Open Market Operations and Macroeconomic Stability in Nigeria: An Application of Co-Integration and Error Correction Modeling

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Abstract

This paper seeks to empirically assess the impact of indirect tool of monetary control on macroeconomic stability in the Nigerian economy. Four key areas were modeled using a static model. Results from both static and dynamic models were presented and the latter model yields more consistent and significant coefficients. Further, the error correction term in the four models was significant and correctly signed. The paper established case for macroeconomic stability through effective conduct of OMO operations in the long run. It supports the recapitalization measure of the CBN aimed at strengthening the financial system and better performance of the economy.

1.0 Introduction

The objective of attaining macroeconomic stability has been one of the major pre-occupations of policy makers in both developed and developing economies. Approaches to macroeconomic management have been neatly dichotomized under the normative branch of economics into monetary and fiscal options. While the latter relies on effective management of fiscal tools, which include: government budgets, taxes and government borrowing; the former involves the use of direct and indirect tools of monetary controls aimed at affecting the supply of money, cost and availability of credits. Set of factors affect the effectiveness or undermine the performance indicators across the two options, but, the main focus here is monetary policy.

Depending on which economy we talk about, factors like level of economic development, type of economic system, level of government involvement in economic activities, level of development of financial institutions, etc, determine not only the effectiveness of the monetary policy, but, the choice of tools or techniques of its implementation. In Nigeria for instance, the use of direct tools predominates before the implementation of the Structural Adjustment Programme (SAP) in July, 1986, (Ajayi

2003). With the economy's financial system emerging out of almost three decades of regulation, where macroeconomic target are set and pursued through a regime of tight monetary controls, the deregulation of the financial sector paves the way for a shift of emphasis in favor indirect tools, which are more market-based. According to Oduyemi (1993) the most potent instrument of indirect or market based technique is the use of open market operations (OMO). The Central Bank of Nigeria (CBN) in its monetary credit, foreign trade and exchange policy guidelines for the 2004/2005 fiscal year, identified the indirect tools as: Open market operations, interest rate, reserve requirements, discount windows operations and stabilization securities.

The direct tools of monetary controls, according to Ojo (1992), are: credit ceiling, selective credit control, administratively directed interest and exchange rates and special deposits. Open Market Operation was introduced in Nigeria in June 1993. Its implementation involves the purchase and sale of treasury bills in the money market with the aim of affecting the supply of money. According to CBN (2004), OMO involves the purchase and sale of government and other eligible securities by the bank. Begg, Fisher and Dornbush (2000) submit that it is when Central Bank alters the monetary base by buying and selling of financial securities in the open market. Whichever means of monetary controls the bank employs, the policy objectives basically remain the same. These include: price stability, economic growth and development, balance of payments equilibrium, full employment among others.

Against the background of these developments in the financial system, this paper seeks to assess the effectiveness of open market operations in the attainment of macroeconomic stability 1970 - 2004. The paper is organized into five sections. Section one is the introduction, section two reviews related literature and theoretical issues. The methodology of the paper is presented in section three, while section four contains the presentation and analysis of results. The last section that is, section five, summarizes and concludes the paper.

2.0 Literature Review and Theoretical Issues

The Nigerian money market is a platform, just like in any other economy, for the transmission of monetary policy. The market according to Nwankwo (1989), is a platform for the trading of short term securities, which provides services that are essential to a modern economy by facilitating trade and, therefore, increasing production. It offers access to a variety of financial institutions that enable economic agents to pool price and exchange risk. To put the market on the right track, OMO operations are aimed at controlling the monetary base, which in turn influences commercial banks' reserve balances. This, according to Nnanna (2002), allows the CBN to keep the base money and eventually broad money (M_2) at levels adequate for non-inflationary economic activities. Oduyemi (1993) identifies three types of transaction in securities in the OMO operations as: outright sale or purchase of securities in the market, repurchases transactions (Repos) involving the purchase or sale of securities with obligation to reverse the transaction on an agreed date and matched sale/purchase transaction, which is a simultaneous sale and purchase of securities for delivery at future date.

On the efficacy of monetary policy, Ojo (1992) discovers that movement in monetary aggregates indicates wide variations from the stipulated targets in most instances. He attributed this to excessive government spending covered by high powered money, which adversely affects macroeconomic stability. In the same vein, Iyoha (1995) in his critical assessment of the success of indirect tools of liquidity management, concludes that it has not actually met the expectation of the monetary authorities. Thus, Ajayi (2003) laments that the underdeveloped nature of the Nigerian financial system makes the transmission mechanism of monetary policy complex and uncertain.

On the other hand, Oke (1993) in his empirical study of the indirect tools of monetary controls discovers that the policy has raised the number and diversity of the financial institution as well as the scope of financial services they offer. At the level of other indices such as money supply growth, bank credit, interest rate, domestic output and exchange rate, he observes that while money supply and bank credit increased dramatically, interest rate structure was seriously distorted due to a number of factors,

which include: the transfer of government deposits from commercial banks to the CBN in 1989; the emergence of distressed banks in 1990; introduction of stabilization securities; etc. The period of rising inflation, that is, 1992 and 1993, however, saw an unprecedented rise in the level of interest rates and the widening of the gap between the deposit and the lending rates.

Exchange rate, on the other hand, depreciated persistently while marginal changes were recorded in the gross domestic product (GDP) within the period under review. In another empirical study, Jibia (2005) discovers that the unattractiveness of the OMO instruments as reflected in the treasury bills rate and the high level of fiscal indiscipline across the three tiers of government impair the effectiveness of the OMO operations as an instrument of liquidity management.

At the theoretical level, the rule of allowing money to grow at 4 – 5%, or at a rate consistent with the economic growth of a nation, is the lever of not only monetary management, but also of the entire economy under the monetarists school of thought. This sustains and promotes a non-inflationary growth and economic stability. The objectives of monetary policy, which according to Ajayi (2003) remain basically the same whether in developed or developing countries are: maintaining full employment, price stability and attaining balance of payments equilibrium. Although the same policy objectives can be attained using fiscal policy instruments, **Gittins (2003)** argues that while monetary policy can be implemented almost instantly, the implementation of fiscal policy is delayed by the time it takes to design an effective intervention, and the time it takes to put administrative apparatus required to implement it.

On the channel of policy transmission, liquidity, credit and exchange rate were identified as the main conduits through which the policy works in an economy. The liquidity channel otherwise called the interest rate channel exists when short term interest rates react to changes in liquidity or money supply to influence the operations of the economy. Credit or loan channel works through commercial banks and other financial institutions in the economy. The exchange rate channel propagates monetary

policy through the foreign exchange market. According to the monetarist, monetary policy is transmitted into the economy through a portfolio adjustment process, which changes in the stock of money set in motion.

Describing how the mechanism works, Friedman and Schwartz (1963) state that an expansionary OMO operation, (purchase of treasury bills in the open market) increases the stock of money in circulation and the ability of the banks to create more credits due to the positive effect of OMO on of level of their reserves. To achieve an efficient allocation, the bank and the non-bank public will reorder their portfolios in favor of the real sector and thereby increase the level of gross domestic product (GDP). Okun (1963) emphasizes the view that changes in money supply affect economic activities just as changes in economic activities affect money supply through the concept of credit availability. Other writers on monetary transmission include: Minsky (1963), Modigliani (1963), Tobin (1978), Laidler (1978), Campbell (1982), etc.

3.0 Research Methodology

The empirical analysis of this paper covers the period of 1970 – 2004, a period of twenty six years. This is despite the fact that OMO was introduced effective from 1993. The rationale behind extending the sample is to allow for a broader assessment of monetary policy in the country using the indirect means of control, before and after the introduction of OMO. Beside, the Central Bank in Nigeria had been intervening through the sale and purchase of treasury bills, which have been the main instruments of OMO since 1970's. Data was collected at annual level from the publications of the CBN on all the variables in the model. These are: gross domestic product (GDP), exchange rate (EXG), money supply (MSS), interest rate (INT), inflation rate (IFR) and level of domestic credit (DCM). Nominal values were converted into natural log and this qualifies the coefficients of the exogenous variables to stand in as their elasticities. Conventional regression method was first applied to test for the stationarity of the time series variable using the Augmented Dickey Fuller test (ADF). The test is based on the following specification: $\Delta X_t = \alpha_o + \beta X_{t-1} + \Delta X_{t-1} + U_t$. A residual co-integration test was also carried out to test the stationarity of the error terms.

Conventional OLS models were developed to empirically examine the effects of conduct of OMO, money supply and domestic credit (as exogenous variables on one hand) on the level of GDP, level of inflation rate and exchange rate (as endogenous variables on the other hand). Equation one has log real GDP as dependant variable, which is regressed against log of treasury bills, a measure of OMO operation; log of money supply (broad money); and log of domestic credit to the economy. Theoretically, the coefficient of treasury bills can be less than or greater than zero (this, however, depends on the desired effect of OMO on money supply), while that of money supply and domestic credit is greater then zero. The representation of the equations is as follows:

$$Ln\ \text{GDP} = \alpha_0 + \alpha_1\ Ln\ \text{TBR} + \alpha_2\ Ln\ \text{MSS} + \alpha_3\ Ln\ \text{DCM} + U_t \quad (1)$$

$$Ln\ \text{IFR} = \beta_0 + \beta_1\ Ln\ \text{TBR} + \beta_2\ Ln\ \text{MSS} + \beta_3\ Ln\ \text{DCM} + U_t \quad (2)$$

$$Ln\ \text{INT} = \Gamma_0 + \Gamma_1\ Ln\ \text{TBR} + \Gamma_2\ Ln\ \text{MSS} + \Gamma_3\ Ln\ \text{DCM} + U_t \quad (3)$$

$$Ln\ \text{EXG} = \gamma_0 + \gamma_1\ Ln\ \text{TBR} + \gamma_2\ Ln\ \text{MSS} + \gamma_3\ Ln\ \text{INT} + \gamma_4\ Ln\ \text{IFR} + U_t \quad (4)$$

Equations (2) and (3) are specified in the same way as equation (1). Inflation rate, which is the dependent variable in equation (2), is regressed against *ln*TBR, *ln*MSS and *ln*DCM. The coefficients of the latter two are greater than zero while that of the *ln*TBR is less than or greater than zero. In equation (3), interest rate depends on the same three independent variables as contained in equation (1) and (2), and the coefficients too behave in almost the same way. *Ln*TBR is greater than or less than zero because, theoretically, an inverse relationship exists between interest rate and price of bond, and other money market instruments. *Ln*MSS and *ln*DCM on the other hand are expected to be less than and greater than zero respectively. Equation four has exchange rate as the dependent variable and in addition to the three independent variables the equation has *ln*INT as an additional explanatory variable. The coefficient of *ln*TBR retains its expected value as in equation (1), (2) and (3); while those of the other independent variables, with the exception of interest rate, are less than zero. Higher money market rate, for instance, attracts foreign currencies into the economy and causes appreciation of the exchange rate, all things being equal.

To establish a long run relationship in the models, the order of stationarity of each of the variables is established using the Augmented Dickey Fuller (ADF) test and the Philip-Perron test. This is confirmed by the cointegrated Durbin-Watson (CRDW) statistic. Once this is satisfied, the next step is to establish the order of stationarity of the error term. According to Granger Theorem: if a set of variables are cointegrated of order 1, that is, *I*(1), then there exist a valid error correction representation of the data. In other words, Engle and Granger (1987) state that cointegration is a necessary condition for error correction model to hold. The error correction specification is of the form;

$$\Delta y_t = \alpha_0 + \alpha_1 \Delta x_1 + \alpha_2 (y_{t-1} - x_{t-1}) + \varepsilon_t \quad (5)$$

where x is a vector of explanatory variables and the specification assumes that the cointegrating vector is not known a priori. With the existence of stationarity in the error term obtained through a conventional regression, the error term has satisfied the necessary condition for its incorporation as a correction variable in the long run model. Thus, equations (1) to (4) can be re-specified as follows:

$$Ln\ \text{GDP} = \alpha_1\ Ln\ \text{TBR} + \alpha_2\ Ln\ \text{MSS} + \alpha_3\ Ln\ \text{DCM} + \alpha_4 \text{ECV}_t + U_t \quad (6)$$

$$Ln\ \text{IFR} = \beta_1\ Ln\ \text{TBR} + \beta_2\ Ln\ \text{MSS} + \beta_3\ Ln\ \text{DCM} + \beta_3 \text{ECV}_t + U_t \quad (7)$$

$$Ln\ \text{INT} = \Gamma_1\ Ln\ \text{TBR} + \Gamma_2\ Ln\ \text{MSS} + \Gamma_3\ Ln\ \text{DCM} + \Gamma_4 \text{ECV}_t + U_t \quad (8)$$

$$Ln\ \text{EXG} = \gamma_1\ Ln\ \text{TBR} + \gamma_2 Ln\ \text{MSS} + \gamma_3\ Ln\ \text{INT} + \gamma_4\ Ln\ \text{IFR} + \gamma_5 \text{ECV}_t + U_t \quad (9)$$

Equations (6) to (9) were estimated, and they formed the basis of analysis in the next section.

4.0 Empirical Results

This section presents the results of regression on the cointegration property of the variables and the conventional regression results of equations (1) to (4). This is followed by the cointegration test results of the residual term and the result of the long run specification of the error correction model.

4.1 Time Series Properties of Variables

Table 1 contains the results of the ADF and Phillips-Perron unit root tests of the variables. The tests were conducted at the level of first differencing of the variables. The two tests show that the hypothesis of nonstationarity is rejected at 1 per cent level of significance using MacKinnon critical values. Thus all the variables are stationary with no deterministic trend and with no intercept, that is, they are all *I*(1) variables.

Table 1

Augmented Dickey Fuller and Phillip-Perron Stationarity Tests

	ADF- Test				Phillips- Perron Test			
Variable/ Coefficient	Slope	t-Stat.	Critical Value*	CRDW	Slope	t-Stat.	Critical Value*	CRDW
Ln GDP	-2.00	- 6.60	-3.65	2.17	- 1.50	-10.61	-4.26	2.33
Ln EXG	-1.59	-5.59	-3.71	1.99	-1.12	-5.67	- 3.70	2.09
Ln TBR	-1.48	-5.58	-3.65	2.08	-1.13	-6.34	-3.64	2.07
Ln IFR	-1.72	-6.41	-3.65	2.08	-1.38	-8.63	-3.64	2.00
Ln MSS	-0.75	-6.68	-3.65	1.66	-1.47	-12.44	-3.64	0.44
Ln INT	-0.77	-4.06	-3.65	2.01	-0.95	-10.68	-3.64	1.55
Ln DCM	- 0.80	- 4.40	- 3.70	2.02	-0.68	-5.61	-3.69	1.88

Note: Researchers Computations from data presented on appendix 1
*MacKinnon critical values for rejection of hypothesis of a unit root.

Table 2 presents the result of conventional regression of equation (1) to (4) using ordinary least squares method (OLS). Generally, most of the coefficients of regression were statistically insignificant and with wide violations of the theoretical expectations of the coefficients. Except in equation (1) and (4), D. W. statistic in equations (2) and (3) reveals the presence of autocorrelation in all the models. This is notwithstanding the fact that F-statistic is significant at 1 per cent level in all the models, except in equation (1). The adjusted R^2, in addition, is above 70 per cent level in all except equation (1).

Table 2

Results of Static Models Estimated Using OLS: 1970 - 2004

Dependent Variable	Coefficient	t-values	Other Statistics	
Ln GDP				
C	7979306	1.119	R^2	0.118
LnTBR	-434831.5	-0.690	Adj. R^2	-0.057
LnMSS	353317.4	0.136	F- stat.	0.670
LnDCM	642553.2	-0.239	D.W.	2.220
Ln IFR				
C	-4.89	-5.38*	R^2	0.850
LnTBR	0.24	1.650	Adj. R^2	0.830
LnMSS	1.01	3.150*	F- stat.	56.37*
LnDCM	-0.25	-0.93	D.W.	1.260
Ln INT				
C	0.930	9.06*	R^2	0.750
LnTBR	0.024	1.45	Adj. R^2	0.720
LnMSS	-0.023	-0.65	F- stat.	30.77*
LnDCM	-0.064	-2.11	D.W.	1.150
Ln EXG				
C	-4.78	-5.81*	R^2	0.960
LnTBR	0.15	2.44**	Adj. R^2	0.950
LnMSS	0.12	1.95**	F- stat.	181.55*
LnDCM	1.38	2.23**	D.W.	1.420
LnIFR	0.58	7.78*		

Source: Extracted from Regression output using EVIEWS Software
*indicates significance at 1 per cent, ** indicate at 5 per cent

Nonetheless, the conventional regression above yields regression residuals that have satisfied the cointegration requirement and thereafter qualify to stand as error correction mechanisms. The test results, which are presented in table 3, reveal that all the four error terms are stationary at zero level of differencing. The calculated t-statistics are smaller than the MacKinnon critical values at 1 per cent level.

Thus, having fulfilled this requirement, the error terms can now be used as independent variables or error correction tools. With this result, we reject the null hypothesis of absence of long run relationship between the conduct of open market operation and macroeconomic stability. In other words, the conduct of monetary policy via open market operation determines long macroeconomic stability in the Nigerian economy.

Table 3

Residual Stationarity Test on Error Term

Variable/ Coefficient	Slope	t-Statistic	Critical Value	Decision
Equation 1	-1.12	-4.54	-3.86	*I*(0)
Equation 2	-0.64	-3.90	-3.64	*I(0)*
Equation 3	-0.41	-3.68	-3.64	*I(0)*
Equation 4	-0.76	-4.69	-2.63	*I(0)*

Note: Researchers Computations from data presented in appendix 1
*MacKinnon critical values for rejection of hypothesis of a unit root.

The next step, therefore, is to estimate equation (6) to (9) that were earlier specified in section 3 of this paper.

Table 4 contains the results of the dynamic specification of equations (6) and (7), which were estimated using the OLS. The appropriate lag structure of the model was analyzed based on general to specific simplification procedures using first differencing of all the variables and lags of up to three periods, in some cases. In addition the lagged error term EVC was included and estimated.

The results show that of the six regressors in equation (6), which has DLNGDP as dependent variable, it is only the coefficient of DLNTBR, which is not statistically significant. Again, the coefficient of DLNMSS is incorrectly signed. A plausible explanation could be due to influx of oil money into the economy and the monetization of the level government spending. The lagged coefficient of the ECV is also negatively signed, and this suggests that the influence of all non included variables accounted for by the correction mechanism exert a negative influence on the level DLNGDP. The value of cointegrated D.W statistic, besides indicating absence of autocorrelation in the long run model, also shows that the OLS regression yields a non spurious result because its value is greater than that of adjusted R^2. This holds for all the other regression results. In addition, the F-statistic indicates that the coefficients in the model are significantly different from zero at 99 per cent level.

Table 4

Results of Dynamic Models Estimated Using OLS: 1974 - 2004

Equation	Variable	Slope	Standard Error	t-Statistic
	Dependent Variable is DLNGDP(-1)			
Eq. 6	DLNTBR(-3)	38011.49	30569.01	1.243
	DLNMSS	-287104	162579.7	-1.765**
	DLNDCM(-1)	372384.9	95179.84	3.912*
	ECV1(-1)	0.998153	0.015623	63.891*
	ECV1(-2)	-1.00858	0.016642	-60.607*
	Adjusted R^2	0.996		
	D. W. Statistic	2.178		
	F – Statistic	2258.42*		
	Dependent Variable is DLNIFR(-1)			
Eq. 7	DLNTBR(-1)	0.2408	0.0154	15.583*
	DLNMSS(-1)	0.7314	0.0728	10.039*
	DLNDCM(-3)	0.0004	0.0449	0.009
	ECV2(-1)	1.0022	0.0242	41.243*
	ECV2(-2)	-0.994	0.0228	-43.459*
	Adjusted R^2	0.986		
	D. W. Statistic	1.772		
	F – Statistic	551.93*		

Note: Researchers Computations from data presented on appendix 1
*indicates significance at 1 per cent, ** indicate at 10 per cent

In equation (7), virtually all the coefficients are significant statiscally and consistent theoretically. Of particular importance is the positive relationship between money supply and inflation rate. The ECV variable in one and two-year lags has statistically significant and theoretically consistent coefficients too. The size of domestic credit, however, was found to have no significant effect on the level of inflation in the economy at three year lag. This exposes the fact that the bulk of money in the economy is outside the banking sector due largely, to the underdeveloped nature of the financial sector of the economy. Also just like in equation one, the D.W., the adjusted R^2 and the F- statistic are all within the acceptable bounds.

Results of the dynamic specification of equations (8) and (9) are presented in table 5. The result of equation (8) shows that all the coefficients are statistically significant and correctly signed, except the coefficient of DLNMSS and that of DLNDCM. The signs of these coefficients indicate that while lagged money supply positively relates to

interest rate; domestic credit in the economy is inversely related to the level of interest in the economy. The value of adjusted R^2, which stood at 98 per cent implies that changes in the dependent variable are well accounted for by the independent variables in the model. The values of D. W. and F-statistic also indicate the econometric reliability of the model.

Table 5

Results of Dynamic Models Estimated Using OLS: 1974 - 2004

Equation	Variable	Slope	Standard Error	t-Statistic
Eq. 8	Dependent Variable is DLNINT			
	DLNTBR	0.0221	0.0013	16.956*
	DLNMSS(-1)	0.00931	0.00223	4.1775*
	DLNDCM	-0.0786	0.00313	-25.133*
	ECV3(-1)	-1.01948	0.0272	-37.507*
	ECV3	0.9423	0.029	31.809*
	Adjusted R^2	0.9867		
	D. W. Statistic	0.9737		
	F – Statistic	483.34*		
Eq. 9	Dependent Variable is DLNEXG			
	DLNTBR(-2)	0.0191	0.0133	1.4334
	DLNTBR	0.1661	0.0139	11.985*
	DLNMSS(-1)	0.00051	0.0379	0.0135
	DLNINT(-2)	-0.0753	0.1376	-0.548
	DLNIFR	0.578	0.0266	21.714*
	ECV4(-1)	-0.9718	0.0515	-18.867*
	ECV4	1.0252	1.0252	21.075*
	Adjusted R^2	0.941		
	D. W. Statistic	2.022		
	F – Statistic	83.87*		

Note: Researchers Computations from data presented on appendix 1
*indicates significance at 1 per cent, ** indicate at 10 per cent

Lastly, the result of equation (9) shows that four out of the seven independent variables have statistically significant coefficients. Although money supply and interest rate are theoretically established to be significant factors affecting exchange rate in any economy, their statistical insignificance here can be due to low level of its elasticity, or

according to Fakiyesi (2003) that residents hedge against further depreciation of the domestic currency holding/hoarding foreign currencies due to poor market signals. The dynamic model performed very well with adjusted coefficient of determination assuming a value of 94 per cent, and the values of D. W. and F-statistic no autocorrelation and non-zero regression coefficients respectively.

Also from the results, besides the strong statistical significance and correct sign of the ECV variable, the variable, uniquely has an absolute value of a round figure of (1) in both actual and lagged form. This implies that the adjustment process is stable and that the dependent variables in the four equations adjust towards its long run value annually.

Summary and Conclusion

The attainment of macroeconomic stability is said to depend not only on a particular policy, but also on the reliability and efficiency of its instruments given the level of development of the financial market. The paper examines the use of instrument of open market operation in particular, which was introduced in June 1993, and treasury bills operations in general as a tool of monetary control. Four key macroeconomic aggregates were considered, which are the production sector (GDP), the domestic exchange sector (inflation), the monetary sector (money supply and interest rate) and the foreign trade sector variable (exchange rate). Multiple regression models were developed to capture and explain these four key areas using broader money aggregates/instruments as independent variables.

Results of conventional regression show that the models are generally weak; the independent variables have coefficients whose values were statistically insignificant and theoretically inconsistent. This, the paper discovers is due to the time series nature of the data. To correct this, the Augmented Dickey Fuller and Philip-Perron tests were carried out to establish the order of stationarity of the variables. All the variables were found to be stationary at first level of differencing and the residuals of the conventional models were stationary at zero level. With these outcomes, the short run static model was re-specified into a long run dynamic model by incorporating into it, an error

correction term. At the end the long run models yielded superior results; statistically and theoretically.

In conclusion, the paper establishes the existence of a long run relationship between open market operation in particular, and or the use of indirect tool of monetary control and macroeconomic stability in the Nigerian economy between 1970 and 2004. It was also discovered that domestic credit to the economy significantly determines changes in GDP in equation (6) just like money supply was found to be significant in explaining inflation in equation (7). Treasury bills intervention was found to have a significant positive effect on the level of interest rate via prices of bond in the money market in equation (8) while the same variable has a positive corrective effect on the level of exchange rate, although with an elasticity which is less than unity in equation (9). The error correction mechanism in all the four models, equally explains the dynamic speed adjustment process. This notwithstanding, the author believes that a key factor to macroeconomic stability lies in the nature and development of the financial markets. This has to do with the capacities of the operators in the market measured in terms of how they mobilize and disburse financial resources. The recapitalization and consolidation recently taking place in the Nigerian banking industry is a step towards achieving a stable macroeconomic environment.

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Appendix I

Value of regression Variables in Natural Logarithm
(1970 – 2004)

Year	LNTBR	LNINT	LNDCM	LNEXG	LNGDP	LNIFR	LNMSS
1970	4.62144	0.11570	NA	4.732	11.84616	2.62467	6.856356
1971	4.816241	0.79366	NA	4.167	11.93461	2.772589	4.610158
1972	5.013963	0.76923	NA	3.956	11.99525	1.163151	7.057295
1973	5.644739	0.73529	NA	3.911	14.66709	1.683695	7.254177
1974	3.921973	0.580645	NA	3.688	12.75203	2.595254	7.676103
1975	2.721295	0.48309	6.191544	3.552	12.5953	3.523415	8.194892
1976	2.734367	0.23904	7.869898	3.1810	12.62461	3.054	8.571473
1977	4.744932	0.197368	8.617834	3.067	12.64806	2.734367	8.861846
1978	4.516339	0.318840	8.994656	2.833	12.58695	2.809403	8.948912
1979	4.90082	0.285714	9.08876	2.340	12.67217	2.468099	9.195977
1980	5.289781	0.224056	9.285457	2.238	12.74618	2.292534	9.574802
1981	5.089446	0.194552	9.696549	2.627	12.57184	3.039749	9.651694
1982	5.323985	0.213248	9.960737	2.837	12.52201	2.04122	9.734714
1983	6.569481	0.173048	10.24631	2.586	12.40801	3.144152	9.871423
1984	6.314815	0.135980	10.34614	2.170	12.17986	3.678829	9.980471
1985	7.005335	0.117500	10.39453	2.650	12.25119	1.704748	10.07822
1986	8.110457	0.113850	10.5138	8.187	11.14399	4.657763	10.1102
1987	7.018849	0.165230	10.75634	9.663	11.56384	4.754452	10.30877
1988	6.333457	0.097130	10.95651	8.007	11842842	5.199601	10.66383
1989	8.390337	0.090209	10.80485	7.854	12.28672	5.608372	10.74123
1990	8.306917	0.094474	10.96258	9.000	12.46022	5.680855	11.08064
1991	7.825645	0.062953	11.33647	8.738	12.67685	5.801816	11.36387
1992	7.537057	0.065217	12.04983	12.234	13.20731	6.170447	11.7556
1993	5.205654	0.024365	12.54503	8.722	13.44677	6.622603	12.17821
1994	7.852322	0.017786	12.99251	5.645	13.7224	7.073863	12.48479
1995	8.669966	0.010186	13.06972	10.42	14.48881	7.620901	12.66245
1996	8.76499	0.007907	12.82417	9.920	14.82364	7.877814	12.81791
1997	8.915714	0.008145	12.81003	9.370	14.85755	7.95973	12.97432
1998	7.18675	0.006776	13.14704	8.870	14.8167	8.054904	13.16634
1999	8.466573	0.008098	13.35666	NA	14.99437	8.118982	13.45846
2000	10.18521	0.005492	13.06476	NA	15.39288	8.186047	13.85095
2001	10.38112	0.00500	13.65181	NA	15.52848	8.358901	14.08978
2002	10.80634	0.005173	14.15014	NA	15.56056	8.496378	14.2852
2003	11.10075	0.003708	14.43293	NA	15.59271	8.702194	14.50123
2004	11.42541	0.002017	14.51869	NA	15.64318	9.06783	14.63243

Complied by the author using values of variables in nominal terms

LS // Dependent Variable is DLNGDP(-1)
Date: 05/02/06 Time: 07:12
Sample(adjusted): 1974 2004
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNTBR(-3)	38011.49	30569.01	1.243465	0.2248
DLNMSS	-287104.3	162579.7	-1.765929	0.0891
DLNDCM(-1)	372384.9	95179.84	3.912434	0.0006
ECV1(-1)	0.998153	0.015623	63.89188	0.0000
ECV1(-2)-	1.008584	0.016642 -	60.60651	0.0000

R-squared	0.997130	Mean dependent var	0.116047
Adjusted R-squared	0.996689	S.D. dependent var	3057806.
S.E. of regression	175960.2	Akaike info criterion	24.30272
Sum squared resid	8.05E+11	Schwarz criterion	24.53400
Log likelihood	-415.6792	F-statistic	2258.416
Durbin-Watson stat	2.177612	Prob(F-statistic)	0.000000

LS // Dependent Variable is DLNIFR(-1)
Date: 05/21/06 Time: 01:01
Sample(adjusted): 1974 2004
Included observations: 31 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNTBR(-1)	0.240842	0.015457	15.58130	0.0000
DLNMSS(-1)	0.731410	0.072860	10.03851	0.0000
DLNDCM(-3)	0.000398	0.044940	0.008849	0.9930
ECV2(-1)	1.002135	0.024298	41.24286	0.0000
ECV2(-2)	-0.993935	0.022871	-43.45858	0.0000

R-squared	0.988360	Mean dependent var	0.243195
Adjusted R-squared	0.986569	S.D. dependent var	0.768107
S.E. of regression	0.089016	Akaike info criterion	-4.691188
Sum squared resid	0.206020	Schwarz criterion	-4.459900
Log likelihood	33.72633	F-statistic	551.9292
Durbin-Watson stat	1.772462	Prob(F-statistic)	0.000000

LS // Dependent Variable is DLNINT
Date: 05/02/06 Time: 07:16
Sample(adjusted): 1972 2004
Included observations: 33 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNTBR	0.022143	0.001306	16.95655	0.0000
DLNMSS(-1)	0.009310	0.002229	4.177482	0.0003
DLNDCM	-0.078691	0.003131	-25.13305	0.0000
ECV3(-1)-	1.019477	0.027181	-37.50744	0.0000
ECV3	0.942305	0.029624	31.80881	0.0000

R-squared	0.985724	Mean dependent var	-0.023989
Adjusted R-squared	0.983685	S.D. dependent var	0.059118
S.E. of regression	0.007551	Akaike info criterion	-9.633362
Sum squared resid	0.001597	Schwarz criterion	-9.406618
Log likelihood	117.1255	F-statistic	483.3426
Durbin-Watson stat	0.973777	Prob(F-statistic)	0.000000

LS // Dependent Variable is DLNEXG
Date: 05/02/06 Time: 07:30
Sample(adjusted): 1973 2004
Included observations: 32 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLNTBR(-2)	0.019052	0.013292	1.433339	0.1641
DLNMSS(-1)	0.000512	0.037905	0.013513	0.9893
DLNINT(-2)	-0.075334	0.137577	-0.547574	0.5888
DLNIFR	0.578262	0.026630	21.71440	0.0000
ECV4(-1)	-0.971885	0.051515	-18.86621	0.0000
ECV4	1.025169	0.048643	21.07519	0.0000
DLNTBR	0.166058	0.013855	11.98516	0.0000

R-squared	0.952670	Mean dependent var	0.166025
Adjusted R-squared	0.941311	S.D. dependent var	0.322021
S.E. of regression	0.078012	Akaike info criterion	-4.911143
Sum squared resid	0.152147	Schwarz criterion	-4.590514
Log likelihood	40.17226	F-statistic	83.86843
Durbin-Watson stat	2.021843	Prob(F-statistic)	0.000000