

MACROECONOMIC REFORMS, GOVERNMENT SIZE, AND INVESTMENT BEHAVIOR IN NIGERIA: AN EMPIRICAL INVESTIGATION

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ABSTRACT

This paper uses the co-integration and error correction frameworks of analysis to investigate the extent to which government size and other factors have been successful in improving the conditions needed to stimulate private investment in Nigeria. The paper lays emphasis on the implications of policy reforms initiated since the early 1980s. The results show, surprisingly, that government size did not complement private investment initiative. This is attributed to, among others, inefficiency in government expenditure and poor service delivery. The reforms effort in the banking system yielded positive results. This is because credit to the private sector was a significant factor in stimulating private investment in Nigeria. In addition, interest rate, political stability and external debt were significant factors. The paper recommends the need to urgently strengthen the budget preparation and execution process in Nigeria. This, in the opinion of the author, would substantially improved service delivery and efficiency of government expenditure.

Key Words: Macroeconomic reforms, government size, and co-integration/error correction frameworks

Introduction

Reforms, which are generally perceived as movement towards a more friendly market oriented economy has attracted considerable debate in development economics. This is because of the perception of policy-makers that the adoption of the neoclassical economic dogma is capable of propelling the economy to the path of sustained economic growth and development. In line with this conceptualization of reforms,

Nigeria like most developing economies, has adopted various forms of fiscal and monetary policies' reforms since independence. One important objective of the reforms is to place the private sector in the driver's seat of economic growth and development.

The era of free market economy started in 1986 when there was a major policy shift. Prior to the adoption of market economy, which resulted in the adoption of Structural Adjustment Programme (SAP) in early 1986, the Nigerian economy was characterized by excessive government control of production, financial intermediation processes and foreign trade variables via the administrative determination of interest rates, prices and exchange rates. The adoption of Keynesian economic doctrine was premised on the need to sustain the pace of economic growth and development within the environment of a shallow and weak private entrepreneurial class. However, the country's enthusiasm with this strategy progressively lost momentum, principally because it failed to deliver its most important promise of sustained economic growth and development. This resulted to an adverse economic performance (Ndebbio and Ekpo, 1991).

SAP and later in the early part of this millennium (2000s) NEEDS (National Economic and Empowerment and Development Strategy) were introduced to reduce the adverse effects, which the interventionist policies had on economic performance. In the new paradigm, as in SAP, faith in government was replaced with confidence in the free market system and the creativity of the private sector. The implementation of fiscal and monetary policies under SAP and later NEEDS were fairly disciplined.

Government expenditure as a ratio of GDP declined from an average of 18.53 per cent in the decades of the 1990s to an average of 13.43 per cent from 2000 to 2008. However, in real terms overall government expenditures have actually increased substantially in the past two decades. With respect to monetary policy, the Central Bank of Nigeria has put strenuous efforts to adhere to various monetary targets aimed at reducing inflation, stabilizing interest rate, exchange rate and stimulating the growth rate of output. End year inflation declined from 21 per cent in 2003 to 10 in 2004 but increased slightly to 11.6 per cent in 2004 before averaging at about 10.5 from 2005 to 2008. Maximum prime lending rate declined from 21.3 per cent at the end of 1999 to about 19 per cent by the end of 2008.

Improved implementation of the fiscal and monetary policies has provided some level of stability in the macroeconomic environment. For example, whereas credit to the private sector grew by 30.8 per cent, exceeding its target growth of 22.5 per cent by the year ending 2005, credit to the federal government declined from 37 per cent compared to the targeted growth rate of 10.9 per cent in the same year, which is an indication of crowding in of private investment. Moreover, GDP growth experienced high volatility declining from 10.7 per cent in 2003 to about 5.2 per cent in 2006. The level of private investment and exchange rate also experienced various levels of volatility in the period under scrutiny.

Albeit government capital and re-current expenditures have increased substantially in the reform years with one important objective of complementing private sector investment, worries have been raised on the efficiency of government expenditures in relation to its complementary role on investment. The major objective of this paper therefore, is to investigate the extent to which government size (the ratio of government expenditure to GDP) has complemented private investment in Nigeria. To the best of the author's knowledge the relative impact of government size on private investment behaviour in Nigeria has not been explored in previous empirical studies for Nigeria.

Following the introductory part, the rest of the paper is organized into four sections. Section two attempts a review of related literature and conceptual issues. In section three we present the model and the expected a priori signs. The results, methodological issues and discussions are done in section four, while the paper concludes in section five with concluding remarks and some recommendations.

Theoretical Issues and Literature Review

The evolution of investment theory has its origin from Keynes (1936) path breaking work. Keynes had argued that investment depends to a large extent on the prospective marginal efficiency of capital, relative to interest rate which is the opportunity cost of capital. He stresses the volatility of private investment given that investors cannot predict for a certainty the returns on investment. It follows that investors' instinct would be the main driving force in investment decision. This corroborates the views of both Keynesian and neoclassical models of investment. Both models argue that income and interest rate are important determinants of investment (Obaseki and Onwioduokit, 1998).

Subsequent theories of investment after Keynes were basically growth models. This growth models gained currency in the 1960s. One of the most important is the accelerator theory which argues that investment is a linear proportion of changes in output. Jorgenson (1967 and 1971) and Hall (1977) reviewed the restrictive assumptions of the accelerator theory and formulated the neoclassical approach. In this approach, optimal capital stock is a function of the level of output and user cost of capital. Lags in decision making and delivery create a gap between current and desired capital stocks, giving rise to an investment equation relating to change in the capital stock.

The major drawbacks of this approach are the assumptions of perfect competition and the exogenously given output which are inconsistent. In addition, the assumption of static future prices, output and interest rates is unrealistic given that investment is a futuristic process and the lags in delivery cannot be introduced in an orderly fashion as predicted by the model. The neoclassical model has its major appeal in that it addresses the primary motive for investment- that is profit maximization. This suggests that cost-benefit analysis calculations are at the heart of investors.

The variant of the above model was introduced by Tobin (1969). Tobin argued that main focus should be the link between the increase in the value of the firm as a result of installation of an additional unit of capital and its replacement cost. When the increase in the market value of the extra unit exceeds the replacement cost, firms will want to increase their existing capital or vice versa. This ratio identified in the literature as marginal Q, may differ from the other one because of delivery lags and adjustment or installation costs.

The major defects of the average Q as identified by Precious (1985) and Hayashi (1982) are that if firms enjoy economies of scale or cannot sell all their products, marginal or average Q will differ. In addition, they argued that the assumption of increasing installation cost is suspect. This is because the cost of acquiring additional capital stock by the firm is likely to be either proportional to the investment volume, due to the lumpy nature of most investment projects. Furthermore, since capital goods are firm specific with a low second hand value, disinvestment is more costly than investment.

In a comprehensive review of empirical investment studies on developing countries, Rama (1993) has raised an important question relating to the relevance of the industrial countries investment theories as

discussed above to developing countries. According to Rama (1993), four important specific features of developing nations need to be considered. Financial repressions, foreign exchange shortages, slow growth of infrastructure and macroeconomic uncertainty.

Agenor and Montiel (1996) have made further contributions to the theoretical debate, by emphasizing in addition, the underdeveloped nature of the capital markets in developing countries, external debt overhang and dependence on imported capital goods. He also argued that most empirical studies have been eclectic in the sense that different factors are taken into consideration depending on the researchers' view of important characteristics such as financial repression, foreign exchange strangulation, infrastructural constraints and external debt burden, and economic cum political instability. This approach differs from that of industrialized countries which are based on elaborate investment models.

Macroeconomic uncertainty plays a key role in determining investment behaviour in developing countries. Uncertainties arise from high and unstable inflation rate, unstable fiscal deficits, overvaluation or depreciation and exchange rate misalignment. Macroeconomic uncertainty or instability could also arise from political instability or poor macroeconomic management. When the future is highly uncertain, investors take a 'wait' and 'see' attitude. At the microeconomic level firms may decide to limit their capacity in the face of uncertainty in demand conditions, which leads to reduced investment capacity.

There are plethoras of literature on the determinants of investment behaviour. Iyoha (1998) investigated the macroeconomic issues important to stimulating investment behaviour in Nigeria. In particular, he estimated equations for both aggregate and private investment. His findings showed that interest rate, marginal product of capital, foreign exchange rate premium, external debt to income ratio, inflation were the key determinants of investment behaviour. His findings also revealed that the major determinants of private investment were public investment, return on investment, foreign exchange premium and a debt overhang variable.

Apkokodje (1998) explored the association between private investment and macroeconomic policies. His paper identified fiscal policy, exchange rate policy and monetary policy as macroeconomic policies. His findings confirmed previous studies submission of a negative impact of real exchange rate and high

inflation on private investment in Nigeria. The paper also emphasized the adverse effect of large budget deficits on private capital formation.

Bamidele and Englana (1998) investigated the relationship between macroeconomic environment and private investment behaviour. They found that Nigeria's macroeconomic environment occasioned by policy reversals, political instability and poor infrastructural facilities is responsible for the high cost of doing business in Nigeria. The paper concluded by arguing that macroeconomic stability, reliable and efficient infrastructure, diversified export base, political stability and transparency are factors required to lubricate the engine of economic growth and development in Nigeria.

Umoh (1998) investigated the relationship between rural financial markets, investment and rural development. His findings showed high potentials of the daily savings enterprises in financial intermediation process. The paper argued that to rekindled interest in rural savings and given the obvious failure of government initiatives in savings mobilization at the rural level, the daily savings enterprises becomes an important alternatives.

Bogunjoko (1998) examined private and public investment nexus, and growth and policy reforms in Nigeria. He used VAR framework to simulate and project, intertemporally, private investment response to its principal shocks, namely, public investment, domestic credit and output shocks. The results of the VAR show that government policies that produce sustainable output growth, steady public investment and encouraged the availability of domestic credit to the private sector will promote investment in the long and short term.

The focus of Blejer and Khan's (1994) study was on the role of government policy in stimulating investment. They derived an explicit functional relationship between the principle policy instruments and private capital formation. Using the model they investigated the extent of the crowding out phenomenon. Their study made a distinction between government investment that is related to the development of infrastructure and government investment of other kind.

Ariyo and Raheem (1991) attempted an inquiry into the determinants of investment in Nigeria. The determinants of investment highlighted in their study include public investment, rate of growth of GDP,

domestic credit to the private sector and interest rate. Their findings showed a strong evidence of the 'crowding out' among the variables estimated. Martin and Wasom (1992) modelled private investment in Kenya with the real exchange rate, foreign exchange reserves, credit, public investment and incomes as argument. Their results indicate the significance of all variables except interest rate and income.

Ekpo (1995) investigated the relationship between public investment and private investment. In particular, the study attempted to determine the influence of different categories of public expenditure on private investment. The study isolated infrastructure expenditure (which is social services expenditure that does not compete with private investment) from real sector expenditure like manufacturing and construction which compete with private investment. Social services crowd in private investment while expenditure in real activities like manufacturing and construction crowd out private investment. This strongly suggests that the private sector is better placed to invest in construction and manufacturing. The empirical findings further revealed that capital expenditure on agriculture positively influence investment, while capital expenditure on education and health exerts positive impact on private investment.

Obadan (1997) had argued that the success of most private firms in most cases is not based on any managerial expertise; rather it comes from government continued patronage. Ajakaiye (1997) summarizes this position by saying that a large part of what the public perceived as private sector profits are essentially transfers, through various tricks, from public sector organization.

Shonekan (1997) highlighted the usefulness of public sector expenditure to the development of Nigeria's private sector enterprises. He argued that public spending squeeze tends to produce recession of some sort in private sector operation. This underscores the annual ritual of private enterprises, who, usually wait for the direction of government policies and programmes through budget statements before making any new commitment.

The central thesis of Chete and Akpokodje (1997) study is that private investment in Nigeria is influenced by public investment and other factors including inflation, real exchange rate, change in domestic credit to the private sector and net foreign private capital inflow. Their paper concluded with the argument that public investment crowds in private investment in Nigeria.

Busari and Olaniyan (1998) investigated public investment and policy uncertainty in Nigeria from 1970 to 1994. The paper argued that in a bivariate framework, inflation uncertainty and fiscal deficit uncertainty impacts negatively and significantly on private investment decision. Their findings revealed a weak negative relationship between exchange rate uncertainty and private investment decision. A multivariate extension of the model confirms the bivariate analysis. The paper recommends that the relevant authorities should strive to reduce macroeconomic uncertainty if efforts aimed at improving private investment are to yield any positive and fruitful dividend.

The Model

The national income identity provides a useful starting point to establish the link between private investment (savings and investment) government size and the external sector behaviour, and can be summed up as follows:

$$Y = C + I + G + (X-M) \text{ ----- (1)}$$

Where,

Y = gross domestic product

C = private consumption

I = investment

G = government expenditure or absorption

X = exports

M = imports

Introducing net taxes (T) and net international receipts (IR) on both sides of the equation (1) yields:

$$Y + IR + T = C + I + (G-T) + (IR + X - M) \text{ ----- (2)}$$

Defining domestic savings as:

S = Y + IR – T – C in equation 2 yields

$$X + IR - M = S - I - (T-G) \text{ ----- (3)}$$

$X + IR - M$ = is the current account balance, and is equivalent to the increase in net official assets plus the rate of capital outflow or the increased rate of private claims on the rest of the world. That is,

$$CA = \Delta NFA \text{ ----- (4)}$$

Where,

CA = current account balance

ΔNFA = change in net foreign asset

Substituting equation 4 into 3 yields:

$$S - I - (T - G) = \Delta NFA \text{ ----- (5)}$$

In equation 5 if savings equilibrate investment ($S = I$) for the private sector, and tax receipts is less than government expenditure ($T \leq G$), the deficits could be financed in three ways- external and domestic sources or seignorage. The external sources include borrowing from external creditors or drawing down external reserves. The deficit could be financed domestically through an increase in public debt held by the private sector or by printing money.

Understanding how domestic borrowing is done will be useful in establishing the link between government size and private investment.

$$NFA_g = \Delta M_2 - \Delta DC \text{ ----- (6)}$$

Where,

NFA_g is the net foreign asset of government

M_2 is the broad money supply

DC is the domestic credit by the banking system to both government and non bank private sector (DC_{nb}).

Given the underdeveloped nature of Nigeria's capital market, fiscal balance is financed primarily either from seignorage, borrowing from the banking system or abroad.

$$G - T = \Delta DC_g - \Delta NFA_g \text{-----} (7)$$

Substituting equation 7 into 6, the link between government size and private investment is established as follows:

$$G-T = \Delta M_2 - \Delta DC_{nb} - (\Delta NFA_{nb} + \Delta NFA_g) \text{-----} (8)$$

Where,

ΔDC_{nb} = change in credit to non bank private sector

ΔNFA_{nb} = change in net foreign asset of non bank public

Equation 8 provides the three major sources of financing government expenditure. Namely increase in broad money supply (M2), borrowing from the banking system and drawing down external reserves or borrowing from abroad.

The three sources of financing fiscal deficits are not without its macroeconomic implications. For instance, it has been argued in the literature that financing government expenditure through seignorage is inflationary, and inflationary financing of fiscal deficit could cause portfolio shift of money (Egwaikehide, 1997). According to the Tobin-Mundell model, a high rate of inflation lowers the real interest rate. The low interest rate causes portfolio adjustment away from money balances to real capital. This induces a high level of investment.

The Tobin-Mundell model unfortunately may not apply in Nigeria due to the underdeveloped nature of the country's financial and capital market. Rather, a high rate of inflation moves portfolio adjustment from real money balances to real assets, thus suggesting that a high rate of inflation lowers investment. Furthermore, a high rate of inflation suggests macroeconomic uncertainty and the inability of monetary authorities to manage the economy. It follows that within the Nigerian economic environment; high rates of inflation are expected to lead to a contraction of private investment. Studies conducted by Oshikoya (1994), Green and Villanueva (1991), and Hadjimichael *et al.* (1995) confirms this negative association of inflation and private investment in developing countries.

Domestic borrowing could lead to two adverse effects. First, it could lead to a credit squeeze, which drives up interest rate in a free market economy or dampens financial repression in a regulated financial market. Second, fiscal financing of deficit via domestic borrowing crowds out private sector use of these resources as it drives up interest rate.

It has been argued in the received theory that fiscal financing of budget deficit through foreign borrowing leads to exchange rate appreciation. Appreciation of domestic currency vis-à-vis foreign currency drives the prices of imported inputs upwards and adversely affects private investment. The resultant debt servicing obligation adversely government investment and, given that public expenditure on infrastructure complements private investment, debt servicing do not only hurt public investment but by extension private investment.

The behavioural form of the model follows an eclectic approach, derived from the Keynesian, neoclassical and other theories as summarized in the literature review and conceptual framework. The model is adapted from previous studies by Apkokodje (1998), Wai and Wong (1982), Hall (1977), Jorgenson (1967, 1971). The estimated model is presented as follows:

$$\text{Invest} = \partial_0 + \partial_1 \text{GS} + \partial_2 \text{budgetd} + \partial_3 \text{inflatr} + \partial_4 \text{creditp} + \partial_5 \text{exchtr} + \partial_6 \text{intr} + \partial_7 \text{exdbt} + \partial_8 \text{pol} + \text{Ut} \text{-----} 9$$

A priori expectation = $\partial_1 \geq 0$, $\partial_2 \leq 0$ or ≥ 0 , $\partial_3 \geq 0$, $\partial_4 \geq 0$, $\partial_5 \leq 0$ or ≥ 0 , $\partial_6 \leq 0$, $\partial_7 \geq 0$, $\partial_8 \geq 0$

Where,

Invest = private investment (the residual of foreign private investment and government investment)

GS = Government size (the ratio of government expenditure to GDP)

Budgetd = fiscal deficit

Inflatr = inflation

Exchtr = real exchange rate of the naira to US dollars

Creditp = banking system credit to the private sector

Intr = maximum prime lending rate

Exdbt = external debt

Pol = political instability

Conceptual Framework

Theoretically we expect a positive relationship between government size and private investment behaviour. This is because increase in government size is likely to have a positive effect on economic growth as it increases the tempo of economic activities. This in turn increases real income and aggregate demand. Empirical literature on the impact of government size on investment has been very scanty. To the best of our knowledge no study in Nigeria has attempted to examine the impact of government size on private investment behaviour. Most studies focus on the impact of government expenditure on growth and the results are mixed. Aschauer (1989), Ram (1996), Esfahani and Ramirez (2003), for example found evidence that larger government size is positively correlated with economic growth. Landau (1983), Uwatt (2006), Barro (1991), among others, found a negative relationship between government size and economic growth.

In addition, government size is expected to complements private investment both on the demand and supply sides. On the demand side, government is a big spender most firms in Nigeria rely on government expenditure to deplete their stock of inventory. Government expenditure on infrastructures such as roads, electricity, water and transportation complement private businesses by reducing the costs of doing business on the supply side.

Exchange rate reforms may have positive or negative effects on investment depending on whether or not the reform leads to real appreciation or depreciation. Exchange rate appreciation will increase the cost of imported capital especially in Nigeria where most of the capital goods are imported and intermediate goods and subsequently depress investment. On the other hand, exchange rate depreciation that raises the profitability of traded goods sector would stimulate investment. Studies conducted by Akpokodje, (1998), Oshikoya (1994), and Chete and Akpokodje (1997) for developing countries have found a negative association of exchange rate and private investment. Moreover, private entrepreneurs may defer investment until they are sure the reform would be permanent.

Financial sector reforms such as an increase in real deposit rate or reduction in directed credit allocation policies, which increases the availability of bank credit to the productive private entrepreneurs, may

have a positive impact on investment. The received theory predicts an inverse relation between interest rate and investment.

Empirical literatures that attempt to investigate the impact of macroeconomic uncertainty on investment have used a variety of measures Precious (1985), Pindyck (1991), Salimano (1986), and Serven and Solimano (1993). In this paper we used the standard deviation of inflation as measures of uncertainty. The paper also includes a dummy (pol), which takes the value of one for post reform years and zero otherwise. The dummy is included to test whether the stabilization or adjustment policy reforms per se has influenced investment behaviour over and above its impact operating through other variables explicitly allowed for in the model specification.

Empirical Results and Discussions

Testing for Unit Root

Table 3.1 in the Appendix presents the results of the unit root tests based on ADF and PP. With the exception of the government size variable, the results obtain provide strong evidence that all the time series variables are non stationary and become stationary at first difference. This means that they integrated of order 1 at 95 per cent confidence intervals. The null hypothesis cannot therefore be rejected for most of the variables under scrutiny.

Since majority of the time series variables included in the regression line are $I(1)$, the use of traditional econometric technique such as OLS and the use of tests such as t-statistics and F-tests can lead to misleading result. The regression may produce results where all the diagnostic statistics are good, but in reality are spurious.

The unit root results indicate that the variables are integrated of different orders, and we can possibly conclude that various subsets of the variables under consideration may be co-integrated. To test this conjecture, we proceed to carry out further analysis of the variables.

Engle and Granger (1987) had demonstrated that albeit individual series could be non stationary, a linear combination of them might be stationary. Therefore, our next task is to investigate whether the variables under scrutiny are co-integrated. This is because the existence of co-integration allows us to establish

whether or not well defined linear relationship exists among them in the long run. To do this we use two approaches namely, the Engle Granger two step procedures and Johansen maximum likelihood approach.

The Engle-Granger Two Step procedure is simple and straightforward. It involves running regression using stationary time series achieve by using first difference of the variables and including in the regression as an explanatory variable the lagged residuals from the levels regression. The results of the Engle-Granger tests for equation 9 indicates that the residual of -4.150023 follow an $I(0)$ process using ADF, showing that the residuals from the levels regression are well defined. This indicates a strong evidence of the existence of a linear relationship between dependent and explanatory variables included in the regressions (Gujarati, 2004).

The Johansen ML technique has several important advantages in comparison with other methods such as Engle-Granger approach. First, it is an invariant test, which permits the existence of co-integration between the system variables without imposing bias on the estimates. As a result it does not assume somewhat arbitrarily the direction of the regression that can lead to different and misleading results. Second, it can identify whether more than one co-integrating vectors really exists. Thirdly, it can also estimate the long-run or co-integrating relationships between the non stationary variables using a ML procedure (Gujarati, 2004).

In summary, the Johansen test for co-integration is a multivariate unit root test which estimates the co-integration rank r in the multivariate case, and which is also able to estimate the parameters of these co-integrating relationships. To test for co-integration this procedure uses two test statistics- the maximum eigenvalue test, which tests the null hypothesis that there are $r+1$ co-integrating vectors versus the alternative hypothesis that there are r co-integrating vectors and trace test, employed to test the hypothesis that there are at most r co-integrating vectors.

Before presenting the result of the co-integration test, we need to determine the lag K of the autoregressive (VAR) model in levels because this is a critical stage in the Johansen ML procedure. The literature recommends the use of Akaika Information Criterion (AIC) and the Schwarz Bayesian Criterion (SBC) to select the lag length of the VAR system and this is achieved by minimizing the AIC

and SBC. In most cases both criteria agree with use of a lag length of 2 and in few cases where the choice criteria differs a smaller lag length might be used. The importance of an appropriate lag length is that if a researcher uses a VAR of greater order, such as 4, 5, or 6, the researcher might be taking a risk of over parameterization, a situation which is more acute in cases where the sample size is finite. Moreover, since the data series are annual, a cursory inspection of the preliminary result suggests that serial correlation is not a problem we therefore set the order of the VAR at 2 (Patterson, 1990).

Tables 3.2a and 3.2b (see Appendix) present the result of the Johansen co-integration tests using a VAR at an order of 2. The maximum eigenvalue statistics is used to determine the number of co-integrating vectors (r), from which we conclude that the results support the existence of at least four co-integrating rank. This suggests the presence of co-integration in the time series variables implying that normalized co-integration coefficient gives the long run relationship in the variables.

The presence of co-integration makes it possible to estimate error correction mechanism (ECM), which is a solution to the problem of spurious result associated with estimating equations involving time series variables, and to capture dynamic adjustment to the long run (Patterson, 1990). Adopting the general to specific framework, we proceeded to estimate over-parametised error correction model of equation 9 equation from where a parsimonious (preferred) error correction model would be obtained. The novelty of ECM is that it provides a framework for establishing the links between the long run and short run approaches to economic modelling. Thus with ECM no information associated with the variable first differencing is lost because the modelling technique incorporates both the short run dynamics and long run information through the error correction term. The over-parametised error correction model of money supply is presented in table 3.3 in the appendix. The equation includes ECM term lagged one period, representing the past value of the error correction factor whose coefficient should be negative and statistically significant to support the existence of co-integration.

Based on the result in table 3.3, the over-parametised model was further estimated using the general to specific approach and the summary of the parsimonious (preferred) model is presented in table 3.4. We arrive at the parsimonious model in table 3.4 by eliminating the jointly insignificant variables. A careful examination of the parsimonious results show that the error correction term is well specified as it has the expected a priori sign and is statistically significant.

Examination of the parsimonious model shows that the error correction term is statistically significant and has the correct a priori sign. The existence of a well specified error correction model indicates how agents adjust their anticipated changes in investment, and this case, about 40 per cent on the average. This means that about 40 per cent of disequilibrium in aggregate investment is corrected within a year. The nature of the distribution of the error term indicates that it is stationary. This means that the combinations of dependent and the explanatory variables are co-integrated. The existence of co-integration provides further validity of the regression results (Nyong, 1995; Engle and Granger, 1987; Domowitz and Elbadawi, 1987). A priori expectations about the signs of the parameters were met in four of the variables and were also statistically significant at 5 and 10 per cent levels. There were no indications of serial correlation as shown by the value of DW.

Since the validity of the diagnostic statistics requires that the error term follow a normal distribution, we proceed further to test the hypothesis that the error term is normally distributed using the Jarque-Bera test. The result shows that the JB statistics is about 4.80148, and the probability of obtaining such a statistics under the normality assumption is about 90 per cent. Therefore, we do not reject the hypothesis that the error terms are normally distributed. This suggests that the OLS estimators are unbiased; has minimum variance or efficient estimators; are consistence and follows a normal distribution.

To determine whether the parameters of the equation were constant over the reform period, equation 9 was re-estimated using the recursive OLS. Plotting the recursive estimates of coefficients of interest in the equation we found no evidence of structural instability in the parameter estimates. It follows that the coefficient estimates can be used for making inferences about the impact of policy reforms on investment behaviour in Nigeria.

The parsimonious result shows that external debt, interest rate, political stability and credit to the private sector are all significant variables important in explaining investment behaviour in Nigeria in the period under scrutiny. The lagged values of these variables were not statistically significant and were dropped. This suggests that economic agents in Nigeria depend more on current economic environment than in the previous behaviour to take investment decisions.

Surprisingly, government size variable was not a significant factor in influencing private investment decision in Nigeria despite the huge government expenditure over the last two decades in capital projects related to infrastructure. This supports the argument in the academia and political circles that government expenditures do not compliment investment decision. This could be attributed to high level of corruption and leakages in governance, and the unproductive nature of government expenditure.

The interest rate coefficient is not only a significant factor in influencing aggregate investment but has the correct a priori sign. This shows that decreases in interest rate reduces the cost of capital and increases the profitability of investment. The positive and significant of the political stability variable shows that political stability deepened aggregate investment in Nigeria.

The banking system's credit to the private is positive and significant, this implies that a one per cent change in credit to the private sector result in about 34 per cent increase in aggregate investment.

Concluding Remarks

This paper has attempted to investigate the determinants of aggregate investment in Nigeria within the framework of the ongoing reforms in the country. The empirical results show that the overall effect of the reforms has been successful but still below the threshold needed to drive investment to the desired level. The non significant of the government size variable (GS) is disturbing. This is because government expenditure on capital projects such as roads, electricity etc. are expected to compliment investment efforts of the private sector and government. It is obvious from the result that government expenditures are not having the right value.

The liberalization of the banking system has tended to help investment behaviour via interest rate and increased availability of credit to the private sector. The reform process has also resulted in some measure of political stability that has boosted investors confidence in the Nigerian economy as seen in the positive and statistical significant of the political stability coefficient.

The results show that a stable political environment is paramount to ensure a strong response of domestic and foreign investors to economic incentives. Poor performance of government expenditure is hampering the efforts to attract both foreign and domestic investors into the country despite various

incentives. In addition, it appears there is an urgent need to strengthen the budget preparation and execution process in Nigeria. This is because the non significant of government size variable strongly suggest the existence poor service delivery and that economic agents are not getting much value on government expenditure.

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Appendix

Table 3.1 Unit Root Test

Augmented Dickey-Fuller Test

Philip Peron Test

variables	Levels	1 st diff.	Lag length	Order of integration	Levels	1 st diff.	Order of integration
invest	2.601199	-2.766266	2	I(I)	-0.908976	-2.766266	I(1)
creditsps	-1.054464	-3.628150	2	I(I)	1.86991	-3.652072	I(1)
budgetd	-1.849200	-5.942593	2	I(I)	-1.954373	-5.942593	I(1)
Exdebt	-2.265712	-4.436955	2	I(I)	-1.680309	-7.468126	I(1)
intr	-1.817308	-2.971322	2	I(I)	-1.680309	-7.468126	I(1)
inflatr	-0.472318	-7.766668	2	I(I)	-0.829288	-7.852842	I(1)
exchtr	-0.156451	-5.727498	2	I(I)	-0.112010	-5.732212	I(1)
GS	-5.84450		2	I(0)	-5.844225		I(0)
mgdp	-1.644404	-5.318479	2	I(I)	-1.739102	-5.318479	I(1)
ECM1	-4.150023		2	I(0)	-4.56432		I(0)

Critical Values

1% = -3.626784

5% = -2.945842

10% = -2.611531

Critical Values

1% = -3.621023

5% = -2.943427

10% = -2.610263

Table 3.2 Johansen Co-integration Test

Date: 09/03/09 Time: 22:23				
Sample (adjusted): 1972 1994				
Included observations: 23 after adjustments				
Trend assumption: Linear deterministic trend (restricted)				
Series: CREDITPS EXCHTR EXDEBT1 INFLATR INTR INVEST MGDP				
Lags interval (in first differences): 1 to 1				
Unrestricted Co-integration Rank Test (Trace)				
Hypothesized				
		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.999984	569.8675	150.5585	0.0000
At most 1 *	0.995823	315.8191	117.7082	0.0000
At most 2 *	0.974263	189.8213	88.80380	0.0000
At most 3 *	0.901782	105.6449	63.87610	0.0000
At most 4 *	0.700071	52.27184	42.91525	0.0045
At most 5	0.505879	24.57502	25.87211	0.0719
At most 6	0.304764	8.360604	12.51798	0.2236
Trace test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Co-integration Rank Test (Maximum Eigenvalue)				
Hypothesized				
		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.999984	254.0484	50.59985	0.0001
At most 1 *	0.995823	125.9978	44.49720	0.0000
At most 2 *	0.974263	84.17643	38.33101	0.0000
At most 3 *	0.901782	53.37307	32.11832	0.0000
At most 4 *	0.700071	27.69682	25.82321	0.0280
At most 5	0.505879	16.21442	19.38704	0.1363
At most 6	0.304764	8.360604	12.51798	0.2236
Max-eigenvalue test indicates 5 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Table 3.3: The Over-Parameterized Error Correction Model of Growth in Nigeria

Variable	Coefficient	t-statistics
Log(GS)	0.458985	0.034179
Log(GS(-1))	-134631	-0.5411487
Log(exchtr)	0.081131	0.186706
Dlog(exchtr(-1))	-0.065677	-0.112262
Dlog(exdebt)	0.388083	2.013024
Dlog(exdebt(-1))	-0.065141	-0.236185
DLog(creditps)	-0.120780	-2.191626
DLog(creditps(-1))	-0.410342	-0.309439
D(budgetd)	-1.04000	-0.825368
D(budgetd(-1))	-2.00e-05	-0.964078
D(intr)	-0.048755	-2.627058
D(intr(-1))	0.024196	0.326898
D(mgdp)	0.007871	0.233647
D(mgdp(-1))	0.022921	0.512087
D(pol)	0.2285651	1.628247
ECM1(-1)	-0.606268	-1.656877

R^2 -adjusted = 0.30; DW = 1.5

Table 3.4 Parsimonious Error Correction Model of Growth in Nigeria

Variable	Coefficient	t-statistics
DLog(exdebt)	0.457643	4.939647
D(intr)	-0.036383	-3.930173
Dlog(creditps)	0.321083	2.213762
D(pol)	0.020154	1.820873
ECM1(-1)	-0.387388	-2.242064

R^2 -adjusted = 0.31; DW = 1.7