INTEREST RATE AND DOMESTIC SAVINGS IN NIGERIA: AN EMPIRICAL INVESTIGATION

I. J. JOHN AND A. S. ANTIA

ABSTRACT

Since the wake of the present civilian administration, there has been an aggressive drive for foreign investment to bridge the financial-investment gap (capital formation need). But there has been a less-than-expected foreign capital inflow; hence domestic savings become imminent. This work sought to understand whether interest rate (bank savings deposit interest rate) is a determinant of domestic savings to income ratio in a liberalized financial sector economy. Using secondary data from the Central Bank of Nigeria Statistical Bulletin (2004), Volume 15; and employing the ordinary least squares (OLS) method of analysis on the savings-interest rate model, it found that interest rate liberalization is not a determinant of saving-income ratio. Thus refuting the McKinnon-Shaw thesis of interest liberalization to boost growth in developing countries: It therefore recommended that Nigeria should not hurriedly "copy" the advanced nations in liberalizing her financial sector but should rather first develop her money and capital markets, provide adequate infrastructures, and maintain adequate functional institutions in her economy before financial liberalization; so as not to hurt her economy.

1.0 INTRODUCTION

When there is a reduced financial flow to a country from traditional sources (donors, foreign direct investors, portfolio investors, etc), the generation of domestic savings assumes critical importance. This implies the implementation of macroeconomic policy that is conducive to savings growth. It therefore becomes germane to evaluate government's interest rate policy in Nigeria since the structural adjustment (SAP) period, which liberalized the rate of interest in the economy, to determine its appropriateness and effectiveness vis-à-vis savings growth objectives.

The impacts of interest rates liberalization on savings and investment are a matter of considerable debate. McKinnon (1973) and Shaw (1973) set the ball rolling with the thesis that financial repression with ceilings on interest rates, high reserve requirement for banks, and directed credit to specific sectors of economic activity distort resource mobilization and resource allocation. Removal of these distortions would stimulate savings and investment and hence economic growth. These propositions have been challenged on the grounds that asymmetric information and moral hazard result in market failure, which can only be rectified with government intervention in financial markets as stated in Stiglitz and Weiss (1992). Also, removal of constraints on borrowing by households may stimulate consumption rather than savings; interest rate liberalization may change the composition of savings leaving the total volume of savings unchanged.

Nigeria's economic reforms initiated since in 1986 (SAP) including measures designed to liberalize the financial sector provide an opportunity to test the McKinnon-Shaw type of propositions concerning domestic savings. Following this introductory section is section II that looks at the theoretical framework and literature review on the relationship between interest rate liberalization and domestic savings growth. Section III presents the research methodology; section IV presents, analyzes, and interprets the research data; and finally, section V summarizes and concludes the work.

2.0 THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Theoretical Framework Relevant To This Study

The seminal work in the early seventies of Shaw (1973) and McKinnon (1973) placed at the heart of the development debate the issue of financial and monetary policy. McKinnon and Shaw were of the view that financial repression (i.e. the holding of interest rate below market levels) had retarded the growth of many less developed countries (LDCs). At the centre of the debate was interest rate policy, which often resulted in the imposition of below market rated rates thereby creating a disincentive to save, and retarding the process of financial deepening. The results were a shortage of investible resources and growth retardation. On the basis of this experience, Shaw and Mckinnon argued strongly for interest rate liberalization as a critical input into the process of growth and development. An important contribution to this argument was that of Fry (1995) who reviewed extensively the theoretical and empirical work on this issue and further theoretical and empirical support to the Shaw-McKinnon model. The growing acceptance of the model eventually led to financial reform becoming a standard element in structural reform programmes recommended by International Financial Institutions.

Increased interest rates, however, may reduce rather than increase the volume of savings for a number of reasons. First, the negative income effect of increased interest rates might offset the positive substitution effect between consumption and savings. Second, an increase in the real interest rate may merely reallocate the existing volume of savings in favour of financial savings as opposed to other forms of savings and leave the total volume of savings unchanged as stated in Gupta (1984) and Rangarajan (1997) both cited in Mahambare and Balasubramanyam (2000). Such a reallocation may also occur if reforms are likely to stimulate savings since the totality of incomes would be devoted to consumption.

Statistical evidence on the issue suggests that a one percent increase in the real interest rate raises the saving rate by only about one-tenth of one percent increase in the real interest rate in the relatively poor countries, whereas this coefficient is about two-thirds of one percentage point in the relatively rich countries as stated in Ogaki et al (1996). Fourth, even at relatively high levels of income, financial reforms, which ease, borrowing constraints may stimulate consumption rather than savings (Hall, 1978; Jappelli 1989, 1994).

Finally, increased interest rates may restrict the ability of the corporate sector to restructure production methods and hence its productivity and growth. And if the savings propensity of the household is lower than that of the corporate sector, total savings may decline as stated in Singh (1993).

I. J. JOHN, Department of Banking and Finance, University of Calabar, Calabar, Nigeria
A. S. ANTIA, Department of Banking and Finance, University of Calabar, Calabar, Nigeria

2.2   Empirical Literature Review

In general, empirical studies on the elasticity of savings with respect to interest rate have produced a mixed bag of results; empirical result has not provided a consensus on the validity of the McKinnon-Shaw model. Works which have found a positive significant relationship between savings and interest rate include: Yusuf and Peters (1984) for South Korea; Leite and Makonnen (1986) for six African countries; and Ostry and Reinhart (1992) for 13 developing countries; others in that line include Watson (1992), Fry (1980, 1999), Roubini and Sala-i-Martin (1992) and Modeste (1993). One of the more innovative and interesting approaches to testing the McKinnon-Shaw hypothesis was that of Roubini and Sala-i-Martin (1992) who, expanding on the growth model of Borro (1991), showed that financial repression, a dummy variable as a proxy capturing three ranges of the real interest rate, has been a factor in retarding growth in Latin America during 1960 to 1985. Studies that also found a negative or insignificant relationship include Ciovanini (1983,1985), Mwega et al (1990), Oshikoya (1992), and Reichel (1991). Others in this line are Dornbusch and Reynoso (1989), and Watson (1991).

Studies with mixed results include Gupta (1987), Labiri (1989) and Villagomez (1994). The weight of evidence, therefore, supports a weak and relatively low positive elasticity of savings with respect to the rate of interest.

Financial reforms, however, may stimulate financial savings in other ways than through an increase in interest rates. A reduction in controls on the financial system along with increased competition and improved customer service may result in increased savings. Access to savings instruments may not enhance the willingness to save but also result in the substitution of financial savings for investments in assets such as gold and jewellery. One other aspect of financial reforms, which may influence household savings, is taxation. Reforms, which reduce high marginal income tax rates and increase disposable incomes, may not only serve to eliminate tax evasion but also stimulate savings.

Tax reforms designed to reduce tariffs on trade and excise duties, however, may encourage consumption and reduce savings. Yet another issue, which has aroused considerable discussion, relates to the impacts of reforms on public savings defined to include current surplus of public administration and publicly owned enterprises as stated in Mahabare and Balasubramanyan (2000). The seemingly obvious proposition here is that reforms, which tend to reduce the profligacy of the public sector, would increase public savings and hence total savings. The much-discussed Ricardian equivalence theorem, however argues that an increase in public savings may be offset by an equivalent reduction in private savings leaving the total volume of savings unchanged. The Ricardian equivalent theorem rests on a number of assumptions such as well functioning capital market, perfect information, an independent banking sector free of government imposed restriction, none of which may hold in developing countries such as Nigeria. In any case, empirical evidence in support of the theorem is weak. Most studies detect a very weak negative relationship between public and private savings as stated in Edwards (1995), Corbo and Schmidt-Hebbel (1991). Indeed, increased public savings may promote total volume of savings. The experience of the East Asia countries is often cited as suggesting as much.

None of the existing econometric studies on savings discusses the impacts of differing type of foreign trade regimes on the savings rate. Most studies on economic and financial liberalization analyze the impacts of exports and foreign direct investment on growth, but not on savings (Greenaway et al 1997). It is likely that a relatively liberal foreign trade regime promotes savings. Typically, the savings rate tends to be high in relatively open economies such as the East Asian countries. Liberal foreign trade regimes may promote savings for a number of reasons, import competition may serve to reduce the prices of consumer durables, so too would increase flows of foreign investment in these industries. The resulting increase in real incomes may promote savings, provided both the income and substitution effects of a growth in income work in favour of savings as opposed to consumption. Liberalization of the foreign trade regime may promote competition and efficiency with a benign impact on growth and hence savings. Also, increased exports may result in increased savings if the propensity to save from export incomes is relatively high. Equally, remittances from expatriates abroad may increase with economic reforms, as has happened in newly industrializing countries (NICs), and promote savings.

To sum up, there are no settled conclusions on the impacts of financial liberalization on the savings rate. The one proposition, which seems to be robust, is that liberalization is likely to promote savings because of its impacts on growth. Nigeria's post SAP experience provides an opportunity to test this and other propositions highlighted in the reviewed literature.

3.0 RESEARCH METHODOLOGY

3.1 Sources of Data

The data were sourced from various secondary sources such as: The Central Bank of Nigeria Statistical Bulletin (2004) Volume 15; the Federal Bureau of Statistical (formerly Federal Office of Statistics) Abstract of Statistics (various issues) and Central Bank of Nigeria website. www.cenbank.org. Debt data was extracted from the Debt Management Office (DMO) Data Bank reported in Nyong (2005).

3.2   Technique Of Data Analysis

The analytical methodology was based on the ordinary least squares (OLS) method, which is based on the Gauss-Markov assumptions. The option was taken in order to establish a functional relationship between the dependent and independent variables; and to make possible predictions and/or economic forecasting. It will also enable one determine the degree of association between the dependent and independent variables. Here, the method involved the specification of a mathematical model, stating of the dependent and independent variables and stating of the a priori expectations about the sign and magnitude of the parameters. The log-linear transformation was preferred to the linear form because of its straightforward application in estimating output elasticity of the variables and to avoid scaling problem as followed by Amadi and Osara (2000), Ekpo (1997), and Friend and Puckett (1964). Also, if there is serial correlation in the residuals, a transformation of original function shall be made by either adding their lags, or including the first autoregressive term (AR) in the equation, which ever solves the problem. The model was estimated using Eviews (5.1 version) for accuracy and econometric manipulations.

3.3 Model Specification And Description

The McKinnon-Shaw model comprises two important hypotheses with respect to the impacts of financial liberalization on domestic savings, investment and growth. These include: that a rise in the expected real deposit interest rate leads to an increased savings-income ratio; and that income expands with the increase in expected real deposit interest rate as the quantum of investment as well as the productivity of investment rise because of the increased dumpiness of capital, the modernization of capital inputs and enhanced allocative efficiency in the capital market as stated in Kendall (2000).

This study sought to evaluate the former hypothesis in the Nigeria economy after the SAP period. Following the literature and modifying to include other variables believed to be affecting savings in Nigeria (Ekpo et al 2004); the savings function is presented as:

$$GDSY = f(Y, dr, DUTY, PIT, DUMS, OPEN, DEBS)$$
$$+ + \quad + \qquad - \qquad - \qquad + \qquad +$$

Log - linearilizing:

$LGDSY = b_0 + b_1LY + b_2Ldr + b_3LDUTY + b_4LPIT + b_5 LDUMS + b_6LOPEN + B_7LDEBS + Ut$...............................(3.1).

Where LGDSY= ratio of gross domestic savings to GDP (L behind a variable means log).

Y = growth rate of gross domestic product.

dr = bank savings deposit rate of interest

DUTY = Customs/excise duties revenue (a proxy for indirect tax)

PIT = Personal income tax revenue (a proxy for direct tax)

DUMS = Interest rate liberalization dummy

OPEN = openness to trade, trade orientation or

DEBS = external debt service to exports ratio.

The income and saving variables are derived from several theoretical antecedents--the permanent income, relative income and life cycle saving hypothesis. The coefficients of both variables are expected to be positive. The debt service ratio is included because of the enormous debt burden on the Nigeria economy since in the 1980s. The expected sign of the debt coefficient is positive since debt repayments are supposed to be sourced from savings. While use of the external debt variable as an argument in savings function is rare, it is nevertheless recognized that, depending on the circumstances of the particular economy, it may be an important influence in national saving behaviour as stated in Fry (1995). The inclusion of indirect tax variables (DUTY) follows from Maizel's (1968) hypothesis, which states that government, and private savings rely heavily on trade and direct taxes respectively. With the exception of the savings and income variables, all variables are assumed to be exogenous.

3.4   Limitations Of The Study

A major limitation of this study is the methodological constraint; given the current developments in theoretical econometrics where there is need to test for stationarity of time-series data for co-integration and error correction to " clean the data of white noise" (Adam, 1992:7), this work is limited because of the sample size which is not up to thirty years required for such analysis. It is therefore suggested that the use of co-integration technique be attempted in future to seek for the establishment of a long-run relationship among the variables.

4.0 PRESENTATION, ANALYSIS AND INTERPRETATION OF DATA

4.1 Presentations And Analysis

LGDSY = 2.36 - 0.22 LGGDP + 0.21LDR - 0.34 DUTY-0.33
t-stat   (0.72)   (-1.72)   (0.38)   *(-4.04)
        LPIT + 0.43 LOPEN - 0.21 LDEBS - 0.53 DUMS
t-stat   (-1.23)   (0.32)   (-1.02)   ***(-1.95)

$R^2 = 0.72$ R^2 (adj.) = 0.52   F- statistic= 3.66   DW = 2.059
ser = 0.51
*Significant at 1% level, *** significant at 10% level.

The above equation of gross domestic savings to GDP ratio (GDSY) shows a high explanatory power of the independent variables. The coefficient of multiple determination (R^2) of 0.72 or 72% indicates that about 72% variations in the observed behaviour in the dependent variable is jointly explained by the independent variables. The remaining 28% may better be accounted for by other omitted variables and is represented by the stochastic error term. The high R^2 indicated that the model fits the data well and is statistically robust; there is a tight fit of the model.

The F-statistic of 3.66 is significant at the 5% level considering the table F-statistic [$F_{0.05}$ (7,10)=3.14]. The calculated F-statistic is greater than the table F-statistic (i.e. 3.66> 3.14), therefore it is significant at 5% level. This buttresses the fact that the high R^2 is better than would have occurred by chance." The low standard error of regression (SER) of 0.51 also confirms the robustness of the model.

On the test of significance, the table t-statistic, two-tailed test, with degree of freedom, N-k =18-8=10, the following

correspond to 10%, 5% and 1% significance levels, respectively: 1.812, 2.228 and 3.169.

Any parameter that is less than the above figures (the least being the 10% level) is statistically insignificant in the model; and therefore, could as well be removed from the model and the overall goodness of fit (R^2) may not be significantly affected as stated in Koutsoyiannis (1977).

A cursory examination of the model shows that only customs/excise duties (DUTY) that were taken as a proxy for indirect taxes; and interest rate liberalization dummy (DUMS) were significant at the 1% and 10% levels respectively. The rest of the independent variables failed the test of significance in the model.

DUTY carried the wrong sign. This means that if there is a 1% increase or decrease in collection of DUTY, domestic savings to GDP (GDSY) will reduce or increase (respectively) by a margin of 0.34 percentage point.

The interest rate liberalization dummy, which was included to test the hypothesis whether there was a structural break in the economy since the introduction of the IMF-and World Bank--induced structural adjustment programme (SAP) in Nigeria. The variable impacted significantly but negatively in the model.

Another essential test is the second-order or econometric criteria: the DW statistic is 2.059. The table DW at 5% level indicates the following, given $K^1=7$ (excluding the constant term) and sample size (n) equals 19: then du =2.396, 4-du=1.604, dL=0.549 and 4-dL=3.441. The decision rule is: if calculated DW falls within the du and 4-du, then the results of the model are fantastic, reliable, and have no serial correlation in the residuals of the model; therefore there is no autocorrelation.

If it lies within du and dL or 4-du and 4-dL, then the results are inconclusive. But beyond the above-mentioned regions, the results will be critical and therefore have autocorrelation. In such a case, the results of the estimates will no longer be reliable for prediction and need transformation of the original model to solve the econometric problem. The DW statistic (2.059) shows that there is no serial correlation in the residuals of the model. Therefore, our estimates are reliable. A caution here is too many variables becoming insignificant may suggest multicollearity.

4.1.1   DISCUSSION OF FINDINGS

Given the empirical results of the model, the much-touted Mckinnon--Shaw thesis of financial liberalization (interest rate liberalization) as a critical input into the process of growth and development may not hold in Nigeria during the post-SAP period. Our study shows that the gross domestic savings to GDP ratio is not determined by the deposit savings interest rate, during the financial deregulation era in Nigeria. Our study confirms the works of Giovannini (1983,1985) Mwega et al (1990), Oshikoya (1992), Reichel (1991), Dornbusch and Reynoso (1989) and Watson (1991) who found negative, or insignificant relationship between savings growth and interest rate. The results refute McKinnon--Shaw hypothesis that a rise in the expected deposit interest rate leads to an increased savings income ratio. The level of economic growth in Nigeria does not boost savings--income ratio.

The high significant (but negative) and insignificant PIT relationship between savings income ratio and custom/excise duty refutes Maizel's (1968) hypothesis that government and private savings rely on trade and direct taxes respectively. In Nigeria, DUTY depresses savings-income ratio.

5.0. SUMMARY OF MAIN FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Summary of Main Findings

The main findings of the study include the following:
1.   Commercial banks savings deposit rate of interest is not a determinant of domestic savings-income ratio

during the post- SAP era. Thus, refuting the McKinnon–Shaw thesis of interest liberalization to boost growth in developing countries.

2.   The customs/excise duty (DUTY) revenue depresses the gross domestic savings–income rate in Nigeria after the liberalization of the financial sector, thus refuting Maizel's (1968) hypothesis. DUTY hurts our economy.

3.   There was a structural break in the Nigerian economy as the IMF World Bank–induced structural adjustment programmer (SAP) was introduced into the Nigerian economy.

5.2   CONCLUSIONS

This study provided empirical analysis for the McKinnon–Shaw thesis for Nigeria during the financial liberalization periods (1986-2004); and provided empirical refute of the policy of financial liberalization. Indications are that interest rate liberalization is not a determinant of savings-income rate during the study period.

5.3   Policy Recommendations

Based on these empirical findings, it was recommended that the managers of the Nigerian economy, the monetary policy makers in particular, should not liberalize the financial sector in line with the manner in the highly developed, industrialized nations because the less developed nations still have weak and underdeveloped money and capital markets which distort monetary policies. What is essential at this stage is to develop these markets, provide adequate infrastructures, create and maintain adequate functional institutions, etc and set the economy in the right footing before "copying" the advanced nations in liberalizing the nation's financial sector, or deregulating interest/deposit rate so as to not further "hurt" the economy.

REFERENCES

Amadi, S. N. and Osaro, O., 2000. Security Pricing & Nigerian Capital Market 1985-1994: some Reflections. African Journal of Business and Economic Research, 1 (1): 35 –48.

Barro, R., 1991. Economic Growth in a Cross Section of countries, Quarter Journal of Economics, 106(2): 407 –443.

Boyd, J. H. and Schonfeld, E. P., 1977. The Effect of Financial Press Advertisement on Stock Prices. Financial Management 116(2): 60-81.

Dornbusih, R., and Reynoso, A., 1989. Financial Factors in Economic Development American Economic Review, 79 (2): 204 –209

Edwards, S., 1995. Why are savings Rates so Different Across Countries? An International Comparative Analysis, NBER Working Paper, W5095

Ekpo, A. H., 1997. Foreign Direct Investment in Nigeria: Evidence from Time Series Data. CBN Economic and Financial Review, 35 (1): 59-78.

Ekpo, A.H. Ndebbio, J.E.U., Akpakpan, E.D, & Nyong, M.O., 2004. Macro-economic model of the Nigerian economy Ibadan: Vantage Publishers.

Friend, I. And Puckett, M., 1964. Dividend and Stock Prices. American Economic Review.

Fry, M., 1995. Money, Interest and Banking in Economic Development, John Hopkins University Press.

Fry, M. J., 1980. Saving, Investment, Growth and the Cost of Financial Repression, World Development, 8(4): 317-327.

Giovanini, A., 1983. The Interest Elasticity of Savings in Developing Countries: the Existing Evidence. World Development, 11 (7): 601 – 607.

Giovannini, A., 1985. Saving and the Real Interest Rate in LDCs, Journal of Development Economics, 18:197 – 217.

Greenaway, D., Leybourne, S., Sapsford, D., 1997. Modelling Growth (and Liberalization) using smooth Transition Analysis, Economic Enquiry, 34 (4): 789- 814.

Greenaway, D. and Sapsford, D., 1987. Fiscal Dependence on Trade Taxes: A further Econometric Investigation. Public Finance, 42: 309- 319,

Gupta, K. L., 1984. Financial Intermediation, Interest Rates and the structure of Savings: Evidence from Asia. Journal of Economic Development, 9: 7 – 22.

Gupta, K. L., 1987. Aggregate Savings, Financial Intermediation, and Interest Rates. Review of Economics and Statistics 69 (2): 303 – 311

Hall, R. E., 1978. Stochastic Implications of the Life – Cycle Permanent Income Hypothesis: Theory and evidence. Journal of Political Economy, 86: 971 – 987.

Jappelli, T and Pagano, M., 1989. Consumption And capital Market Imperfections: An International comparison, The American Economic Review, 79 (5): 1088 – 1105.

Jappelli, T. and Pagano, M., 1994. Saving, growth, and liquidity constraints. The Quarterly Journal of Economics, 109 (1): 83 – 109.

Kendall, P., 2000. Interest Rates, Savings and Growth in Guyana. http:www.lums.co.uk/publications.

Lahiri, A., 1989. Dynamics of asia savings: the Role of Growth and Age Structure, IMF staff papers, 36; 228 – 261.

Leite, S. P. and Makonnen, D., 1986. Saving and Interest Rates in BCEAO countries: An Empirical Analysis, Savings and Development, 10 (3): 219 – 131.

Mahambare, V. and Balasubramanyam, V.N., 2000. Liberalization and Savings in Developing countries: The case of India. http:llwww.lums.co.uk/publications.

Maizels, A., 1968. Exports and the Economic Growth of Developing Countries. Cambridge University Press.

Mckinnon, R. I., 1973. Money and Capital in Economic Development, Washington, DC: Brookings Institute.

Modeste, N., 1993. An Empirical test of the Mckinnon Model of Un-repression and Economic Growth: The Experience of some Caribean Countries. Social and Economic Studies, 42 (2): 81 – 94.

Ncebe, M., 1994. The dynamics of Trade and Economic relations in Southern Africa: current status and options for the future. In: Economic Policy Experience in Africa: what have we learnt? (eds.) Atsain, A., Wangwe, S. and Drabek, A. G. African Economic Research Consortium, Nairobi, Kenya.

Ndiyo, A. N., 2005. Fundamentals of Reasearch for Behavioural Sciences and the Humanities. Calabar: Wusen Publishers

Nwega, F.M., Ngola, S.M., and Mwangi, N., 1990. Real Interest Rates and the Mobilization of Private savings in Africa: A case study of Kenya, African Economic Research Consortium (AERC) Nairobi: English Press Ltd.

Nyong, M. O., 2005 International Economics, Theory, Policy and Applications. Calabar: Wusen publishers

Ogaki, M. J., Ostry, D., and Reinhart, C.M., 1996. Saving Behaviour in Low – and Middle – Income Developing Countries, IMF Staff Paper, 43(1): 38 – 71.

Oshikoya, T. W., 1992. Interest rate Liberalization, Savings, Investment and Ostry, J. and Reinhart, C. M. (1992). Private saving and Terms of Trade Shocks: Evidence from Developing Countries, IMF Staff Papers, 39: 495 –517.

Rangarajan, C., 1997. Financial Development and Economic Growth. Dr. V. K. R. V. Rao Lecture, The Institute of Social and Economic change.

Reichel, R., 1991. The Macroeconomic Impact of Negative Interest Rates in Nigeria: some Econometric Evidence, Savings and Development, 15: 273 – 282.

Roubini, N. and Sala- I-martin, X., 1992. Financial Repression and Economic Growth. Journal of Development Economics, 39:5-30.

Shaw, E. S., 1973. The Financial Deepening in Economic Development, New York: Oxford University Press.Watson, P., 1991. Specification and analysis of savings Functions for the Organization Of Eastern Caribean States, University the West Indies, Mimeo.

Watson, P., 1992. Savings, the Rate of Interest and Growth in a small open Economy: The Trimdad and Tobago Experience. Social and Economic Studies, 41 (4): 251-270.

Yusuf, S. and Peters, K. P., 1984. Savings behaviour and its Implications for Domestic Resource mobilization, The case of the Republic of Korea, World Bank Staff Working Paper, 628. The World Bank, Washington D C.

APPENDIX
AREGRESSION RESULTS

Dependent Variable: LOG (GDSY)
Method: Least Squares
Date: 04/26/07 Time: 10:04
Sample: 1986 2004
Included Observations: 18
Excluded Observations: 1

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.359245	3.259520	0.723801	0.4858
LOG(GGDP)	-0.215287	0.124870	-1.724086	0.1154
LOG (DR)	0.209332	0.557692	0.375354	0.7152
LOG (DUTY)	-0.340430	0.084217	-4.042288	0.0024
LOG (PIT)	-0.332619	0.269729	-1.233156	0.2457
LOG (OPEN)	0.430264	1.330537	0.323376	0.7531
LOG (DEBS)	-0.210302	0.206951	-1.016194	0.3335
DUMS	0.534820	0.274493	-1.948423	0.0800

R-Squared	0.719027	Mean dependent variable	-2.192852
Adjusted R-Squared	0.522346	S.D. dependent variable	0.731870
S.E. of regression	0.505813	Akaike info criterion	1.775805
Sum Squares resid	2.558473	Schwarz criterion	2.171526
Log likelihood	-7.982243	F-statistic	3.655806
Durbin-Watson stat	2.059840	Prob (F-statistic)	0.031792

Source: Computer print out

APPENDIX B
Nigeria's Macroeconomic Variables

Year	GDSY	GGDP	Dr	DUTY	PIT	OPEN	DEBS
1986	0.19	2.5	9.5	1728.2	433.7	37.6	29.4
1987	0.17	-0.7	14	3540.8	407.6	53.3	11.8
1988	0.16	9.9	14.5	5672	540.5	45.2	10
1989	0.11	7.2	16.4	5815.5	938	57.9	26.9
1990	0.11	8.2	18.8	8640.9	1724	72.2	28.1
1991	0.12	4.8	14.29	11456.9	3040.4	68.6	29
1992	0.1	2.9	16.1	16054.8	4903.1	82.7	19.8
1993	0.12	2.2	16.66	15486.4	5626.5	97.3	16.6
1994	0.12	0.1	13.5	18294.6	3888.2	82.5	15.2
1995	0.05	2.5	12.61	37364	20436.4	86.5	13.8
1996	0.05	4.3	11.69	55000	3407	75.6	11.6
1997	0.05	2.7	4.8	63000	8339.9	75.2	9.8
1998	0.06	1.9	5.49	57.7	11431.6	57.46	14.2
1999	0.3	1.1	5.33	87.9	20076.5	62.05	226.6
2000	0.3	4.2	5.29	1.5	380061.6	62.42	147.8
2001	0.35	3.1	5.49	170.6	44405.2	62.48	153.9
2002	0.04	1.5	5.08	181.4	68134.5	60.86	180.2
2003	0.04	10.7	4.15	195.5	54164.4	65.01	176.9
2004	0.05	6.1	4.19	217.1	56164.5	65.01	193.6

Source: CBN Statistical Bulletin (2004), Volume 15

GDSY= ratio of gross domestic savings to GDP
GGDP= growth rate of gross domestic product
Dr   = bank savings deposit rate of interest
DUTY = Customs/ excise duties revenue in Nmillion
PIT   = personal income tax revenue in Nmillion
OPEN= openness to trade (i.e. exports+ imports/GDP)
DEBS= external debt service to exports ratio