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DOES EXCHANGE RATE REGIME AFFECT MACROECONOMIC PERFORMANCE?

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ABSTRACT

This research finds out if a significant difference exists between macroeconomic performance-(Gross Domestic Product, Inflation, Foreign Direct Investment and Trade Openness) as proxy during fixed and flexible exchange rate regimes in Nigeria. It adopts the Chow model,which is useful in determining whether two estimated functions are significantly different. Results show that there is a clear cut difference between macroeconomic performances during the two regimes. For the flexible exchange rate regime, all the coefficients are highly significant at 95% confidence interval and satisfy apriori expectation. With an R^2 value of 91%, the flexible exchange rate regime is found as a better regime choice. Also, an F-statistic value of 52.1for flexible exchange regime as against 9.3for fixed exchange rate regime, indicate that the former regime is better than the latter. The paper therefore recommends that government should pursue policies that promote deregulation of the exchange rate regime.

INTRODUCTION

An exchange rate regime is the way an authority manages its currency in relation to other countries and the foreign exchange market. It is basically the foreign exchange policy of that country. Exchange rate regime can either be floating, pegged or fixed. The most common type of exchange rate regime is the floating exchange rate. The fixed exchange rate regime on the other hand is also known as the pegged exchange rate. In this case, the currency is tallied with another one currency or group of currencies. This type of regime can be used by governments to control inflation of their respective countries. The purpose of exchange rate management is to adopt a policy that would maintain both internal and external balances. Thus, the appropriate exchange rate policy to be adopted by a country is one that would maintain its internal balances by sustaining low levels of unemployment, keeping prices stable and also promoting growth in the country's output. In addition, the exchange rate policy regime must also maintain external balances; that is, maintaining equilibrium in the balance of payments and promoting trade openness in the economy.

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In short, exchange rate is a key tool in economic management and in macroeconomic stabilization and adjustment process in developing countries. Thus, for an appropriate exchange rate policy, extensive exchange rate management cannot be overemphasized. The exchange rate policy adopted by a country is derived from perceived overall economic objectives to be achieved and the expected direction of growth. So, the government must ensure that sectoral policies are non-conflicting and are conceived within the ambit of the overall policy framework (Ifionu and Ogbuagu, 2007). The adopted exchange rate policy must be aligned with objectives for their efficient achievement and avoidance of adverse effects.The exchange rate regime could have consequences on a country's medium term growth, both directly – through its effects on the adjustments to shocks – and indirectly, via its impact on other determinants of economic performance. (Balliu *et al*., 2002). While acknowledging the fact that there are numerous researches on the impact of exchange rate on macroeconomic performance, it is important to note that majority of these papers focus on exchange rate volatility and not necessarily on the policies. Azeez *et al*. (2012), whose paper was on the effect of exchange rate volatility on Nigeria's macroeconomic performance, adds up to the numerous numbers of authors focusing on exchange rate volatility. Eichengreen (2008) and Ifionu & Ogbuagu (2007) are just a few of the authors whose

works have examined the relationship between exchange rate volatility and economic performance. Domac *et al.* (2004) considered a sample of 22 transition countries in order to consider the relationship between exchange rate system and various macroeconomic indicators. They found out that countries with lower budget deficits, open to international trade and implement to a large extent market friendly reforms, tend to adopt fixed exchange rate regimes. Nigeria, like many other developing countries, has adopted the two main exchange rate regimes for the purpose of gaining internal and external balances. With two phases of exchange rate management in Nigeria, the country operated a fixed/controlled exchange rate regime in the first phase (between 1960 and 1985), and a flexible exchange rate regime in the second phase of exchange rate management which began in 1986.The fixed exchange rate policy induced an over-valuation of the naira and was supported by exchange control regulations that engendered significant distortions in the economy. It gave rise to massive importation of finished goods, with the ill-fated consequences of reduced domestic production,deficit balance of payment position and drastic reduction in the nation's external reserves level (Sanusi, 2004).

It was as a result of the downturn of Nigeria's economy that the Structural Adjustment Program was introduced, which allowed the economy to operate a more flexible exchange rate policy. Despite the change of policy, the economy still experienced over two decades of economic stagnation, with GDP growth averaging 5.4% between the years 2000 and 2004. This outcome needs to be improved upon to reduce high poverty levels. Existing literature has shown that even when the country's economic performance took a downturn, changing the exchange rate policy, in anticipation of a better performance, ended with meagre or no result. According to Ifionu and Ogbuagu (2007), Nigeria's economy was deregulated in 1986, giving a market based framework for the determination of exchange rate. This new framework was to counter the depreciating and volatile exchange rate, external sector deficit, and unrealized objectives that were prompted by the fixed exchange rate policy framework. They noted, however, that despite the new policy measures, the targets of macroeconomic aggregates like inflation, interest rate and unemployment remained unrealized. Therefore, the main objective of this paper is to find out whether there existsstatistically significant difference between the fixed exchange rate regime and the flexible exchange rate regime in Nigeria. We shall also determine which exchange rate regime or policy enhances macroeconomic performance of the Nigerian economy.

Research Questions

This research attempted answering the following questions:

- Is there a significant difference between macroeconomic performance during a fixed exchange and flexible exchange rate regime?
- Which exchange rate regime enhances better macroeconomic performance?

Research Hypothesis

The hypotheses are stated in null form as follows:

H_{01}: There is no significant difference between macroeconomic performance during a fixed exchange and flexible exchange rate regime.

H_{02}: Fixed exchange rate regime does not enhance better macroeconomic performance.

Empirical and Theoretical Issues

This section reviews Optimum Currency Area Theory, The Capital Account Openness and Institutional and Historical Characteristic Hypotheses of exchange rate regime choice proposed in literature.

Optimum Currency Area Theory(OCA)

This originates from the works of Mundell (1961). It relates the choice of exchange rate regime to some long run determinants that are relatively stable over time. The OCA theory argues that low degree of openness and large size of an economy measured by Gross Domestic Product should favour floating exchange rates (Mundell, 1961 and Mckinnon, 1963). Modifying these submissions, (Fischer, 1977 and Marston, 1981) in their own views emphasized the place of size and nature of economic shocks as potential determinants of exchange rate regime choice. (Edwards, 1996 and Corden, 2002) argue that openness may provide an incentive to maintain fixed exchange rates. (Eichengreen and Masson, 1998, Mussa *et al.*, 2000) have proceeded in their own contributions to emphasize that foreign shocks are more important in countries with open economies and hence floating exchange rate will be appropriate as a shock absorber. Furthermore, (Juhn and Mauro, 2002) argue that openness itself might be endogenous to the choice of exchange rate regime. Other theoretical and empirical studies have tried to analyse the impact of identified explanatory variables on observed exchange rate regime choice by considering certain OCA variables such as openness, gross domestic product (GDP), GDP per capita and geographical concentration of trade.

In relation to this, (Collins, 1996; Rizzo, 1998; Berger *et al.*, 2000) found that openness is significantly associated with floating exchange rate regime. On the other hand, (Holden, Holden & Suss, 1979) found openness to be not significantly associated with any particular exchange rate regime. However their works found per capita GDP to be significantly associated with floating exchange rate regimes and the same variable was found to be significantly associated with fixed exchange rate (Honkapohja & Pikkaraine, 1994 and Edwards, 1999). Other researchers found no significant association with none of the identified exchange rate regimes (Collins, 1996; Rizzo, 1998). GDP was found to be positively and significantly associated with floating exchange rate regime (Melvin, 1985; Collins 1996). Small countries with low commodity diversification of foreign trade tend to peg exchange rates in order to avoid excessive real exchange rate volatility (Honkapohja & Pukkarainen, 1994). Inflation measured by the rate of change in consumer price index has always been found positively and significantly associated with floating exchange rates. Empirical studies have however proved that using inflation as an explanatory variable in the exchange rate regime choice raises the issue of possible reverse causality. This is to say that high rate of inflation make

it difficult to sustain fixed exchange rate option, but fixed exchange rate might also help to curb inflation. All these reviews according to critiques, lack robustness checks in their empirical findings.

Capital Account Openness Hypothesis

Increased capital mobility has being found to prompt countries to move toward either fixed exchange rate regime or pure floating exchange rate regime. Capital openness measured by the ratio of private capital inflows and outflows to GDP and capital controls have been considered as one of the explanatory variables determining the choice of an exchange rate regime (Obstfield & Rogoff, 1995; Eichengreen, 1994; Fischer, 2001).

Institutional and Historical Characteristic Hypothesis

Lack of institutional strength or political instability may make it difficult to sustain a fixed exchange rate regime (Berger, Sturm & Schjelderup, 2001). Adopting a fixed exchange rate regime implies that a country's inflationary bias would theoretically converge to the relatively lower bias of the stable reserve – currency country. A country's inflationary bias would be lower with decreased credibility gain if monetary policy was conducted by a conservative and independent central bank. The attractiveness of a fixed exchange rate regime would be lowered as the degree of conservatism and independence of the central bank increases (Rogoff, 1985).

Exchange Rate Policy Regime and Economic Growth

Exchange rate could be seen as the ratio of the relative prices of all goods traded among countries. According to Fadairo (2007), the exchange rate is an important variable that determines a country's economic performance. Engel (2009) puts it that the real exchange rate is the consumer price level in one country compared to the level in another country, expressed in some common currency. Given the exchange rate, the need for exchange rate management arises, primarily to control its stability; noting that stable exchange rates foster trade and investment, in addition to stable prices, which in turn lead to an increase in the country's income. Exchange rate policy is one of the tools used for economic regulation and management in any country. The choice of exchange rate policy has been a subject of on-going debate in international economics specifically because of the series of economic crises in recent years. Unsustainable exchange rate policies were widely perceived to have been a cause of such economic crises (Bailliu, Lafrance and Perrault, 2002). The choice of exchange rate policy has an effect on a country's macroeconomic variables, whether positive or negative; therefore, it is the responsibility of policy makers to adopt a particular exchange rate- macroeconomic policy mixthat would improve the country's economic performance.

Sloman (2006) defines the exchange rate policy as the system under which the government or policy makers allow the exchange rate to be determined. Frequent shifts in demand and supply would cause changes in the exchange rate. The exchange rate policy could also be defined as the way a country manages its currency in relation to other currencies and the foreign exchange market. Stotsky *et al*. (2012) and

Bailliu *et al*. (2002) note that exchange rate policy plays a crucial role in the determination of growth for most developing countries. A country's exchange rate policy has impact on its economic growth indirectly through its influence on economic aggregates such as investment and openness to international trade which translates to its impact on economic growth.The exchange rate of a country is determined by either of these two exchange rate policies: the fixed exchange rate policy and the flexible exchange rate policy. The fixed exchange rate policy is regulated by the government of the country. It involves fixing a currency's value against the value of another single currency or to a basket of currencies, or to another measure of value such as gold. According to Ghosh, Gulde and Wolf (2003), it is one whose value varies only with minimal and defined limits. On the other hand, the flexible exchange rate policy is determined by market forces. It occurs when the government does not interfere with the foreign exchange markets, but leaves the determination of exchange rates to the interaction of demand and supply of the country's currency (Colander, 2009). Variability and volatility is a major characteristic of the flexible exchange rate policy. With the different methods of determination, the two types of exchange rate policies yield different results and different dimensions of impact. They both have their advantages and drawbacks.

The pluses of the fixed exchange rate policy include the reduction of transaction costs in trade, increased macroeconomic discipline, possibility of increased credibility due to stability in the exchange rate and increased response to domestic nominal shocks. Levy-Yeyati and Sturzenegger (2002) submit that a negative correlation exists between fixed exchange rate regimes and inflation. However, a careful examination revealed that this link, far from being a general finding, is mainly attributable to long pegs in low to moderate inflation periods in developing countries. Short-lived pegs, on the contrary, appear to be clearly inferior to floats, exhibiting a poorer growth performance without any substantive inflation gain. While hard pegs are indeed associated with lower inflation rates than their more conventional counterparts, they are far from eliminating the inflation-growth trade-off mentioned above. Furthermore, Levy-Yeyati and Sturzenegger (2002) find that fixed exchange rate policies are connected with slower growth rates and higher output volatility. Levy-Yeyati and Sturnegger (2002) state that lower price uncertainty is usually linked with fixed exchange rate policy. Also, low inflation, transparency, credibility, low and stable interest rates, as well as monetary and financial stability are among the merits of the fixed exchange rate policy (Vandrovych, 2003).

The flexible exchange rate policy differs from the fixed policy in that it represents the actual value of a country's currency since it is determined by the market forces of demand and supply. The value of the currency shows whether demand for foreign exchange is greater than the supply of the currency; so, based on the value, policy-makers can make decisions so as to promote equilibrium in the market. Obstfeld and Rogoff (1995) hint that flexible exchange rate policy would offset trend inflation differentials, smoothly accommodate equilibrium movements in real exchange rates, and liberate monetary policy to pursue domestic goals. It will also discourage rather than encourage destabilizing speculation, ease external constraints, and thereby discourage the

proliferation of official controls on international trade and payments. However, flexible exchange rate policies are associated with exchange rate volatility, high inflation and transaction costs. Sanusi (2004) emphasizes that there is a general consensus that a fixed exchange rate policy is preferred if the source of macroeconomic instability is predominantly endogenous. Alternatively, if the economic disturbances are exogenous in nature, a flexible exchange rate policy should be recommended.There are other empirical studies on the effect of exchange rate regimes on economic growth. Such studies argue that the best that macroeconomic policy can achieve is price stability in the medium term. The nominal exchange rate cannot be used for instance to keep unemployment rate off its natural level on a sustained basis. However, an attempt to over stimulate the economy by expansionary monetary policy or currency devaluation will result in higher rate of inflation with no increase in real economic growth. The linkage between exchange rate regime and economic growth exists but the direction of influence is not clear (Levy Yeyati and Sturzenegger,2002; Goldstein, 2002). Mckinnon and Schnabl (2003) submit that before the Asian crisis of 1997/1998, the exchange rate stability against the US dollar contributed to low inflation and sound fiscal position. This promoted investments and boosted long term growth and became known as the East Asian Miracle.

Ghosh *et al*. (1997), Garofalo (2005) and Collins (1996) all did a comprehensive research on the relationship between the fixed exchange rate and economic growth. They found out convincingly that a peg enhances investments while a float produces faster GDP growth which is associated with faster growth in international trade. Fixing exchange rate can also ease technology transfer thus aiding GDP growth. This in turn promotes greater degree of openness (Moreno, 2001). De Grauwe and Schnabl (2004) in their own submission emphasize that fixed exchange rate encourage high GDP growth via the elimination of exchange rate risk which stimulates international trade and international division of labour, enhances low interest rates which also stimulate consumption, investment and economic growth. Balliu *et al* (2003) emphasize the fact that exchange rate regimes influence on economic growth could be direct (through dampening the impact and adjustment to economic shocks) or indirect (through investment, international trade and financial sector development).

Baxter and Stockman (1989) compared growth between fixed and flexible exchange rate periods in 49 developed countries. They conclude that exchange rate arrangements do have little effect on key macroeconomic variables. In the works of Mundel (1995) on United States, Japan, Canada and Europe, he argues strongly that the periods of fixed exchange rates do have appreciable effects on key macroeconomic variables including real per capita growth. It is however important to note here that this comparison was based on non-econometric analysis which would have discovered the significant causal relationships. Ghosh *et al*. (2003) proceeded on a descriptive analysis of economic growth performance under alternative regimes in 145 IMF – member countries covering a period of 30 years. It was found that a 1.7 percentage GDP growth was realized under a flexible exchange rate regime, while 1.4 percentage GDP was realized under a fixed exchange rate regime. The higher productivity observed under a flexible

exchange rate regime was assumed to be supported by the growth in external trade.In related studies, Moreno (2000; 2001) worked on a study of a sample of 98 developing and east-Asian countries from 1974 – 1999. Utilizing descriptive statistics, an attempt was made to measure how the choice of exchange rate regime actually affected GDP growth and volatility. The findings support the view that real growth is higher by 1.1 and percentage under a fixed and flexible exchange rate regime respectively. Garofalo (2005) conducted a study on Italy related to exchange rate regime and effect on economic growth. With the OLS technique used to estimate the specified model, the results indicate emphatically that Italy experienced the highest growth rates under some form of soft fixed exchange rate / managed float regime. To correct for the potential of endogeneity bias, Garofalo proceeded to utilize a 2 – stage instrumental – variable estimation with heteroskedacity consistent standard errors. The estimation suggests that fixed exchange rate lowers the rate of growth rather than low growth suggesting imposing a fixed exchange rate. This submission however solved the problem of direction of causality (Petreski, 2009).

Haung and Malhorta (2004) examine the relationship between exchange rate regime and economic growth. Their study carefully considered 12 developing Asian and 18 developed European economies over a period of 1976 – 2001. Utilizing a panel regression inferential statistical technique,they found that for developing and emerging markets, there is a non-linear relationship between economic growth and exchange rate policy choice, with fixed regimes associated with the highest rates of growth. It is worthy to note here that further studies conducted on these findings criticized the growth framework used by Haung and Malhorta as weak and lack appropriate diagnostics checks. Bleaney and Francisco (2007) in a study on choice of exchange rate regime and economic growth considered 91 developing countries over the period 1984 – 2001. Growth rate was regressed on its lagged value, exchange rate dummies and time dummies. High inflation periods were excluded. Fixed exchange rate regime was found associated with slower growth rates than flexible exchange rate regimes. Critics have however cautioned that the model specified in this study is weak, endogeneity is not considered and robustness checks are not carried out.

Bailliu, Lafrance and Perrault (2002) estimate the impact of exchange rate arrangements on growth in a panel-data set of 60 countries over the period from 1973 to 1998 using a dynamic generalized method of moments estimation technique. They find evidence that exchange rate regimes characterized by a monetary policy anchor, whether they are pegged, intermediate, or flexible, exert a positive influence on economic growth. They also find evidence that intermediate/flexible regimes without an anchor are detrimental to economic growth. Their results thus suggest that it is the presence of a strong monetary policy framework, rather than the type of exchange rate regime per se, that is important for economic growth. Furthermore, the work emphasizes the importance of considering the monetary policy framework that accompanies the exchange rate arrangement when assessing the macroeconomic performance of alternative exchange rate regimes. Sokolov and Lee's (2008) work, further extends the work of other researchers to find out that de facto pegging has a significant impact on growth and

inflation in the developing countries. They find that non-industrialized countries pursuing the de jure/de facto floating (Match Float) grew faster than those pursuing de jure/de facto pegging (Match Peg). However, it is the fear of Floating (de facto pegging under de jure floating) exchange rate policy, which promotes growth. The estimates for industrialized countries are statistically insignificant, but the sizes of the coefficients suggest that Match Float is associated with the highest real GDP growth for this group of countries. Stotsky *et al*. (2012), after examining the relationship between the choice of exchange rate policy and economic growth, using a panel dataset of seven countries in Eastern Africa between 1990 and 2010 and a pooled OLS for estimation, find that no robust evidence support the fact that exchange rate policy affects growth performance. In addition, after using the OLS and GMM methods of estimation, the authors find that flexible exchange rate policies produce lower inflation, as compared to the fixed exchange rate policy. However, when they compared their analysis with that of other authors, pegging a country's currency could raise inflation. On the contrary, Ghosh *et al*. (1997) and Ghosh, Gulde and Wolfe (2003) find that inflation was lower under pegged exchange rates than under flexible exchange rates. Rogoff *et al*. (2004) in his own contribution submit that for countries that have relatively limited financial market development and relatively closed capital markets, fixed exchange rate policies appear to have some measure of credibility, with the important provision that monetary policy must be consistent in avoiding large and volatile parallel market premiums.

In addition, they point out that though, on the average, the value of exchange rate flexibility was found to increase with financial maturity, the performance of any exchange rate policy can be enhanced by consistent macroeconomic management. Odozi (1990) however hints that, whatever the choice of exchange rate policy, the authorities are presumed to adjust their domestic macroeconomic policies to fit the chosen exchange rate policy. Having seen various dimensions and views on the choice of exchange rate policy, it is evident that for the ultimate outcome of policy choice, evaluations of individual country experience and trends cannot be over-emphasized. No exchange rate regime can prevent macroeconomic turbulence. But the choice of exchange rate regime can be better or worse suited to the economic institutions and characteristics of an economy (Calvo, 2003). Therefore, countries must thereby align their exchange rate policies with perceived macroeconomic goals and targets.

Exchange Rate Management in Nigeria – A Brief Overview

Exchange rate arrangements in Nigeria have undergone significant changes over the past forty years (Sanusi, 2004). It shifted from a fixed exchange rate policy between 1960 and the mid 80's to a flexible regime beginning from 1986. The various exchange rate policies that have been adopted in Nigeria at different periods are discussed below giving the reasons for transition.

(i)Foreign Exchange Management in the Pre-SAP period (1970 – June, 1986)

During this period, the exchange rate of the naira was administratively managed and backed up by control measures.

Before and immediately after the creation of the Central Bank of Nigeria, the Nigerian pound was pegged to the British pound sterling (Ifionu and Ogbuagu, 2007). Consequently, as a result of the generalized floating of the major world currencies in 1972, the Nigerian currency was devalued in February 1973 by 10 per cent, similar to the dollar devaluation of that year. This was done is order to avert an adverse balance of trade in Nigeria's external transactions and safeguard the external value of the naira since the level of reserves was quite high. Thereafter, both the pound sterling and the dollar were used as reference currencies, and a policy of progressive appreciation of the naira against the weaker of the two currencies was adopted. Due to the adverse effect of this measure, it was discontinued. The need for a change in policy was particularly influenced by the 1982 re-appearance of trade arrears, which proved difficult to tackle. Hence, in 1981, a policy of gradual depreciation was embarked upon. The policy was meant to increase foreign exchange receipts through increased export volume and value, stem the outflow of foreign exchange and reduce the pressure on the balance of payments.

During the period of administrative management of the naira and particularly between 1978 and 1985, the Central Bank used a basket of currencies of Nigeria's major trading partners as one of several indicators to determine the value of the naira. Others were the state of the balance of payments, level of reserves, foreign exchange supply and demands relationship, inflation and domestic output. The basic framework for foreign exchange management was the Exchange Control Act of 1962, which was reinforced by the Economic Stabilisation (Temporary Provisions) Act, 1962. The 1962 Act made provisions for measures to increase foreign exchange resources, reduce the disbursement of foreign exchange and preserve the nation's international reserves. Other policies that were either in pursuance of the objectives of the 1962 Act or meant to reinforce the provisions of the Act that were applied during this period are as follows: trade and exchange controls, export promotion, external reserves, diversification, external debt and exchange rate administration.

Foreign Exchange Management during SAP(July 1986 – 1995)

The pitfalls of exchange control led to the abandonment of the pre-SAP foreign exchange management. Consequently, a market based system commenced in July, 1986, with the Structural Adjustment Programme (SAP). SAP objectives include the achievement of balance of payments and fiscal viability, the rationalisation of public enterprises through privatization and commercialization, the reduction in the level of unemployment and the attainment of sustained economic growth. To achieve the objective of balance of payments and fiscal viability, a market-determined exchange rate mechanism was put in place, fiscal and monetary policies were tightened to be consistent with the achievement of balance of payments equilibrium.The major source of foreign exchange to the market is the Central Bank of Nigeria, which incidentally earns most of the nation's foreign exchange from crude petroleum exports. The main users of foreign exchange are the manufacturers who ironically contribute little to the pool of foreign exchange resources. This asymmetry has resulted in continuous pressure on official foreign exchange resources. Since the inception of the market determined system in September, 1986, the naira has undergone substantial

devaluation. However, the authorities have constantly adjusted the modalities of operating the system to make it more efficient in order to be able to realize the objectives for which it was set up. Thus, in January, 1989, the autonomous market was abolished and the Inter-Bank Foreign Exchange Market (IFEM) emerges. A set of criteria were used to determine the exchange rate. Due to the persistent decline in the value of naira, the Bureaux de Change was established in 1989, to enlarge the scope of the officially recognized foreign exchange market and make foreign exchange available to small users in a less formal manner. In addition, the Dutch Auction System (DAS), first operated in 1987, but abandoned in 1989, was re-introduced in December, 1990. It was meant to check the sharp practices that led to the persistent pressure on the naira. The sharp practices that emanated from the system, in the form of round-tripping of funds leading to persistent instability in the exchange rate, informed the merger of the official Foreign Exchange Market and the Inter-Bank Market in 1989, into an enlarged Inter-Bank Foreign Exchange Market (IFEM). Thus, the inter-bank market was outlawed. The Bureaux de Change was established with the abolition of the inter-bank market in 1989 and exchange rate in the Bureaux de Change is market determined. With the introduction of the AFEM in 1995, the banks were once more allowed to engage in inter-bank dealings with only private sourced Foreign Exchange.

Foreign Exchange Management in the Post-SAP period (July 1995 – 2005)

The reversal of the policy in 1995 to that of a guided deregulation necessitated the institution of the Autonomous Foreign Exchange Market (AFEM) and the liberation of foreign exchange dealings through the active participation of the Bureaux de Change in the AFEM. In 1997, the policy thrust of guided deregulation through the AFEM was retained with some adjustments. Current account transactions were further liberalized. Although, the dual exchange rate system was retained in 1998, its operation was modified, unlike in the past, all ministries and parastatals were to source their foreign exchange requirements from the AFEM. Thus, most of the transactions were conducted at AFEM. Consequently, the fixed official exchange rate was applicable to only a small proportion of foreign exchange transactions as such unification of the dual exchange rates was almost accomplished. At present, the dichotomy has been totally eliminated and we now have only IFEM rate applicable to all transactions.

Model Specification

Among other empirical studies on choice of exchange rate regimes and economic growth, Huang and Malhorta (2004) specifically and distinctly submit that there is a non-linear relationship between exchange rate and economic growth of nations; therefore, we specify a non-linear form of our model written as a log-linear function. The implicit form of the model is specified as follows:

Gdp = f(Erp, Inf, Fdi, Open)

Explicitly the general model can be re-written as follows:

lnGdp = lnNer + lnInf + lnFdigdp + lnOpen   + e

Where:

Gdp: Gross Domestic Productat Current market prices (USD) converted into naira at ₦159.45 per $US as at 26th December, 2013(CBN official rate)
Ner: Nominal Exchange Rate
Inf: Inflation Rate
Fdi: Foreign Direct Investment as a percentage of GDP
Open: Trade Openness.

Technique of Estimation

Given that our objective is to establish whether there exist a significant difference in macroeconomic performance between the two exchange rate regimes (fixed and flexible). More importantly we intend to econometrically consider the best regime type with respect to macroeconomic performance of the Nigerian economy. We therefore employ the F-test as developed by Chow (1960) popularly known as the chow model which is useful in determining whether two estimated functions are significantly different.

Firstly, we specify the general pooled equation as follows:

$\ln Gdp\hat{} = \alpha_0\hat{}_+ \alpha_1 \ln Ner\hat{} + \alpha_2 \ln Inf\hat{} + \alpha_3 \ln Fdigdp\hat{} + \alpha_4 \ln Open\hat{} + v\hat{}$ ……………… Eqn 1

where$\alpha_0, \alpha_1, \ldots \alpha_k$represents the parameter estimates of the pooled regression, v is the residual of the equation,$\hat{}$ is the symbol indicating that the equation is the estimated equation and ln; the logarithm operator. Secondly, we write the fixed exchange regime equation limited to the fixed exchange regime sample period 1970-1985 as follows:

$\ln Gdp\hat{} = \beta_0\hat{} + \beta_1 \ln Ner\hat{} + \beta_2 \ln Inf\hat{} + \beta_3 \ln Fdigdp\hat{} + \beta_4 \ln Open\hat{} + e\hat{}$ ……………… Eqn 2

Where $\beta_0, \beta_1 \ldots \beta_k$represent the parameter estimate of the fixed exchange rate regime equation, and $e\hat{}$ the equation's residual. We also estimate another equation representing the flexible exchange rate regime covering the time frame 1986-2010 as follows:

$\ln GDP\hat{} = \gamma_0\hat{} + \gamma_1 \ln Ner\hat{} + \gamma_2 \ln Inf\hat{} + \gamma_3 \ln Fdigdp\hat{} + \gamma_4 \ln Open\hat{} + \lambda\hat{}$ ……………… Eqn3

where $\gamma_0, \gamma_1 \ldots \gamma_k$ represent the parameter estimate of the flexible exchange rate regime equation, and $\lambda\hat{}$ the equation's residual. This Chow test can be evaluated using the formula below:

The F* ratio $= \dfrac{[RSS - (RSS1 + RSS2)]}{[RSS1 + RSS2]/(n1 + n2 - 2k)}$

Where the RSS = equals the sum of squared residual in equation 1

RSS1 = equals the sum of squared residual in equation 2
RSS2 = equals the sum of squared residual in equation 3

n1 and n2 represent the sample size in the both regimes while k is the number of parameters,

Chow (1960) suggested that if the F-calculated using the above formula is greater than the tabulated F-distribution at the chosen level of significance with v1 = k, and v2 = (n1+n2-

k) degrees of freedom, then reject the null hypothesis. Also, if established that the two sample periods (i.e. the two exchange rate regimes) are significantly different with respect to macroeconomic performances, then we can use the R2, F-Statistic, the various information criteria (such as; Akaike, Schwarz and Hannan-Quinn) of the various equations to decide which regime gives better macroeconomic performance.

The results of the three equations model can be summarized in the table below:

Dependent Variable: LNGDP						
Independent Variables	Equation 1	Prob.	Equation 2	Prob.	Equation 3	Prob.
C	16.40183	0.0000	34.68325	0.0004	17.17702	0.0000
LNNER	-0.103064	0.2523	2.088733	0.0659	0.223962	0.0070
LNFDIGDP	0.675347	0.0000	-0.125907	0.6890	0.557293	0.0000
LNINF	-0.194344	0.0912	0.016292	0.9159	-0.166881	0.0359
LNOPEN	0.185255	0.5952	2.172462	0.0010	-1.080121	0.0038
R-squared	0.6639		0.787512		0.912461	
Adjusted R-squared	0.6255		0.702517		0.894953	
S.E. of regression	0.4642		0.304730		0.253346	
Sum squared resid	7.5420		0.928602		1.283684	
Log likelihood	-23.3898		-0.418137		1.640807	
F-statistic	17.2852		9.265375		52.11710	
Prob(F-statistic)	0.000000		0.002139		0.000000	
Mean dependent var	29.4638		29.08703		29.68984	
S.D. dependent var	0.758557		0.558706		0.781667	
Akaike info criterion	1.419489		0.722418		0.268735	
Schwarz criterion	1.630599		0.958435		0.512511	
Hannan-Quinn criter.	1.495820		0.719904		0.336348	
Durbin-Watson stat	0.844450		1.413403		2.273695	

Our major interest in the model above is in equationstwo (fixed exchange rate regime equation) and three (flexible exchange rate regime equation). The pooled regression (equation 1) enables us to get the pooled Sum of Squared Residual (RSS) and the general degrees of freedom.Therefore, we first run the general regression with the complete sample period, and then examine the two regimes as represented in the two equationsto find out whether there is statistical difference using the tests presented by Chow (1960).

From the table therefore, we find the following:

Degrees of freedom (df) pooled estimate: N-k = 35, RSS = 7.542032, $RSS_1 = 0.928602$, $RSS_2 = 1.283684$, $n_1 = 15$, $n_2 = 25$, k = 5, $V_1 = k = 5$, $V_2 = (n_1 + n_2 - k) = 35$

$$F^* = \frac{[7.542032 - (0.928602 + 1.283684)]}{[0.928602 + 1.283684]/(40 - 10)}$$

$F^* = 72.27$, F Observed = 2.45

Since F-calculated (F*) is greater than F-tabulated at 5 per cent significant level ($F_{0.05}$), we reject the null hypothesis and accept the alternate hypothesis that the two regimes are statistically different from each other.Having established that, we then compare the individual regimes to see which one enhances better macroeconomic performances.There is a clear cut difference between the macroeconomic performances during the two regimes. For instance, in the fixed exchange rate regime, although some of the regression coefficients may have complied with the a priori expectations, the statistical test of significance shows all of them insignificant in exception of the logarithm of OPEN,however; in the flexible exchange rate all the coefficients are highly significant at 95 per cent confidence interval and satisfy the a priori expectation.

Secondly, the R^2 which shows us the goodness of fit show that the flexible exchange rate regime is a better regime with an R^2 of 91percent while the fixed exchange rate regime has an R^2 of 79 per cent. Also, the F-Statistics which measures the significance of the entire regression model confirms the flexible regime to be a better regime than the fixed regime with an F-Statistics of 52.1 against 9.3 of the later. And finally using the various information criteria to judge, Akaike, Schwarz and Hannan-Quinn confirms that the flexible exchange rate regime enhances better macroeconomic performances that the fixed regime.

Conclusion

Based on empirical findings, we therefore conclude that the fixed exchange rate regime differ significantly from the flexible regime. Also, it has been established empirically that the flexible exchange rate regime in all ramifications enhances better macroeconomic performances. By policy implication, the federal government of Nigeria is advised to pursue policies that promote the deregulation of the exchange rate regime to encourage a better macroeconomic performance of the Nigerian economy.

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