

FINANCE GROWTH NEXUS IN NIGERIA: AN APPLICATION OF CO-INTEGRATION AND ERROR CORRECTION TESTS

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ABSTRACT

The role which deposit money banks play in the Nigerian economy with reference to the facilitation of flow of money and credit in the economy cannot be over looked. Therefore this study examines empirically the nature of relationship between economic growth index (GDP) and the finance indicators, namely private sector credit to GDP; private sector deposit to GDP and broad money to GDP employing the Johansen co-integration test and error correction model test on secondary data for a period spanning from 1986 to 2011. The empirical results show that a long run positive relationship exists between growth index and finance indicators. Consequently, it recommended that in order to achieve high rate of economic growth, besides the effective regulation of its framework, the central Bank of Nigeria must insist that deposit money banks directs most of their credits to the private sector so as to facilitate real sector development and enhancement economic growth.

KEYWORDS: Bank, Co-integration, Deposit, Financial, Money, Nexus

INTRODUCTION

It is widely believed that economic growth depends mostly on the efficiency of resource allocation or degree of financial intermediation. Deposit money banks facilitate the process of financial intermediation by channeling resources to the deficit sector for investment purposes at a price. Banks provide the credit as well as primary means of facilitating the flow of credit so as to promote investment and resources utilisation which helps to increase aggregate economic activity thereby raising output, income and employment.

Many researchers have empirically examined the relationship between growth and financial system development in terms of resources provision and allocation. They supported the significance of deposit money banks to the growth of the economy through their financial intermediation model (Mckinown 1973, Shaw 1973, Fry 1988, King and Levine 1993). These studies provided evidence on the link between financial system developments and growth index in the economy. They adopted sectoral data such as the financial deepening and deposits/credits relative to gross domestic product (GDP) and found that financial system development has a significant positive impact on economic growth.

In Nigeria, the broad objective of national economic policy has been the desire to promote economic growth especially through facilitating the intermediation role of deposit money. Economic growth confers many benefits which include increase in standard of living, income distribution equity. Early economists such as Schumoeter (1934) identified banks' role in facilitating technological innovation through their intermediary role. He believed that efficient allocation of savings and implementing innovative products and production processes are tools to achieve this objective.

Economic growth is measured in terms of level of production of goods and services within the economy. Other measures of growth include factor productivity, technological change, human capital development, real per capita GDP amongst others (Odedokun 1998; King and Levine 1993; Adamoponlos 2001). The positive transformation of an economy is a function of how banks mobilize fund and making it available for use by deficit units such as domestic and foreign entrepreneurs. Additionally is the level of infrastructural provision by the government with respect to creating a desirable enabling environment and also the suitability of the existing macroeconomic and fiscal policies.

Alternative explanations have been offered on the relationship between financial intermediation and growth. However, divergent views exist. But in essence, financial intermediation propels growth. According to Bayoume and Melander (2008) a reduction in the level credit to the economy particularly private sector leads to reduction in the level of growth (GDP) by a considerable percentage. This is because the level of growth in the economy is dependent on the level of credit delivered to the private sector for real sectoral development.

In view of the above finance – growth nexus and gaps and challenges of previous studies, there is need to re-examine the problem by applying Nigerian time series data using modern econometric techniques (co-integration and Error correction tests). Therefore the main objective of this study is to examine empirically the effects of financial intermediation on Nigeria's economic growth index by determining the nature of relationship between economic growth and selected financial intermediation indicators. Furthermore, the nature of the relationship between economic growth index and finance intermediation indicators has generated a prolonged controversy among scholars. Studies like Odedokun (1998), Olomola (1995), Shaw (1973), Nnanna (2004) suggest that financial intermediation promotes growth. However, there exists some problems in the area of robustness of research methodology. In order words, there are scanty studies as regards long run relationship tests using Nigerian data set. Most of the reviewed studies have some methodological and conceptual problems that undermine their accuracy and efficacy for effective policy purpose.

REVIEW OF RELATED LITERATURE

Financial institutions (particularly banks) render financial intermediation services to meet the financial needs of various economic agents. These financial intermediation services involve channeling funds from the surplus unit to the deficit unit of the economy, thus transforming bank deposits into loans or credits. The role of credit in economic development has been recognized as credits obtained by various economic agents to enable them meet operating expenses. For instance, business firms obtain credit to buy machinery and equipment. Farmers obtain credit to purchase seeds, fertilizers, erect various kinds of farm buildings. Governmental bodies obtain credits to meet various kinds of recurrent and capital expenditures. Furthermore, individuals and families also take credit to buy and pay for goods and services (Adeniyi, 2006). According to Ademu (2006), the provision of credit with sufficient consideration for the sector's volume and price system is a way to generate self-employment opportunities. This is because credit helps to create and maintain a reasonable business size as it is used to establish and/or expand the business, to take advantage of economies of scale. It can also be used to improve informal activity and increase its efficiency. This is achievable through resource substitution, which is facilitated by the availability of credit. While highlighting the role of credit, Ademu (2006), further, explained that credit can be used to prevent an economic activity from total collapse in the event of natural disaster, such as flood, drought, disease, or fire. Credit can be garnered to revive such an economic activity that suffered the set back.

Studies have established the relationship that exists between financial intermediation (of which bank credit is an important component) and economic growth. For instance, Schumpeter (1934), Goldsmith (1969), McKinnon (1973) and Shaw (1973), in their studies, strongly emphasized the role of financial intermediation in economic growth. In the same vein, Greenwood and Jovanovich (1990) observed that financial development can lead to rapid growth. In a related study, Bencivenga and Smith (1991) explained that development of banks and efficient financial intermediation contributes to economic growth by channeling savings to high productive activities and reduction of liquidity risks. However, they concluded that financial intermediation leads to growth.

In fact, the relationship between financial development and economic growth has extensively been studied by researchers especially as it affects many developing countries, and it has also long been established that there is a relationship between financial development and economic growth, even though, the nature of this relationship differs from country to country and from jurisdiction to jurisdiction (Arestis and Basu, 2008; CemDisbudak, 2010). To this extent, some researchers claim that there is no relationship between financial development and economic growth for some countries (Demetriades and Hessein, 1996; Neusser and Kugler, 1996; Bloch and Tang, 2003). CemDisbudak (2010) observed that the controversy is rooted from the causality and mechanisms by which financial development is fostering economic growth. Favara (2007) examined the empirical relationship between financial development and economic growth and concluded that financial development and economic growth are correlated adding that there is evidence that this relationship is quite heterogeneous across countries. Similarly, Greenwood and Jovanovic (1990), King and Levine (1993) argued that a higher level of financial activity propels economic growth.

Saci, Giorgioni and Holden (2009), focusing exclusively on a sample of developing countries and using proxies - for financial development variables which capture both banking sector and stock market effects, found that the stock market variables are positively and significantly related to growth. On the contrary, the standard banking sector variables, such as credit to the private sector and liquid liabilities have negative effects on growth. These arguments could also be segregated into short-run and long-run relationships and effects. Loayza and Ranciere (2006) have provided evidence for the argument that there is a negative and significant impact of banking credit on economic growth in the short-run but the impact becomes positive and significant on the long run. Alex (2012) studying the role of banks in capital formation and economic growth argued that commercial banks have a vital role to play in the nation's economic growth.

Dey and Flaherty (2005) used a two-stage regression model to examine the impact of bank credit and stock market liquidity on GDP growth. They found that bank credit and stock market liquidity are not consistent determinants of GDP growth, adding that banking development is a significant determinant of GDP growth, while turnover is not. Cappiello et al (2010) in their study of European Area found that in contrast to recent findings for the *US*, the supply of credit, both in terms of volumes and in terms of credit standards applied on loans to enterprises have significant effects on real economic activity. In addition, Mushin and Eric (2000) on Turkish economy, found that bank deposit, private sector credit or domestic credit ratios are determinants of economic growth. Mishra et al (2009) examined the relationship between credit market development and economic growth in India for the period 1980 to 2008. In the VAR framework the test provided the evidence in support of the fact that credit market development spurs economic growth. The empirical investigation indicated a positive effect of credit market development of the country on growth. Mukhopadhyay and Pradhan (2010) recently examined the relationship between financial development and economic growth of 7 Asian developing countries (Thailand, Indonesia, Malaysia, the Philippines, China, India and Singapore) during the last 30 years,

using multivariate VAR model, and concluded that no general consensus can be made about the finance - growth relationship in the context of developing countries.

Olomola (1995) applied co integration to Nigerian quarterly-series data for 1962-1992 in order to test if the relationship between financial deepening-growth is either "demand following" or "supply leading". Among other results, his study showed that the Nigerian economy exhibits a mixture of 'supply-leading' and demand-following patterns.

Koivu (2002) analysed the finance-growth nexus using a fixed-effects panel model and unbalanced panel data from 25 transition countries during the period 1993-2000, and showed among others that a rise in the amount of credit did not seem to accelerate economic growth. However; Nwanyanwu (2010) assessed the impact of bank credit on economic growth in Nigeria between 1992 - 2008 using deposit money banks as a case study and revealed that the marginal productivity coefficient of bank credit to the domestic economy is positive but insignificant. Furthermore, Aniekan and Sikiru (2009) studied banking sector credit and economic development in Nigeria (1970-2008). The estimated regression models indicate that private sector credit impacts positively on economic growth over the period covered in the study; but that lending rates impede economic growth.

ESTIMATION TECHNIQUE AND PROCEDURE

The study adopted modern analytical technique such as co-integration, unit root test, and error correction mechanism using ordinary least square (OLS) method for the data analysis. Using time series data obtained from secondary sources (Central Bank of Nigeria statistical Bulletin of various issues). The first was to run the OLS estimation at level followed by unit root test to check the stationarity property of the variables, (if any) in the model. This is to establish if the time series have a stationary trend and if non-stationary, to show the order of integration through differencing. A time series is stationary if its means, variance, and auto-variance are not time dependent. The Augmented Dickey Fuller (1981) unit root test is applied.

However, capitalizing on the likelihood of the co-movement in variable behavior which implies that there is possibility that they trend together towards stable long run equilibrium, Johansen (1995) co-integration process ignores the short-run dynamics that might cause a relation not to hold in the short-run and this formed the basis for the application of error correction mechanism (ECM). ECM is an extension of the partial adjustment model in co-integration technique which is the traditional approach to modeling of short-run dynamics with long-run equilibrium.

Model Specification

This framework leans closely to endogenous growth theory prescription. The model adopts GDP as a proxy for growth and as dependent variable while finance intermediation indicators were used as independent variables. According to this theory, growth is depends on private sector credit, private sector deposit amongst other factors (Romer 1994). The endogenous growth model is linear and mathematically written in both functional and natural-log forms as follows:

$$RGDP = f(bcgdp, Mr/GDP, PDGDP) \quad (1)$$

$$RGDP = b_0 + b_1BCGDP + b_2M_2/GDP + b_3PDGDP + U_f \quad (2)$$

$$\text{LnRGDP} = b_0 + b_1/nBCGD + b_2/n M_2/GDP + b_3/n PDGDP + U_f \quad (3)$$

Where

RGDP = Real Gross Domestic Product; a proxy for economic growth

BCGDP = Changes in growth rate of credit to core private sector. These measures the amount of credit allocated to private sector as a share of GDP.

M₃/GDP= Financial deepening parameter. i.e ratio of broad money supply to GDP.

PDGDP = Ratio of private sector deposit to GDP

U₊ = Error term B₁, b₂, b₃ = >0

The independent variables are used to capture the extent of financial intermediation in the economy.

EMPIRICAL FINDINGS AND ANALYSIS

This section presents the data, the empirical results and discussion of findings from the model specification tested. Table 4.1 below shows the summary of empirical results of level series OLS multiple regression.

Table 4.1 ols regression

Dependent variable: InRGDP

Method: Least Square

Sample adjusted: 1986-2011

Included obs: 32 after adjusting end points

Table 4.1: OLS Regression

Variables	Coeff.	Std. error	f-stat	Prob.
BCGDP	0.21747	0.088114	2.46174	0.0234
M ₂ /GDP	0.009915	0.00214	4.26514	0.0010
PDGDP	0.039401	0.012614	3.12614	0.0945
C	10.56450	0.34245	27.8140	0.0000
R-Squared	0.99146	Mean dep. Var.		13.91404
Adj-R-Squared	0.99045	S.D. dep. Var.		2.14040
S.E. of Reg.	0.21464	Kaikeinfo		0.000511
Sum sq. resid	0.97641	Schuintent		0.36670
Log Likelihood	7.99241	f-stat		405.0710
Durbin Watson stat	1.38746	Prob(f-stat)		0.00000

Source: E-view version 6.0

Results from table 4.1 above indicate that R-square is 99.1 percent showing a good fit of the variations in real GDP explained by independent variables. The f-stat (405.07) indicated that the independent variables are jointly and statistically important in explaining variations in the growth index. The independent variables were correctly signed in accordance with the apriori expectation. The implication is that financial intermediation enhances economic growth in Nigeria.

However, Durbin Watson statistic of 1.387 ratio together with high R-squared of 99.1 indicates possibility of first order positive serial correlation in the face of non-stationarity at level and can lead to spurious regression. The variables are therefore examined using the ADF (1981) unit root test.

Table 4.2: Summary of Unit Root Test

Variable	At Level		First difference		Remark
	ADF Test Stat	Order of Integration	ADF Test Stat	Order of Integration	
In RGDP	-1.77064	-	-3.99405	I(I)	xxx
In BCGDP	-1.98440	-	-4.66504	I(I)	xxx
In M ₂ GDP	-2.37411	-	-4.17406	I(I)	xxx
In PDGDP	-1.92240	-	-4.20640	I(I)	xxx
	Critical value		Critical value		
	1%	-3.6442	1%	-3.6907	
	5%	-2.9645	5%	-2.9647	
	10%	-2.6314	10%	-2.6405	
X = 10% level of sig. xx = 5% level of sig. xxx = 10% level of sig.					

Source: E-view version 6.0

The summary of results from table 4.2 above shows the null hypothesis of non-stationarity can only be rejected after the first differencing for all the selected variables at one and five percent levels of significance. This is evidenced by the ADF test result which indicates that the computed negative ADF test statistics for each variable is less than the Mackinnon critical value in absolute terms. Thus the null hypothesis is accepted at level series indicating that all the variables become stationary after first order unit root differencing.

Table 4.3: Summary of Johansen Co-integration**Test Results**

Sample 1985-2010

Included obs: 31

Test assumption: Linear deterministic trend in data

Series: InRGDP, InBCGDP, InM₂GDP, In PDGDP

Logs interval: 1 to 1

Table 4.3: Summary of Johansen Co-integration

Eigen Value	Likelihood Ratio	5% Critical Value	1% Critical Value	Hypo. No of CE(s)
0.90761	203.2001	94.5	103.1	At most 1 xx
0.88412	189.490	68.42	76.57	At most 2 xx
0.289005	12.0214	15.41	20.05	At most 3 xx
x(xx) denotes rejection of the hyp. At 5% (1%) sig. level				
L/R test indicates 3 co-integrating equations at 5% sig. level				

Source: E-view version 6.0

The results in table 4.3 show that there are three (3) co-integration relations at 5% level of significance. This implies that the test statistics rejected the null hypothesis which states that the variables are not co-integrated and accepting the alternative. This implies that there is a long-run relationship between RGDP and financial intermediation indicators.

Table 4.4: PAR Simionous Error Correction Model

Dependent variable: RGDP

Method: least squares

Sample (adjusted): 1988-2011

Included obs: 30 after adjusting end point

Table 4.4: PAR Simionious Error Correction Model

Variables	Coeff.	Std. error	f-stat	Prob.
C	-2.02104	0.24105	-6.11204	0.0001
$\Delta \ln \text{RGDP} (-1)$	0.40402	0.26174	1.54110	0.1352
$\Delta \ln \text{RGDP} (-2)$	0.09120	0.02340	4.06112	0.0006
$\Delta \ln \text{BCGDP} (-2)$	0.03564	0.01014	3.5246	0.0008
$\Delta \ln \text{M2GDP} (-1)$	0.005054	0.004012	0.78112	0.0068
$\Delta \ln \text{PDGDP} (-2)$	0.03840	0.01340	2.92466	0.0074
Ecm 02 (-1)	-1.16002	0.302120	-3.83400	0.0008
R-squared	0.86119	Mean dep. Var.		0.004311
Adj-R-squared	0.78134	S.D. dep. Var.		0.20101
S.E. of reg.	0.20014	Akaikeinfo.		-2.20112
Sum sq. resid	0.80239	Schwarz cit		0.11204
Log. Likelihood	-18.4353	f-stat		+5.7262
Dw	2.31814	Prob (f-stat)		0.00214

Source: E-view version 6.0

The parsimonious model result on table 4.4 above gives the final and precise result as opposed to the ols level series model. All the variables are correctly signed. The f-statistics of 15.7 with 0.0002 probability indicates that the independent variables are jointly and statistically important in explaining growth index in Nigeria. The overall goodness of fit of 86.1 per cent implies that the changes in financial indicators in aggregate accounted for 86.1% of variation in RGDP. Durbin Watson statistics ratio of 2.3 indicates absence of serial correlation. The coefficient of the ECM term which measures the speed of the adjustment of the dependent variables at which equilibrium is restored (1/160) is significant and correctly signed (negative) at \leq per cent level and therefore confirms that the variables are co-integrated. The speed implies that economic growth in Nigeria adjusts slowly to the long run equilibrium changes in financial indicators and gives the proportion of disequilibrium error accumulated in the previous period that is corrected in the current period. The results are in conformity with findings of Mushs in and Eric (2000), Mukhopadhyay and Pradhan (2010), Nnanna (2004).

CONCLUSIONS

This paper examines the finance growth Nexus in Nigeria with the application of co-integration and error correction model tests (1986-2011). The coefficient of ECM suggests that economic growth in Nigeria adjusts slowly to the long run equilibrium changes in the financial intermediation indicators.

RECOMMENDATIONS

In view of the findings of this study come up with the following recommendations:

- Banks should be willing to give both short-term and long-term credit to private sector to facilitate financial intermediation for economic growth.
- There should be stronger and comprehensive regulatory framework that will help monitor allocation of credit to the private sector and recover debt owed to banks.

- The Central Bank of Nigeria (CBN) should adopt direct credit control where preferred sectors are favoured in credit allocation.
- Monetary authorities should continue with the reforms in institutions and provide enabling legal, fiscal and economic environment to improve financial depth.

REFERENCES

1. Adamopoulos, A., (2001). "The Relationship between Credit Market Development and Economic Growth." *Am. J. Applied Sci.*, 7: 518- 526.
2. Ademu, W. A. (2006). "The Informal Sector and Employment Generation in Nigeria: The Role of Credit." *Employment Generation in Nigeria*. Selected Papers for the 2006 Annual Conference of the Nigerian Economic Society, in Calabar, August 22nd to 24th.
3. Bayoumi, T. & Melander, O. (2008), "Credit Matters: Empirical Evidence on US Macro Financial Linkages" *IMF Working Paper*.
4. Bencivenga, V. & Smith, B. (1991): "Financial Intermediation and Endogenous Growth," *The Review of Economic Studies*, 58, 195-209.
5. Demetriades, P. & Hussein, K. (1996), "Financial development and economic growth: co-integration and causality tests for 16 countries" *Journal of Development Economics*, 5: 387-411.
6. Dey, Malay K. & Flaherty, Susan (2005), "Stock Exchange Liquidity, Bank Credit, and Economic Growth". Paper presented at the Max Fry Conference on Finance and Development, University of Birmingham, The Business School University House, Birmingham B15 2TT.
7. Dickey D. and W Fuller (1981) "Likelihood Ratio statistics for ARTR with unit root", *Econometric* vol. 83, p.49.
8. Goldsmith, R. W. (1969) "Financial structure and development", New Haven, CT: Yale University Press
9. Greenwood, J. 85 Jovanovic, B., (1990): "Financial Development, Growth and Income Distribution", *Journal of Political Economy*, 98: 1076-1107
10. Johansen S.(1991) "Estimation and Hypothesis Testing of Co-integration vector in GVAM", *Econometric*, vol. 59
11. King, R. G. & Levine R. (1993a), "Financial Intermediation and Economic Development", In: Mayer and Vives (Eds): *Financial Intermediation in the Construction of Europe*. London Centre for Economic Policy Research: 156-189.
12. King, Robert G., & Levine, Ross (1993b), "Finance and Growth: Schumpeter Might Be Right," *Quarterly Journal of Economics*, 108:717-37.
13. Koivu, Tuuli (2002), "Do efficient banking sectors accelerate economic growth in transition countries?" Bank of Finland, Institute for Economies in Transition, BOFIT Discussion Papers, 14
14. Levine, R. (2002). "Bank-Based or Market-Based Financial Systems: Which is better?" *Journal of Financial Intermediation* 11: 398-428

15. Levine, R., (1997), "Financial development and economic growth: views and agenda". *Journal of Economic Literature*, 35: 688-726.
16. McKinnon, P. (1973). "*Money and Capital in Economic Development*", Washington DC: Brookings Institution.
17. McKinnon, R. (1973). *Money and capital in Economic Development*. Washington: The Brooking Institute.
18. Mishra, P. K.; Das, K. B. & Pradhan, B. B. (2009). "Credit Market Development and Economic Growth in India", *Middle Eastern Finance and Economics*, ISSN: 1450-2889, Issue 5
19. Muhsin, K. & Eric, J. P. (2000). "Financial Development and Economic Growth in Turkey: Further Evidence on the Causality Issue" Centre for International, Financial and Economics Research Department of Economics Loughborough University.
20. Mukhopadhyay, B., and Pradhan, R. P. 2010. "An Investigation of the Finance-Growth Nexus: Study of Asian Developing Countries Using Multivariate VAR Model". *International Research Journal of Finance and Economics* 58 : 134-140
21. Nnanna, O. J. (2004). "Financial Sector Development and Economic Growth in Nigeria: An Empirical Investigation". *Economic and Financial Review*. Vol.42, (3) P. 1-17
22. Ochejele, J. J. (2007). *Economic Analysis*. Jos: Ichejum Press.
23. Odedokun, M. O. (1989). "Causalities between Financial Aggregates and Economic Activities: The Results from Granger's Test" *Savings and Development*, 23 (1), 101- 111.
24. Odedokun, M. O. (1998). "Financial intermediation and economic growth in developing countries" *Faculty of Commerce*, University of Swaziland, Swaziland.
25. Ogbulu, O. M (2009), "Capital Market Development and Economic Growth in Nigeria: Application of Co-integration and causality tests." *Journal of Finance, Banking and Investment*. Abia State University. Vol. 3, No.1, pp.1-19.
26. Olomola, S. Akanni (1995). "Co-integration, Error-Correction and Causality: Exploring the Relationship between Financial Deepening and Economic Growth in Nigeria, 1962-1992", *Ife Journal of Economics and Finance*, 2 (2)
27. Schumpeter, J. A. (1934). *The Theory of Economic Development*. Cambridge, Mass: Havard University Press.
28. Shaw, E. S. (1973). *Financial Deepening in Economic Development*. New York: Oxford University Press.
29. Spencer, H. M. (1977). *Contemporary Macroeconomics (3rd Ed)*. New York: Worth Publishers.

APPENDIX 1

OBS	BCGDP	RGDP	M ₂ GDP	PDGDP
1986:1	92.90761	9.91025	167.5090	54.60184
1986:2	87.74788	9.989458	149.5406	46.21384
1986:3	96.90717	-0.236550	169.4097	56.28505
1986:4	99.49033	5.596312	148.9090	45.57280
1987:1	75.09220	35.89296	106.2272	30.39286
1987:2	73.76872	5.826309	103.8232	27.81378
1987:3	77.05313	-0.132913	110.1631	28.42051
1987:4	80.02132	3.564007	123.0608	32.52062
1988:1	71.35713	17.81659	113.9766	30.74708
1988:2	67.03149	8.465089	112.8646	30.23153
1988:3	71.80855	1.054302	124.3020	29.11284
1988:4	69.66993	3.486872	92.75923	35.05993
1989:1	52.11565	45.65905	88.56595	25.88301
1989:2	52.61345	2.032497	82.19524	26.01135
1989:3	53.87286	-1.001035	84.92080	23.82892
1989:4	53.49875	3.005142	76.18022	29.79257
1990:1	48.07665	18.98425	85.89251	25.85117
1990:2	47.33338	1.780821	100.5958	21.18390
1990:3	54.11979	-1.256555	92.9033	29.21585
1990:4	51.91730	3.011214	102.4203	35.46230
1991:1	44.74425	12.00412	105.0255	32.87103
1991:2	48.17434	2.347118	109.1846	38.11769
1991:3	50.11791	-1.182544	105.0255	36.05581
1991:4	52.51462	3.633935	109.1846	33.63499
1992:1	32.68346	67.14105	76.67293	27.41671
1992:2	41.30320	-0.497611	86.21526	33.72046
1992:3	37.29618	-1.913879	93.05365	33.69737
1992:4	56.48826	3.064618	95.82048	29.10921
1993:1	56.77932	23.77570	87.90147	25.93968
1993:2	75.46144	2.691192	93.11951	27.33860
1993:3	87.75989	-0.346335	103.2110	28.85194
1993:4	52.03920	2.702235	113.2542	34.75489
1994:1	62.61209	20.85188	98.30379	30.14887
1994:2	61.45510	6.370306	101.3221	33.62848
1994:3	61.11304	1.078705	106.6235	32.75489
1994:4	61.72890	3.227692	113.5615	33.75744
1995:1	29.69757	102.1282	53.56853	32.75744
1995:2	35.83477	1.650366	60.18274	33.51840
1995:3	38.97448	-0.385011	62.75255	15.10921
1995:4	41.48837	2.673914	64.52937	18.10921
1996:1	31.65973	35.75795	49.01655	19.14463
1996:2	33.89877	0.674263	52.43515	19.14463
1996:3	36.84977	-0.658255	52.46946	15.24085
1996:4	37.23934	2.320418	53.96400	16.22466
1997:1	37.45132	0.013204	57.54729	15.22466
1997:2	44.91511	2.066189	58.60765	19.10974
1997:3	47.80295	-0.086912	60.78860	18.74169
1997:4	44.26627	2.177720	60.08835	19.28992
1998:1	50.17242	-9.397181	72.23332	22.79114
1998:2	51.77080	4.680584	76.93676	22.48208
1998:3	51.89678	0.991728	75.39633	25.29497
1998:4	53.17337	1.773785	75.39633	23.21683
1999:1	50.88640	11.45461	78.37984	27.96518
1999:2	53.20477	2.859929	79.44203	27.27287
1999:3	54.57538	0.270868	81.80762	25.46202
1999:4	55.41987	1.862042	85.71662	25.31107

Source: CBN Statistical Bulletin Various Issues & Author's Computation

APPENDIX 1 Contd.

OBS	BCGDP	RGDP	M ₂ GDP	PDGDP
			68.28028	25.62466
			79.01591	28.43567
			85.60539	30.00564
2000:1	440.34938	42.72267	90.24014	31.67922
2000:2	44.71266	-1.787418	109.4303	40.99049
2000:3	49.09399	-1.71624	106.8144	39.01400
2000:4	51.16870	2.090124	112.4153	41.36175
2001:1	59.29689	1.402543	-118.8825	43.41152
2001:2	61.67743	1.575032	92.40309	35.80347
2001:3	68.62472	-0.133288	92.49922	36.11542
2001:4	72.81054	1.377719	89.24011	31.20547
2002:1	56.92506	35.77097	109.0991	42.82275
2002:2	54.42766	6.770442	104.1578	45.95296
2002:3	52.34868	3.269554	93.10874	42.37653
2002:4	57.45911	-1.867189	91.41697	37.45680
2303:1	51.36429	15.95519	98.04470	38.04054
2003:2	49.15408	4.323450	80.31456	31.99093
2003:3	54.87005	2.062600	83.20250	33.84114
2003:4	60.67385	-1.074608	75.81833	29.20982
2004:1	52.17685	22.48406	80.20201	32.49591
2004:2	56.48208	-1.481513	84.90931	32.75678
2004:3	50.50625	15.17080	81.57417	32.72315
2004:4	51.30775	7.250094	71.71994	29.61097
2005:1	57.31552	-1.011336	68.46720	24.96527
2005:2	56.99660	7.248151	82.97632	34.05439
2005:3	49.69405	15.45657	88.38110	38.46114
2005:4	47.14420	3.816756	86.64758	36.19062
2006:1	51.19581	-2.261110	77.97334	31.54833
2006:2	51.00341	11.03295	101.2131	42.37950
2006:3	50.02467	12.66143	105.4062	43.53911
2006:4	49.49763	3.594765	103.2160	45.69987
2007:1	62.90526	-8.226025	105.3120	43.35391
2007:2	71.35473	2.384245	144.4777	70.14766
2007:3	75.01629	13.81431	138.9514	63.90379
2007:4	89.72017	0.252170	138.6635	58.26471
2008:1	105.8953	-0.042086	139.3513	60.26913
2008:2	116.3460	3.328882	164.7721	70.73445
2008:3	114.1852	12.96526	154.5632	60.26913
2008:4	120.2420	1.800196	143.1275	63.65310
2009:1	146.7848	-16.98722	157.3276	53.79148
2009:2	141.4220	7.543452	148.4317	59.68585
2009:3	144.0040	12.52818	134.8406	59.68585
2009:4	144.4143	3.690841	123.9537	55.65048
2010:1	130.8231	8.379332	121.8421	51.25546
2010:2	121.6388	8.303673	157.3276	48.31277
2010:3	110.3719	12.58747	148.4317	47.45518
2010:4	100.0120	4.458733	123.9537	51.87962
2011:1	109.1316	-12.13789	140.2154	51.87962
2011:2	104.0089	10.33383	132.7369	49.83648
2011:3	106.9586	9.200146	134.8406	49.83648
2011:4	136.0429	0.347688	132.7369	60.26913
			126.0074	49.83648
			132.3919	54.997322

Source: CBN Statistical Bulletin Various Issues & Author's Computation

