level. This implies that we cannot reject the hypothesis of a significant linear relationship between investment, interest rate, exchange rate (a measure of external balance), and money supply.

In terms of the estimated coefficients of the explanatory variables, the result shows that all the coefficient signs conform to theoretical expectation. As in the case of the unadjusted sample, both coefficients of money supply and interest rates had significant impact on investment. As expected, money stock yields positive impact while interest rate exerted negative impact on aggregate investment expenditure. The results show that investment decisions are determined by monetary policy through the interest rate channel. Indeed, the estimated results validate the notion that investment is always significantly affected by the interest rate structure. In particular, the statistical significance of the coefficients of interest rate and money supply upholds the fact that monetary policy rests on the relationship between the rates of interest in an economy, that is, the price at which money can be borrowed, and the total money stock. The CBN has the ability to alter the stock of money and accordingly influence the interest rate to achieve policy goal of revitalizing investment in the country. However, the coefficient of the one-period lagged residuals [the error correction term] is positive instead of the expected negative sign. This mark the second phase of the statistical irregularity of the error correction term. The estimated results show that monetary policy is the most effective policy that induces investment in the Nigerian economy. This indeed could be reflecting the policy target for the nominal money stock in order to minimize the negative effects of the inflationary pressures in the economy. The investment effect of trade policy is positive but insignificant while that of fiscal policy is absolutely negative. This can be traced to negative effects of the fiscal policy restraints. As it were, the inconsistent result is indicative of system instability. Indeed, any short term disturbance in the equilibrating process of investors in relation to changes in the domestic interest rate, exchange rate of the Nigerian naira vis-à-vis the US dollar and the amount of money in circulation will

create deviation from equilibrium in the long run. The observed instability in the system may have been generated as a result of the heavy government presence in aggregate expenditure in Nigeria.

Table 5: Error Correction Results of Aggregate Investment Effects of Macroeconomic Policy in Nigeria

Variable (s)	Estimation Method: Generalized Method of Moments		
	Unadjusted Sample	Adjusted Sample	P-value(s)
	Coefficients (t-values)		
Constant	-66.2(-2.048)**	-28.5(-2.359)**	(0.0006)(0.0002)
DINT	-1.656(-5.353)***	-2.635(-10.378)***	(0.0000)(0.0000)
D(MSS)	1.626(4.639)***	1.856(10.522)***	(0.0000)(0.0000)
D(TGE)	-0.284(-2.428)**	-1.062(-2.069)**	(0.0003)(0.0239)
D(PON)	1.489(0.592)	+	(0.3458)
DGNV(-1)	1.625(5.789)***	1.225(6.026)***	(0.0000)(0.0000)
Adjustment Effect on Investment in Relation to Variations in Macroeconomic Policy			
Residuals (-1)	0.525(0.968)	0.726(2.069)**	(2.2604)(0.0046)
Goodness-of-Fit Test Statistic(s)			
R ² (Adjusted R ²)	0.78 (0.86)	0.74(0.72)	
F-statistic	15.9*	19.9*	(0.0006)(0.0002)
R ² (Adjusted R ²)	0.78 (0.86)	0.74(0.72)	
***(**) indicates variable significance at 1%(5%) levels respectively; t-ratios are reported beside each parameter estimates			
Note: + indicates drop of trade policy variable due to insignificance in the estimation of the unadjusted sample			

5.4 Statistical Properties of the Estimated Model

The ARDL investment model was tested for normality, serial correlation, autoregressive conditional heteroskedasticity, heteroskedasticity, specification error and stability. The results as reported in Table 6, suggest that model is well behaved. In particular, the diagnostics indicates that the residuals are homoskedastic and serially independent. Further, the Breusch-Godfrey LM test provides evidence in favour of serially uncorrelated residuals. The Jacque-Bera statistic accepts the null hypothesis of normality at the 5 percent level of significance. By implication, the regression residuals are not haphazardly distributed and so does the annual series that generated the residuals. Indeed, the model residuals are standardized based on the third and fourth moments, this means that the measured difference of the skewness and the kurtosis of the estimated residual series with those of the normal distribution are low. The residual series would be considered non-normal if computed JB statistic was large. The low value of the ARCH-LM test statistic is an indication that there are no ARCH effects in the estimated regression residuals. As it were, the null hypothesis of no conditional heteroskedasticity is accepted. The estimated model is also devoid of the misspecification error. This result is made evident by the low F-value of the RAMSEY Reset test statistic. The null hypothesis of no misspecification would have been rejected supposed the computed test statistic was excessively large. The recursive plot of residuals for the estimated coefficients [CUSUM and CUSUMSQ] does not diverge from the zero lines [Figures I and II] at the 5 percent level, thereby suggesting the absence of structural instability of the estimated parameters despite the shift from

direct monetary control measures to market-based since the 1980s, grave economic catastrophe of the 1980s, interest rate liberalization, amplified competition in the Nigerian banking system and shocks in the international oil prices that affected the variables used in estimation. By intuition, the estimated parameters are highly stable over the sample period.

Table 6: Diagnostic Test Statistics

Test	F-statistic(s)	
Probability		
1. Normality		
Jacque-Bera statistic	0.2246	0.688
2. Serial Correlation		
Breusch-Godfrey LM test	0.4652	1.6028
3. Specification error		
Ramsey reset test	0.0266	0.0255
4. Stability		
CUSUM Plot	Fig. 1	5%
CUSUMSQ Plot	Fig. 2	5%
Prediction Error	(-2+2)	5%
5. Heteroskedasticity		
White Heteroskedasticity test	2.6895	0.8256
6. Autoregressive Conditional Heteroskedasticity		
ARCH-LM Test	0.0665	0.0082

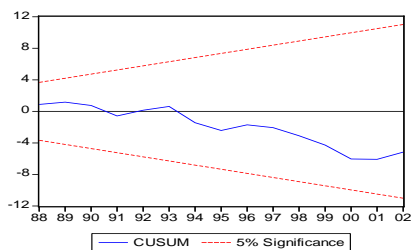


Figure I: CUSUM

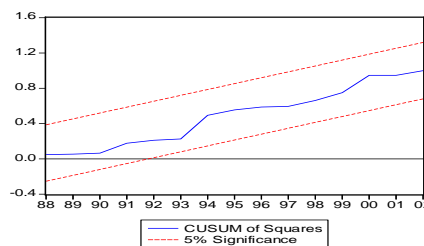


Figure II: CUSUMSQ

6 Conclusion

In this paper, we empirically evaluated the aggregate investment growth effect of macroeconomic policy in Nigeria. The Granger Two-Step technique of co-integration and error correction were employed for the empirical investigation using time series data covering the sample period of forty-three years. Based on this empirical investigation, we find that amongst the macroeconomic policies that are at the disposal of the government, only monetary policy proved to be a significant policy for enhancing the growth of investment in Nigeria. In particular, the result shows a very strong positive effect of monetary policy on aggregate investment as a proportion of GDP in Nigeria. Evidently, this outcome may be rationalized by the fact that money supply has a significant positive impact while interest rate also wielded significant negative impact on aggregate investment in the empirical estimation. The analysis thus follows the Keynesians' economic philosophy that as the monetary authority embark on expansionary policy,

money supply rises and interest rate falls. This in turn stimulates aggregate demand where investment belongs. However, the results suggest that investment in Nigeria is dynamically unstable. Indeed, there is a long-run disequilibrium relationship between the growth of investment and macroeconomic policy in Nigeria. Accordingly, any disequilibrium in the short-run will not be restored until probably when the government augments monetary policy with other economic policies such as the trade and fiscal policies. The observed system instability may have been induced by the intense volatility that characterized investment expenditure in Nigeria. Volatility in the growth of investment will persist to generate trends and patterns that can be unfolded as an empirical exercise in relation to policy evaluation. For policy to deliver the expected investment dividend to the Nigerian economy the role of monetary policy should be optimal and the government ought to be effective in implementing fiscal policy in co-ordination with the CBN implementation of monetary and trade policies.

ACKNOWLEDGEMENTS: We wish to express my profound gratitude and indebtedness to all the authors referenced in this research paper. Their intellectual deposit was of mammoth contribution to the present research and is indeed laudable.

References

- [1] Adesoji, Ultimate Guide to Business Track and Investment in Nigeria (2010).
- [2] O. D. Ajakaiye, "Economic Development in Nigeria: Issues and Experience" Conference Proceedings titled Growing the Nigerian Economy Organized by Central Bank of Nigeria: Pp 12-36, (2001).
- [3] I.R. Akingtoye, Investment Decision: Concepts, Analysis and Management (2006).
- [4] R.S. Chirinko, and U. V. Kalckreuth, 'Further Evidence on the Relationship between Firm Investment and Financial Status', Deutsche Bundesbank Discussion Paper, 28/02, November (2002).
- [5] Deutsche, 'Monetary Policy and Investment Behaviour: An Empirical Study. Monthly Report, July (2002).
- [6] R. Eisner, and M. Nadiri 'Investment Behaviour and the Neo-Classical Theory', The Review of Economics and Statistics, **50**, (1968), 369-382.
- [7] F. O. Egwaikhide, "Fiscal Policy Management and its Effects on the Nigerian Economy" A Paper Delivered at the 2003 One-Day Seminar by the Nigeria Economic Society, (NES) at Muson Centre, Onikan Lagos May 22 2003.
- [8] N. Gujarati, Basic Econometrics, Tata McGraw-Hill Publishing Company Limited, New Delhi, 2005.
- [9] S. Guobadia, "Monetary Policy, Capital Accumulation and Output in the Nigeria Economy"; in Nigerian Economic Structure, Growth and Development, Iyoha, M.A and Itsede C.O (eds).Mindex Publishing, Benin City.
- [10] M. A. Iyoha, Rekindling Investment for Economic Development in Nigeria. Microeconomics Issues, 1998.
- [11] A. Iwayemi, "Macroeconomic Policy Issues in an Open Economy: A Case Study of Nigeria. An NCEMA Publication Ibadan, 1995.
- [12] K. S.Kimball, "The Quantitative Analytics of the Basic Neomonetarist Model," NBER Working Paper, March, Journal of Money, Credit and Banking, **27**, (1995), pp. 1241-77.

- [13] G. S. Maddala, *Unit Roots, Co-integration and Structural Change*. Cambridge University Press, Cambridge. 1998.
- [14] K. Michal, *Macroeconomic Policy Evaluation Problem: An Illustration*. 2003.
- [15] F. S. Mishkin, "Monetary Policy". NBER Reporter Winter 2001 8-11.
- [16] B. Mojon, F. Semets and P. Vermeulen, *Investment and Monetary Policy in the Europe*. 2001.
- [17] J. O. Nnanna, *Monetary Policy and Exchange Rate Stability: A General Overview: Proceedings of Nigeria Economic Society's One-day seminar held Lagos (2002)*
- [18] Nkoro, *Analysis of the impact of Monetary Policy on Economic Development in Nigeria (1980-2000)*. University of Benin, Benin City, 2003
- [19] M. I. Obadan, and A. F. Odusola, *Saving Investment and Growth Pattern in Development and Developed Countries (2001)*.
- [20] G. Omotor, *Monetary Policy and Economic Growth: Theoretical and Conceptual Issue*, CBN Economic and Financial Review **45**(4), (2007) 39-67.
- [21] A.O. Olaloye and S. I. Ikhide "Economic Sustainability and the Role of Fiscal and Monetary Policy in A depressed Economy: The Case study of Nigeria. *Sustainable Development Vol. 3* (1995), Pp 89-100.
- [22] M. O. Ojo, *Monetary Policy in Nigeria in the 1980s and Prospect in the 1990s*. CBN Economic and Financial Review, **30**. (2001).
- [23] M. O. Ojo, "Monetary Policy Instrument in Nigeria, their Changing Nature and Implications": *The Nigeria Banker* (1993).
- [24] Ojo M.O. (2000). *Fiscal and Monetary Policy during Structural Adjustment in Nigeria: Proceeding of a Senior National Policy Workshop Organized by Nigerian Economic Society* pp 11-32.
- [25] A.T. Oyejide, *Monetary Policy and its Effects on the Nigerian Economy: Proceedings of Nigeria Economic Society's one-day Seminar held in Lagos (2002)*.
- [26] C. O. Soludo, *Investment in the Growth Process: A Measures of the Economist's Ignorance in Africa*. (1993).
- [27] S. Schmitt-Grohe and M. Uribe, "Optimal Fiscal and Monetary Policy under Sticky Prices," NBER Working Paper, September, *Journal of Economic Theory*, **114**, (February), (2002), pp. 198-230.
- [28] S. Schmitt-Grohe and M. Uribe, "Optimal Fiscal and Monetary Policy under Imperfect Competition," NBER Working Paper, December 2003, *Journal of Macroeconomics*, **26**, (June), (2004a) pp. 183-209.
- [29] S. Schmitt-Grohe, and M. Uribe, "Solving Dynamic General Equilibrium Models Using a Second-Order Approximation to the Policy Function," NBER Technical Working Paper No. 282, October 2002, *Journal of Economic Dynamics and Control*, **28**, (January), (2004b) pp. 755-75.
- [30] S. Schmitt-Grohe, and M. Uribe, "Optimal Operational Monetary Policy in the Christiano-Eichenbaum-Evans Model of the U.S. Business Cycle," NBER Working Paper No.10724, September (2004c).
- [31] J.O. Sanusi, "Central Bank and the Macroeconomics' Environment in Nigeria". A Lecture Delivered at Senior Executive course No 24 Institute for Policy and Strategy Studies. (2002).
- [32] D. Taylor, "Monetary Policy and the Long Boom" *Federal Reserve Bank of St Louis Review* **80**(6) Nov/Dec (1998), PP 3-11.