Title Page

FISCAL FEDERALISM AND MACROECONOMIC PERFORMANCE IN NIGERIA (1970-2010)

By

SHEHU UMARU BIJIMI

B.Sc. ECONOMICS (ABU) 2008

A Thesis submitted to the School of Postgraduate Studies, Ahmadu Bello University, Zaria

In partial fulfillment of the requirements for the Award of

Masters Degree in Economics.

Department of Economics, Faculty of Social Sciences

Ahmadu Bello University, Zaria, Nigeria.

April, 2013

Declaration

I hereby declare that the work presented in this thesis titled "Fiscal Federalism and Macroeconomic performance in Nigeria (1970-2010)" was performed by me in the department of economics, under the supervision of Professor Mike Kwanashie and Professor A.G. Garba. All works consulted for the purpose of this research are fully acknowledged. No part of this research has been presented for another degree or diploma at any institution. Errors committed in this research are strictly mine.

_____ _____

Bijimi Umaru Shehu Date

Certification

This thesis titled "Fiscal Federalism and Macroeconomic Performance in Nigeria" meets the regulations governing the award of the degree of Masters of Science Economics of the Ahmadu Bello University, and is approved for its contribution to knowledge and literary presentation.

_____ Date_____
Prof. Mike Kwanashie
Internal Examiner,
Chairman, Supervisory Committee
Dept. of Economics,
Ahmadu Bello University, Zaria.

_____ Date_____
Prof. A.G. Garba
Internal Examiner,
Member, Supervisory Committee
Dept. of Economics,
Ahmadu Bello University, Zaria.

_____ Date_____
Dr. M.M. Usman
(Head of Department)
Economics,
Ahmadu Bello University, Zaria.

_____ Date_____
Prof. A.A. Joshua
Dean, School of Postgraduate Studies,
Ahmadu Bello University, Zaria.

Dedication

This research work is dedicated to my creator, God almighty, the giver of knowledge and wisdom.

Acknowledgement

I wish to express my deepest appreciation and allegiance to God almighty, for his grace, love, providence and faithfulness throughout the period of study.

I also wish to show my gratitude to my supervisors Prof. Mike Kwanashie and Prof. A.G. Garba for their immense contributions and constructive criticisms toward the success of this research.

Worthy of mention are the Umarus'. My mother, Gimbiya, my siblings Yusuf, Joel, Murna, Salama, Hadji, and Sabo, for their financial support, moral support, and encouragement in a journey that seems impossible. May all of you live long to celebrate the goodness of God.

My appreciation also goes to all the staff of the great department of Economics, Ahmadu Bello University, Zaria, for the training and parental advice. My thanks will never be complete without mentioning Prof. G.D. Olowononi of the department of economics, ABU Zaria, for supplying me with materials and also made a critic of the work. God bless you.

Big thanks to Prof. Abbas and family, Uncle Audu Bijimi and family, Uncle Yahaya Duniya and family, Abel, Bobo, Wilson, Tanko, Bebeto, Momy Nomshi, and Glory, for their kind-hearted support when the journey gets hot. Your labour will never go unrewarded.

Big thanks, also to my wonderful friends, Innocent Benjamin, Adati, Andy, Emmanuel Yahaya, Gyong, Vera, Jemimah, Suzan, Anang, and others too numerous to mention, for their support. You are friends indeed. God bless you all.

Respect to all my course mates and senior friends especially Mr. Kato, Mr. Osuma Kazim, Mr. Tom Coco Bassey, Anastasia, Capt. Okon Dan, and Mariam Yusuf for their financial support. God bless you all.

Abstract

The study examined the impact of fiscal federalism on key macroeconomic indicators; GDP, inflation and exchange rate in Nigeria between 1970 and 2010. The country having experienced fiscal federalism for over 50 years is still beset with problems of poor output growth, high inflation rate, and balance of payment deficit, among others. There is controversy in the literature on the impact of fiscal federalism on macroeconomic performance. The objectives of the study are to analyze the trend of fiscal federalism in Nigeria over the years; to measure and analyze the impact of fiscal federalism on real GDP, inflation, exchange rate, and to examine whether there is a long relationship between fiscal federalism and the above mentioned macroeconomic variables. A Vector Autoregressive (VAR) model was estimated using the Nigerian annual time series data from 1970 to 2010. Results from the VAR estimate revealed that the ratio of state governments' expenditure to total government expenditure (FDC2), and the ratio of state governments' revenue from the federation account to total government revenue (FDC3) have a positive impact on economic growth, while the ratio of state governments' internally generated revenue to total government revenue (FDC1) has a negative impact on economic growth; FDC1 and FDC2 have a positive impact on inflation, while FDC3 has a negative impact on inflation; FDC1 and FDC2 have a positive impact on exchange rate, while FDC3 has a negative impact on exchange rate over the period of study; the Nigerian federalism is more of fiscal fragmentation rather than fiscal decentralization. It is concluded that fiscal federalism has a mixed (positive and negative) impact on real GDP, inflation, and exchange rate in Nigeria over the period of study. This implies that the impact of fiscal decentralization is not in all cases good on the economy, because it could result to economic growth that is accompanied with inflation and naira devaluation. Based on these, the study recommended that more fiscal powers should be devolve to the lower tiers of government taking into consideration the trade-offs of fiscal decentralization on real GDP, inflation, and exchange rate.

Table of Contents

Title Page I

Declaration II

Certification III

Dedication IV

Acknowledgement V

Abstract VI

Table of Contents VII

List of Tables X

List of Figures XI

List of Appendices XII

CHAPTER ONE: GENERAL INTRODUCTION

1.1 Background of the Study 1

1.2 Statement of Research Problem 3

1.3 Objectives of the Study 5

1.4 Justification of the Study 5

1.5 Outline of the Study 6

CHAPTER TWO: LITERATURE REVIEW

2.1 Conceptual Literature 7

2.1.1 Evolution of Federal System of Government and Fiscal Federalism in Nigeria 9

2.2 Theoretical Literature 18

2.3 Trend Analysis of Macroeconomic Variables in Nigeria 22

2.4 Empirical Literature 25

2.5 Implication of the Literature……34

2.6 Gap in the Literature……35

CHAPTER THREE: RESEARCH METHODOLOGY

3.1 Theoretical Framework……36

3.1.1 Fiscal Federalism and Economic Growth……37

3.1.2 Fiscal Federalism and Inflation……39

3.1.3 Fiscal Federalism and Exchange Rate……40

3.2 Model Specification……41

3.3 Estimation Techniques……43

3.3.1 Unit Root Test……43

3.3.2 VAR Description……43

3.3.3 Impulse Response and Variance decomposition……44

3.4 Definition of Fiscal Federalism Variables……44

3.5 Sources of Data……45

CHAPTER FOUR: EMPIRICAL RESULTS AND ANALYSIS

4.1 Trend Relationship between Fiscal Federalism Measures and Macroeconomic Variables in Nigeria (1970-2009)……46

4.2 Unit Root Test Results……51

4.3 Co-integration Test Results……52

4.4 Vector Error Correction Estimates……56

4.5 Impulse Responses……59

4.6 Variance Decomposition……62

4.7 Robustness Test(s) of the Three Models……65

4.8 Summary of Research Findings……...69

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATION(S)

5.1 Summary……70

5.2 Conclusion……...71

5.3 Recommendation(s)……72

References……..73

Appendices……79

List of Tables

Table 2.1 Summary of the Evolution of Nigeria's Fiscal System (1946-Date)……..10

Table 2.2 Performance of State Government's Recurrent and Capital Expenditures……11

Table 2.3 Performance of Federal Government's Recurrent and Capital Expenditures……13

Table 2.4 Percentage Composition of States Governments Revenues……..15

Table 2.5 Nigeria's Major tax Jurisdiction……17

Table 3.1 Summary of Fiscal Decentralization Variables…….44

Table 4.1 Summary of Unit Root Test Result……51

Table 4.2 Summary of Co-integration Test Result for RGDP model ……...53

Table 4.3 Summary of Co-integration Test Result for Inflation model…….54

Table 4.4 Summary of Co-integration Test Result for Exchange Rate model……..55

Table 4.5 Summary of Error Correction Result for RGDP model……57

Table 4.6 Summary of Error Correction Result for Inflation model…….58

Table 4.7 Summary of Error Correction Result for Exchange Rate model……...59

Table 4.8 Summary of Impulse Response Result of RGDP model……...60

Table 4.9 Summary of Impulse Response Result of Inflation model…….....61

Table 4.10 Summary of Impulse Response Result of Exchange Rate model……62

Table 4.11 Variance Decomposition of RGDP model……...63

Table 4.12 Variance Decomposition of Inflation model……...64

Table 4.13 Variance Decomposition of Exchange Rate model…….64

Table 4.14 LM Residual Test of Economic Growth Model……..66

Table 4.15 LM Residual Test of Inflation Rate Model……..67

Table 4.16 LM Residual Test of Exchange Rate Model……68

List of Figures

Figure 2.1 The Leviathan's Restraint Hypothesis……..21

Figure 2.2 Differential Quality of Governance at Various Levels of Government……...22

Figure 2.3 Inflation Rate in Nigeria (1970-2009)……..23

Figure 2.4 Growth Rate of Real GDP in Nigeria……...24

Figure 2.5 Exchange Rate of Naira to US Dollar……..25

Figure 4.1 Relationship between FDC1 and Economic Growth in Nigeria……..46

Figure 4.2 Relationship between FDC2 and Economic Growth in Nigeria……..47

Figure 4.3 Relationship between FDC3 and Economic Growth in Nigeria……..47

Figure 4.4 Relationship between FDC1 and Inflation Rate in Nigeria……..48

Figure 4.5 Relationship between FDC2 and Inflation Rate in Nigeria……..48

Figure 4.6 Relationship between FDC3 and Inflation Rate in Nigeria……..49

Figure 4.7 Relationship between FDC1 and Exchange Rate in Nigeria……49

Figure 4.8 Relationship between FDC2 and Exchange Rate in Nigeria……50

Figure 4.9 Relationship between FDC3 and Exchange Rate in Nigeria……50

Figure 4.10 Stability Test for Fiscal Federalism Economic-Growth Model…….65

Figure 4.11 Stability Test for Fiscal Federalism-Inflation Model……66

Figure 4.12 Stability Test for Fiscal Federalism and Exchange-Rate Model……67

List of Appendices

Appendix A: VEC Estimate of Fiscal Federalism-Economic Growth Model……...79

Appendix B: Co-integration Test of Fiscal Federalism-Economic Growth Model……...81

Appendix C: Impulse Response and Variance Decomposition of RGDP Model……..82

Appendix D: VEC Estimate of Fiscal Federalism-Inflation Model……...83

Appendix E: Co-integration Test of Fiscal Federalism- Inflation Model……..85

Appendix F: Impulse Response and Variance Decomposition of Inflation Model……...86

Appendix G: VEC Estimate of Fiscal Federalism-Exchange Rate Model……86

Appendix H: Co-integration Test of Fiscal Federalism- Exchange Rate Model……...89

Appendix I: Impulse Response and Variance Decomposition of Exchange Rate Model……..90

CHAPTER ONE
GENERAL INTRODUCTION

1.1 Background of the Study

There are several systems of government all over the world. Few among them include Unitary, Federal systems, etc. In a unitary system of government, the power to carry out both administrative and fiscal roles is solely a function of the central government. However, in a federal system of government, there are 2 or 3 tiers of government having various degrees of autonomy to carry out both administrative and fiscal roles.

Nigeria operates a federal system of government with three tiers of government each having various degrees of autonomy. Simply put, they have different expenditure responsibilities and taxing powers. Presently, there are 36 states, the Federal Capital Territory (FCT), and 774 Local Government Areas in Nigeria[1].

Wheare N.C. (1994), cited in Olowononi (1999), defines fiscal federalism as "the method of dividing power, so that the general and regional governments are each within a sphere co-ordinate and independent." Fiscal federalism is essentially about the allocation of government spending and resources to the various tiers of government (Oates, 1972:16-20; Tanzi, 1995:297). Fiscal federalism in Nigeria dates back to 1954 when the country, which had until then been governed as a unitary state by the British, adopted a federal constitution.

The function of each of the three tiers of government in Nigeria is defined constitutionally in three different lists. The Exclusive List contains the functions reserved for the Federal Government only. The Concurrent List contains functions, which both the Federal and the State governments could perform. However, when there is a conflict, the Federal government

[1] The 2006 housing and population census of the Federal republic of Nigeria provides full details of the 36 states and local governments.

always prevails. The functions reserved for the states are found in the Residual List which are functions neither assigned to Local Governments nor contained in the exclusive or concurrent lists. See page 17 for the summary of these functions.

In line with the experiences of virtually all federations the world over, there is hardly any correspondence between the functions and responsibilities assigned to these levels of government and the financial resources available to execute them (Olowononi, 1999). Government intervenes in the economy for five basic reasons, which according to Oates (1972) are: to achieve broad macroeconomic objective of full employment; promotion of economic growth; maintenance of Balance of Payment (BOP) equilibrium; and the promotion of equitable distribution of income and wealth.

The three traditional roles of government are efficient allocation of resources, equitable distribution of income and wealth, and stabilization (maintaining full employment levels of employment and output at stable prices), (Musgrave, 1959). Over fifty years of experience with fiscal in Nigeria, the country is still faced with the challenges of macroeconomic management, poor output growth rate, high inflation rate, exchange rate fluctuation, weak balance of payment position, etc. (Alade, *et al.,* 2003).

Literature in different countries shows the impact of fiscal federalism on macroeconomic performance. In recent years, there has been a growing empirical literature on the effects of federalism on macro-economic performance (see Feld, *et la.*, 2009). Using the Generalized method of moment (GMM), Elliot and Thornton (2006) observed that fiscal decentralization enhances service delivery in China and Russia. The same result has been confirmed in a similar study conducted by Akai and Sakata (2004) across the 50 states of USA. From the experience of these countries mentioned, the gains of fiscal federalism to an economy are positive.

However, researches in Nigeria on the significance of federalism on macroeconomic performance have mixed outcomes. Aigbokhan (1999) examined the impact of fiscal decentralization on economic growth in Nigeria and observe a negative relationship, while Akpan in 2010 investigated the impact of fiscal decentralization and service delivery and observed a positive relationship.

Against this backdrop, there is the need to re-investigate the relationship between federalism and macroeconomic performance in Nigeria.

1.2 Statement of the Research Problem

There has been a resurgence of interest in the problems of multi-level government finance (see Oates, 1999; Feltenstein and Iwata, 2005; Aigbokhan, 1999). Recent and ongoing political and economic developments raise questions about the role of nation, sub-national governments in the provision and financing of public sector programmes, (Tanzi, 1995). Problems of fiscal federalism and intergovernmental fiscal relations are particularly of wide-spread concern in developing countries.

Recent experience with fiscal federalism in numerous developing and transition economies has led many observers to question whether fiscal federalism undermines macroeconomic stability, (Feltenstein and Iwata, 2005). In several countries, central government transfers to lower-level governments have increased fiscal deficits at the central level, creating pressures on central banks to monetize additional debt and thus jeopardizing stability. In other countries, central governments attempting to control their deficits have reduced transfers to lower-level governments, creating fiscal distress at lower levels (Oates, 1999). As Oates (1994) puts it, “fiscal federalism has much to offer, but it is a complicated enterprise”.

Fiscal federalism in Nigeria dates back to 1954 when the country, which had until then been governed as a unitary state by the British, adopted a federal constitution. Over fifty years of experience with fiscal federalism in Nigeria, the country is still beset with the challenges of macroeconomic instability, poor output growth rate, high inflation rate, exchange rate fluctuation, weak balance of payment position, etc. (Alade, *et al*. 2003).

There are conflicting views on the significance of fiscal federalism for economic growth and development. Aigbokhan (1999) examined the impact of fiscal decentralization on economic growth in Nigeria and observe a negative relationship, while Akpan in 2010 investigated the impact of fiscal decentralization and service delivery and observed a positive relationship. Philip (2011) examined the relative effects of fiscal centralization on economic growth in Nigeria and observed that the cost of maintaining it is very huge.

The study focused on three research questions:

a) What has been the trend of fiscal federalism in Nigeria over the years?
b) What is the impact of fiscal federalism on real GDP, inflation and exchange rate in Nigeria?
c) Is there a long run relationship between fiscal federalism, real GDP, inflation and exchange rate in Nigeria?

1.3 Objectives of the Study

The broad objective of this thesis is to examine empirically the impact of fiscal federalism on macro economic performance in Nigeria. The specific objectives of the study are as follows:

a) To analyze the trend of fiscal federalism in Nigeria over the years.
b) To measure and analyze the impact of fiscal federalism on real GDP, inflation and exchange rate in Nigeria.
c) To examine whether there is a long-run relationship between fiscal federalism, real GDP, inflation and exchange rate in Nigeria.

1.4 Justification of the Study

There has been a resurgence of interest, in many parts of the world, in problems of multi-level government finance (Oates, 1999; Feltenstein and Iwata, 2005; Aigbokhan, 1999). Recent and ongoing political and economic developments raise questions about the role of nation, sub-national governments in the provision and financing of public sector programmes (Tanzi, 1995). Problems of fiscal federalism and intergovernmental fiscal relations are of wide-spread concern in developing countries.

There are many contending issues about the effect of federalism on service delivery around the globe. Some studies observed that there is a positive relationship between federalism and the provision of social services. These include, among others, Akpan (2010) Malik *et al* (2005), Jimoh (2003), Thieben (2003), Yilmaz (1999), Brueckner (2005), etc. Some group of studies observes a negative relationship. These include, Aigbokhan (1999), Davoodi and Zou (1998), Yilmaz *et la* (2004), Zhang and Zou (1998), etc. In contrast, some studies have identified

a two way relationship or have observed ambiguous relationship. These include Bodman (2009), Thornton (2007), etc.

This study is considered very important due to the following reasons. The study establishes a foundation for policy-makers to make reforms that will aid government to make choices that reflects social preferences. This is considered important in Nigeria now because of the ongoing review of the 1999 constitution by the national assembly. Federalism and devolution of powers to sub-national governments are key topical issues of discuss.

1.5 Outline (Structure) of the Study

The thesis has five chapters. Chapter is the general introduction and contains the background of the study, statement of the research problem, objectives of the study, justification of the study, and outline of the thesis chapters.

Chapter two contains a review of theoretical and empirical literature.

Chapter three presents the methodology of the study. It contains model specification, analytical techniques, and type of data collected their sources.

Chapter four contains the presentation of data and analysis of empirical results, while

Chapter five presents the summary, conclusion and recommendations of the thesis.

CHAPTER TWO

LITERATURE REVIEW

2.1 Conceptual Literature

There are different forms of federalism. The prominent ones are fiscal, political and administrative. Fiscal federalism is essentially about the allocation of government spending and resources to the various tiers of government (Oates, 1972:16-20; Tanzi, 1995:297). Political federalism is concerned with the division of powers among tiers of government in a federation (Philip, 2011). While, administrative federalism has to do with the delegation of functions to lower levels of governments (Philip, 2011). The main trust of this research work is the fiscal federalism. Fiscal federalism is very important in countries that practice federal system of government. Various scholars in different literatures, at different times have conceptualized fiscal federalism to suit a particular scenario.

Olowononi (1999), view fiscal federalism as "a set of fiscal activities, relation and interaction, rights and demands by and among the various levels of governments in a federation". Wheare (1994), cited in Olowononi (1999), sees fiscal federalism as "the method of dividing power, so that the general and regional governments are each within a sphere co-ordinate and independent."

Salami (2011), defines fiscal federalism as "the inter-government fiscal relation as enshrined in a federal constitution provided for the functional responsibilities to be performed by the multi–levels of government and the financial resources that can be raised for provision of collective goods and services".

Fiscal decentralization exist when sub-national governments have the power, given to them by the constitution or by particular laws to raise (some) taxes and carry out spending

activities within clearly established legal criteria (Tanzi,1995). Prud'Homme (1995), simply sees fiscal decentralization as transferring of resources and responsibilities to the lower levels of government.

Fiscal decentralization has four basic elements. These are devolution, deconcentration, delegation, and privatization cum deregulation (Rondinelli, 1989). First, devolution involves the transfer of certain levels of power and authority to lower levels/tiers of government which carries with it some measure of autonomy. Enemuo (1996) amplified this view when he said that devolution involves the transfer of power to sub-national units of government, which are autonomous, distinct from the central government and under only indirect supervisory control of the center.

Second, Deconcentration also translates into the transfer of power to sub-national units of government with the central government exercising greater autonomy. Deconcentration obtains when some amount of administrative responsibility is transmitted to lower levels within the central government. Third, Delegation implies the transfer of authority to plan and implement decisions over specific activities to organizations such as corporations which are placed under indirect control of central agencies. Fourth, privatization and deregulation, refers to the transfer of functions from government to non-governmental organizations and to the private sector in general.

Macroeconomic performance in this context can broadly be defined as the pattern or trend of macroeconomic variables as a result of government fiscal roles, (Felteinsten and Iwata, 2005). Thus, the measures of good macroeconomic performance are essentially, price stability, growth of output, and the maintenance of balance in the external sector, (Alade, *et al*, 2003).

2.1.1 Evolution of the Nigerian Federal System of Government and Fiscal Federalism in Nigeria

The Nigerian federal system has evolved over the years. It is characterized with a high degree of fiscal centralization (Philip, 2011). Fiscal federalism in Nigeria dates back to 1954 when the country, which was until then been governed as a unitary state by the British, adopted a federal constitution (Alade, *et al*, 2003).

Between 1946 and 1959, Nigeria was re-structured into 3 regions. These include Northern, Western and Eastern regions. These 3 regions were sub-divided into 23 provinces and 83 divisions. In 1963, the mid-Western region was created, making a total of 4 regions in the country.

In 1967, 12 states were created out of the 4 regions. The 12 states structure remained unchanged till 1970, but 300 local governments were created out of the 12 states. The number of states was further increased to 19 in 1976 but the local governments remained unchanged. This has been the trend till 1986. Additional states and local governments were created in 1987 which has increased the number to 21 and 448 respectively. More states and local governments were created in 1991, and the number rouse to 30 plus federal capital territory (FCT) and 774 respectively. From 1996 till date, the number of states has been increased to 36 plus federal capital territory (FCT), and 774 local governments in Nigeria. See table 2.1 for the summary.

The relevance of subsequent creation of more states and local governments is for the need to bring government people at the grass root and to enhance economic development. The exercise was heralded as a bold attempt to devolve power from the federal government to sub-national governments. However, this had not been the case as

the federal government had much more money than it was constitutionally entitled to, while the sub-national governments receive far less than their statutory requirements (Alade *et al*, 2003). We can deduce from the above events that the Nigerian federalism is more of fiscal fragmentation than fiscal decentralization.

Table 2.1 Summary of the Evolution of the Nigeria's Fiscal System (1946-Date)

Year	Type of Govt./ Head(s) of state	Main structure/ Arrangement	Main institutional changes, political and economic
1946-1959	Colonial State. Sir Arthur Richards	3 regions (Northern, Western and Eastern), 23 provinces and 83 divisions.	Adoption of federal constitution
1960-1966	Civilian (first republic) Tafawa Balewa	Withdrawal of southern Cameroun, creation of Mid-West region	Gained independence, became a republic, return to unitary system via unification of decree 34 of May 1966.
1966-1975	Military rule Yakubu Gowon	Creation of 12 states, 96 divisions.	State creation, Oil boom
1976-1979	Military rule M. Mohammed O. Obasanjo	Creation of 19 states, 300 local govts.	Decree no. 13, 1970 revenue allocation, Decree no. 9, 1971, revenue allocation, Decree no. 51.1972, income tax reform, Decree no. 6, 1975, revenue allocation, Oil boom, Transition to second republic.
1979-1983	Civilian rule S. Shagari	19 states, 300 local govts.	Oil glut, economic recession
1983-1999	Military rule M. Buhari, I. Babangida, S. Abacha, A. Abubakar	21 states in 1987, 30 states in 1991 plus FCT, 36 states in 1996, Local govts. increased to 448, 593, 774 in 1987, 1991, 1996 respectively.	Introduction of structural adjustment programme (SAP), coup and counter coup, prolonged aborted third republic
1999-date	Civilian rule O. Obasanjo U. Yar'adua	36 states and FCT, 774 local govts.	Civilian rule begins, serious global financial crisis, banking reforms

Source: Adapted from Philip 2011

Table 2.2, presents the percentages of state governments recurrent and capital expenditure to sub-national total governments expenditure in millions of naira from 1970 to 2009 in Nigeria. It is computed from the annual data collected from CBN's statistical bulletins of various issues.

From the table, it is evident that the performance of recurrent expenditure from 1970 till date has been consistently higher compare to capital expenditure except for some few years where the capital expenditure exceeded recurrent expenditure. To be specific, within the period of study, it is only 6 years (1977, 1978, 1980, 1981, 1982, and 1983) out of the 40 years that capital expenditure exceeded recurrent expenditure. This is not a surprise because it is probably as a result of the oil boom that the country experienced in the 1970s. Another reason for this development could be attributed to the increased in local representation as a result of creation of states and local governments. Also, it could be as a result of the return to civilian rule.

Drawing from this ground, it can be inferred that the Nigerian fiscal federalism over the years has not been able to strike a balance between recurrent and capital expenditure. The large chunk of revenue that would have been used for developmental purposes has been channeled to financing recurrent expenditure. Hence, it is likely the cause of poor macroeconomic performance that the country experienced over the years.

Table 2.2: Performance of State Governments Recurrent and Capital Expenditure (1970- 2009)

Year	SG's Total Exp. (N'm)	% of SG's Recr. Exp.	% of SG's Cap. Exp.
1970	247.5	78.34343434	21.65656566
1971	444	76.55405405	23.44594595
1972	594.00	68.23232323	31.76767677
1973	729.8	66.86763497	33.13236503
1974	1,353.50	45.88843738	54.11156262
1975	3,059.30	45.84382048	54.15617952
1976	4,657.60	58.21882515	41.78117485
1977	6,339.90	37.05894415	62.94105585
1978	4,213.90	47.76335461	52.23664539
1979	4,342.40	59.50396094	40.49603906
1980	7,233.80	40.33564655	59.66435345
1981	10,990.90	41.9528883	58.0471117
1982	10,680.50	44.32283133	55.67716867
1983	11,090.90	47.44520282	52.55479718
1984	7,064.90	64.97756515	35.02243485
1985	5,857.10	82.34621229	17.65378771
1986	5,774.70	79.67513464	20.32486536
1987	8,263.50	69.23458583	30.76541417
1988	10,778.50	66.73841444	33.26158556
1989	12,974.70	62.74210579	37.25789421
1990	20,049.30	66.77290479	33.22709521
1991	27,023.70	58.73474025	41.26525975
1992	37,060.70	56.07098625	43.92874393
1993	44,180.70	67.44800331	32.55199669
1994	55,916.20	67.55144305	32.44855695
1995	77,895.10	68.23535755	31.76464245
1996	83,987.60	65.27749334	34.72250666
1997	92,686.20	63.60839046	36.39160954
1998	148,132.80	50.71442651	46.34280861
1999	167,896.10	61.16288586	35.99303379
2000	359,670.60	54.71231177	44.17808962
2001	596,956.40	49.36868086	39.4068478
2002	724,537.20	58.54708357	39.1248096
2003	921,159.70	59.19806305	35.17521446
2004	1,125,057.00	49.49191908	36.70269151
2005	1,478,585.40	53.37043095	34.8119696
2006	1,586,796.60	56.36033629	36.80222153
2007	2,116,138.90	57.53085962	40.39400249
2008	2,899,537.30	46.61021605	51.34977915
2009	2,776,913.00	51.35398912	46.60431926

Note: SGs represent state governments; Recr. represent recurrent expenditure; Cap. represent capital expenditure.

Source: Computed by the Author from CBN Data

Table 2.3 is the summary of the performance of federal government's recurrent and capital expenditure in Nigeria between 1970 and 2009. It is computed from the annual data collected from CBN's statistical bulletins of various issues. From the table, it can be seen that the performance of the federal government's recurrent expenditure from 1970 till date has been consistently higher compared to capital expenditure except for some few years where the capital expenditure exceeded recurrent expenditure. To be specific, within the period of study, it is only 14 years (1975, 1976, 1977, 1778, 1979, 1980, 1981, 1982, 1983, 1986, 1996, 1997, 1998, and 1999) out of the 40 years that capital expenditure exceeded recurrent expenditure. This is not a surprise because it is probably as a result of the oil boom that the country experienced in the 1970s. Another reason for this development could be attributed to the increased in local representation as a result of creation of more states and local governments.

A similar conclusion can be drawn from this ground that the Nigerian fiscal federalism over the years has not been able to strike a balance between recurrent and capital expenditure. The bulk of the revenue that would have been used for developmental purposes has been channeled to financing recurrent expenditure. Hence, it is likely the cause of poor macroeconomic performance that the country experienced over the years.

Table 2.3: Performance of Federal Governments' Recurrent and Capital Expenditure (1970- 2009)

Year	Total Fed. Exp (N'm)	% of FG's Recr. Exp.	% of FG's Cap. Exp.
1970	903.9	79.22336542	20.77663458
1971	997.2	82.59125552	17.40874448
1972	1,463.60	69.16507242	30.83492758
1973	1,529.20	63.00680094	36.99319906
1974	2,740.60	55.35649128	44.64350872
1975	5,942.60	46.02194326	53.97805674
1976	7,856.70	48.56237352	51.43762648
1977	8,823.80	43.28293932	56.71706068
1978	8,000.00	35	65
1979	7,406.70	43.03130949	56.96869051
1980	14,968.50	32.10208104	67.89858703
1981	11,413.70	42.46388113	57.53611887
1982	11,923.20	46.17887815	53.82112185
1983	9,636.50	49.30005707	50.69994293
1984	9,927.60	58.69998791	41.30001209
1985	13,041.10	58.09632623	41.90367377
1986	16,223.70	47.44232204	52.55767796
1987	22,018.70	71.05869102	28.94130898
1988	27,249.50	71.22846291	30.60643315
1989	41,028.30	63.35675619	36.64324381
1990	60,268.20	60.09736478	39.90263522
1991	66,584.40	57.43612618	42.56387382
1992	92,797.40	57.15041585	42.84958415
1993	233,806.50	58.47874204	23.31064363
1994	160,893.20	55.92212722	44.07787278
1995	248,768.10	51.30472918	48.69527082
1996	337,217.60	36.91720124	63.14210765
1997	428,215.20	37.02892845	62.97107155
1998	487,113.40	36.56187656	63.43812344
1999	947,690.00	47.4482584	52.5517416
2000	701,059.40	65.84320815	34.1555794
2001	1,018,025.60	56.90426645	43.09287507
2002	1,018,155.80	68.43746311	31.56472713
2003	1,225,965.90	80.28771436	19.71411277
2004	1,426,201.30	72.40913327	24.63186648
2005	1,822,100.00	67.15877284	28.51105867
2006	1,938,002.50	66.57379957	28.50284249
2007	2,450,896.70	64.8444302	30.9814363
2008	3,240,818.50	65.33534661	29.64991714
2009	3,456,925.40	61.67058161	38.32924483

Note: FG stands for Federal Government, Fed. Recr. stands for federal government's recurrent expenditure, Fed. Cap. stands for federal government's capital expenditure.

Source: Computed by the Author from CBN Data

Table 2.4 presents the percentage composition of states government revenues from various sources between 1970 and 2009. From the table, it is observed that the revenue generated internally by state governments put together on the average is about 10% of their total revenue. This could be attributable to the over concentration of fiscal powers at the federal level of government, or negligence on the part of state governments to tap the sources of revenue available to them. On the other hand, statutory allocation to state governments constitutes about 90% of their total revenues. Though it fluctuates across the years within the period of study, the fluctuation is negligible. It is clear from the table that states governments in Nigeria up to about 90% depends on revenue from the federation account within the period of study.

Table 2.4: Percentage Compositions of State Governments Revenues (1970-2009)

Column1	Total S.G's Rev. (N'm)	% of SG's Stat. Allocation	% of SG's Intern. Gen. Revenue
1970	232.2	70.67183463	29.32816537
1971	393.1	76.85067413	23.14932587
1972	454.2	73.60193747	26.39806253
1973	454.9	68.69641679	31.30358321
1974	851	69.44770858	30.55229142
1975	1830	57.56830601	42.43169399
1976	2139.1	72.57725212	27.42274788
1977	2729.4	87.58335165	12.41664835
1978	2445.9	94.94664541	5.053354593
1979	3405.9	74.40324143	25.59675857
1980	3817.1	96.8117157	3.1882843
1981	3968.2	96.40643113	3.593568873
1982	3320.6	97.74438355	2.255616455
1983	2996.5	98.73185383	1.268146171
1984	2780.8	97.88550058	2.114499425
1985	4844.9	67.30376272	32.69623728
1986	4704.4	60.44979168	39.55020832
1987	8151.6	76.02311203	23.97688797
1988	10360.1	78.96931497	21.03068503
1989	11502.1	86.06950035	13.93049965
1990	19140.5	85.5714323	14.4285677
1991	22923.4	86.12247747	13.87752253
1992	29742	82.36601439	17.63398561
1993	33386.8	82.84891035	17.15108965
1994	39936.6	72.63212191	27.36787809
1995	55664.5	69.4724645	30.5275355
1996	60960	68.06594488	31.93405512
1997	78270.7	65.03391435	34.96608565
1998	95281	69.33921768	30.66078232
1999	137766.3	75.24140519	24.75859481
2000	289358.5	86.94059445	13.05940555
2001	463510	87.18129059	12.81870941
2002	477901.6	81.24992676	18.75007324
2003	653933.4	81.84012317	18.15987683
2004	911403.5	85.27595077	14.72404923
2005	1043723.7	88.24039351	11.75960649
2006	1141307.1	89.02758951	10.97241049
2007	1415045.1	78.39600307	21.60399693
2008	2047032.3	82.75241187	17.24758813
2009	1435014.8	67.85925135	32.14074865

Note: SG's stands for states government, Rev stands for revenue, Stat stands for statutory allocation, and Intern. Gen stands for internally generated revenue.

Source: Computed by the Author from CBN Data

Table 2.5 shows the tax/revenue source available to the three tiers of government (Federal, States and Local). The administration and collection of most of the revenue sources of the country is vested at the federal level (exclusive list). Some tax administrations are carried out by both the federal and state governments (concurrent list), while others which are neither found in the exclusive list nor concurrent list are administered by either the state or local governments (residual list).

Table 2.5: Nigeria's Major Tax Jurisdiction

S. No.	Types of Tax	Jurisdiction		Right to Revenue
		Law	Administration and collection	
1	Import duties	Federal	Federal	Federation Account
2	Excise duties	Federal	Federal	Federation Account
3	Export duties	Federal	Federal	Federation Account
4	Mining rents and royalties	Federal	Federal	Federation Account
5	Petroleum profit tax	Federal	Federal	Federation Account
6	Companies income tax	Federal	Federal	Federation Account
7	Capital gains tax	Federal	Federal/State	States
8	Personal income tax (other those in 9 below)	Federal	States	States
9	Personal income tax of armed forces, External affairs officers, residents of FCT and Nigerian police force	Federal	Federal	Federal
10	Licenses fees on television and wireless radio	Federal	Local	Local
11	Stamp duties	Federal	Federal /States	States
12	Capital Transfer Tax (CTT)	Federal	States	State
13	Value Added Tax (VAT)	Federal	Federal/States	Federal/States,Local
14	Pools betting and other betting taxes	States	States	States
15	Motor Vehicle and Drivers' licenses	States	States	States
16	Entertainment tax	States	States	States
17	Land Registration and survey fee	States	States	State/Local
18	Property taxes and rating	States	Local	Local
19	Market and trading license fees	States	Local	Local

* Not longer imposed.

***Source**:* A.A. Adesopo, A.A. Agboola and O.O. Akinlo (2004) P.185

2.2 Theoretical Literature

Fiscal federalism has to do with a decentralized system of government and the rationale for practicing it. Many scholars and researchers have argued that federalism is the best representative government because its dividends are spread to the grassroots. A substantial part of the argument is based on public goods and public choice theories.

2.2.1 Theories of Fiscal Federalism (Theory of Public Goods)

The discussion in this section is anchored on the work of Musgrave (1959) also known as the theory of public goods[2]. The theory has identified 3 major roles of government in the economy. These include; efficient allocation of resources, equitable distribution of income and wealth, and stabilization (maintaining full employment levels of employment and output at stable prices). The theoretical framework in question was basically a Keynesian one which canvassed for an activist role of the state in economic affairs.

According to the theory, the role of stabilization is assigned to the central government due to some reasons which may not allow the sub-national government to function well. These could be due to their vulnerability to making wasteful fiscal policy, and or inability to carry out deficit finance which may benefit only the creditors, (Smoke, 2001). Another reason advanced in favour of the central government is that the sub-national governments especially in the developing countries are highly dependent on the central government for resources to carry out their duties Bahl and Linn (1992), cited in (Philip, 2011).

[2] Publicly provided goods are of three categories, namely, private goods, impure public goods and pure public goods. Private goods are those whose consumption is both enjoyed individually and made contingent upon payment, e.g., electricity, water and milk. Impure public goods are those whose consumption are both collective and made contingent upon payment, e.g., highways with toll imposed. Finally, pure public goods are those whose consumption is collective but not contingent upon payment, e.g., fresh air, national defense, etc.

The theory also assigns the role of equitable distribution of income and wealth on the central government. Reasons advanced for this include: central government is in a better position to move resources from wealthier to poorer jurisdictions; differences in endowments may result to conflict especially if the factors of production are mobile. Hence, a progressive tax policy will make wealthier people to move to jurisdictions with favourable treatments, resulting to abortive policy objective (Philip, 2011). According to Smoke (2001), local governments tend to have access to revenue sources that are not easily levied in a way that is progressive with respect to income. Due to preference variation in the demand for public goods by the sub-national governments, the role of efficient allocation of resources has been assigned to the sub-national governments. This is also known as the "conventional wisdom". To the proponents of this theory, when there is a large number of sub-national governments, greater experimentation and innovation in the provision of local public goods will probably lead to improvement in the overall resource productivity (Philip, 2011). This is the case of the Heterogeneous preferences, propounded by Oates (1972) in his "decentralization theorem".

The decentralization theorem basically postulates that sub-national governments thus become agencies that provide services to identifiable recipients up to the point at which the value placed on the last (marginal) amount of services for which recipients are willing to pay is just equal to the benefit they receive. In other words, sub-national governments will efficiently provide local public goods than the government at the center: given that local preferences and costs of a local public good or service are likely to vary across jurisdictions, decentralization could increase economic welfare in the society as a whole. The key point is that sub national governments have access to better information about local circumstances than central authorities, and therefore can use this information to tailor services and spending patterns to citizen's needs.

Smith and Jimenez (2005) tested this theorem in Canada and their finding conforms to it. Other studies which support this theorem include Akai and Sakata (2007) in the United States of America, Malik, *et al*, (2005) in Pakistan, etc.

The theory focuses on situations where different levels of government provide efficient levels of outputs of public goods "for those goods whose spatial patterns of benefits are accrued to their jurisdictions" Oates (1990:5), cited in (Dye, 2004). Nevertheless, it was also recognized that, given the multiplicity of local public goods with varying geographical patterns of consumption, there is hardly any level of government that could perfectly provide for all public goods.

Thus, it is recognized that there would be local public goods with inter-jurisdictional spill-overs. For example, a road may confer public goods characteristics, the benefits of which are enjoyed beyond the local jurisdiction. The local authority may then under-provide for such a good. To avoid this, the theory then resorts to traditional Pigouvian subsidies, requiring the central government to provide matching grants to the lower level government so that it can internalize the full benefits. One of the strong theoretical arguments advanced in favour of fiscal decentralization is that, the preferences and the needs of citizens and taxpayers for public sector activities are better known to the local government officials than to those who represent the central government (Oates, 1953). The reason given is that the closer is the government to the people, the more information available to make good decisions.

2.2.2 The Public Choice Theory

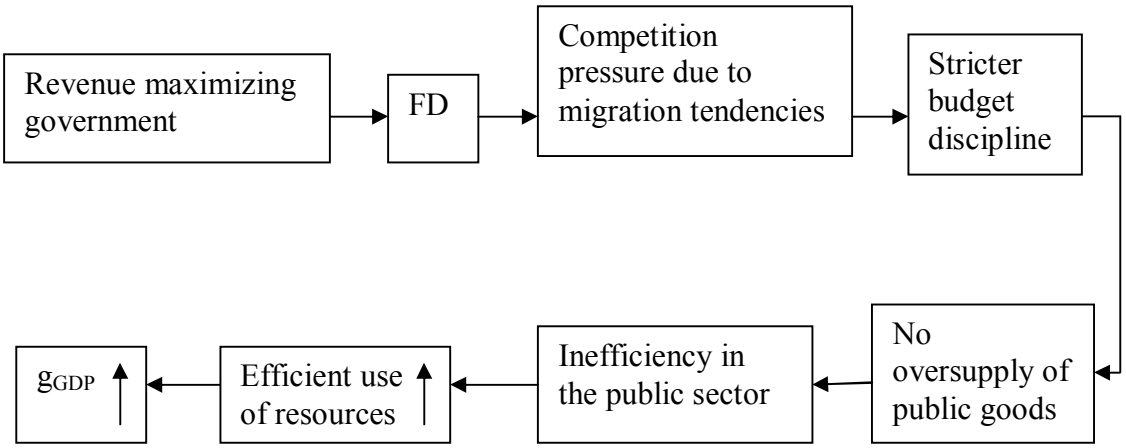
The public choice theory also known as the new political economy approach was made known by a US economist Kenneth Arrow in 1951. The theory is all about revealing preferences through majority voting and median voting rule. The questions that the theory seeks to address are;

a. Which public goods should government produce and in what amount?

b. How should the tax burden of financing government be apportioned?

The theory pointed out how the social welfare of a state is influenced by group interest rather than the majority or the median voter rule.

Figure 2.1: The Leviathan Restraint Hypothesis

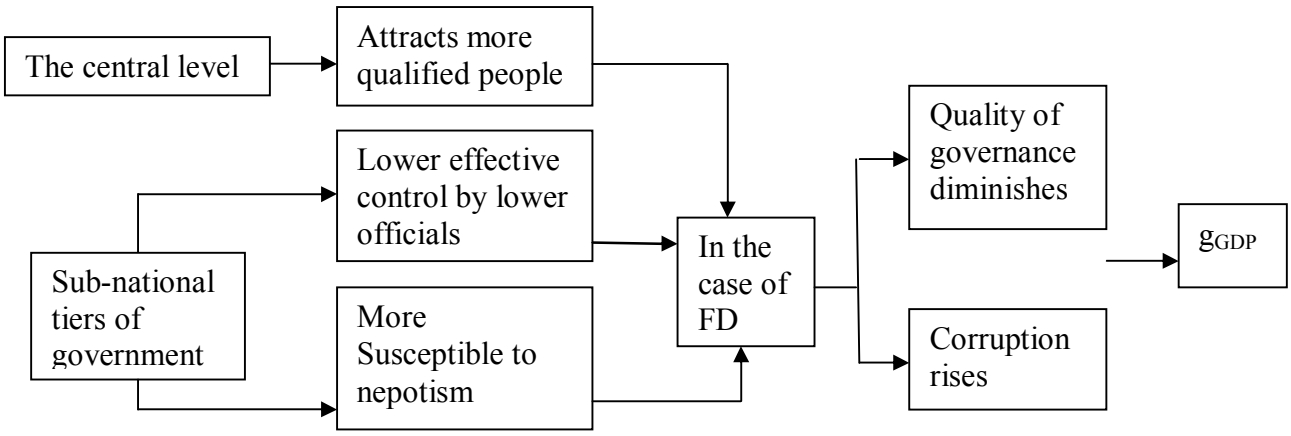


Source: Adopted from Philip 2011

Brennan and Buchanan (1980) developed the "Leviathan" restraint hypothesis, which argues that fiscal decentralization serves as a constraint on the behavior of the revenue maximizing government. If state and local governments levy their own taxes people may migrate to jurisdictions with lower tax burden and therefore, restricting government from overtaxing its citizens. Oates (1985) discusses the work of Brennan and Buchanan and analyzes in a cross-

country approach with 43 countries the hypothesis that– ceteris paribus – a higher degree of decentralization results in a lower size of government. The "Leviathan" restraint hypothesis is summarized in figure 2.1.

Figure 2.2: Differential Quality of Governance at Various Levels of Government.



Source: Adopted from Philip 2011.

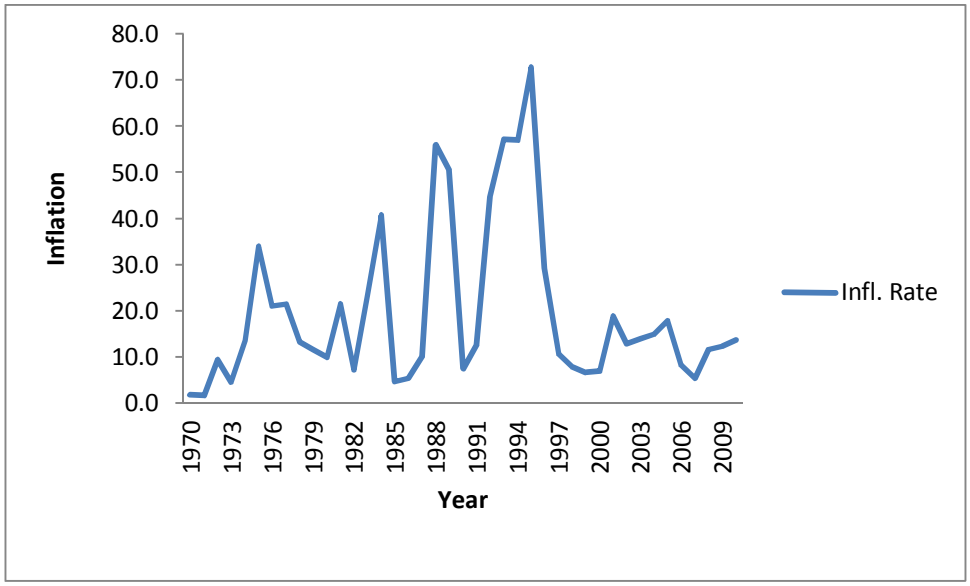
This is a theoretical proposition of Tanzi (1995) and (Markus, 2005). They asserted that because of better career opportunities and salaries at the central level, more qualified people are attracted, hence higher quality of governance is achieved. On the other hand, when fiscal powers are decentralized to the sub-national levels, ceteris paribus, it will result to a lower quality of governance and corruption, which will further impedes proper economic growth.

2.3 Trend Analysis of Macroeconomic Variables in Nigeria

Figure 2.3 shows the inflation rate in Nigeria between 1970 and 2009. Inflation rate was relatively low between 1970 and 1981. The rate of change in inflation within this period ranges between 1.7% and 21%. There was a sharp decrease in 1982 to 7% after which it increased to 40% in 1984. Between 1985 and 1986, there was a sharp decrease to as low as 4.7% and 5.7%

respectively. Between 1988 and 1995, Nigeria experienced the highest inflation ever to as high as 56% and 72% respectively. The sharp increase in inflation could be as a result of the adoption of Structural Adjustment Programme (SAP) in 1986 which exposed the Nigerian economy to external shocks. Between 1997 till date, there has been relatively stable fluctuation in inflation. This could be attributable to the democratization of the economy.

Figure 2.3: Inflation Rate in Nigeria.

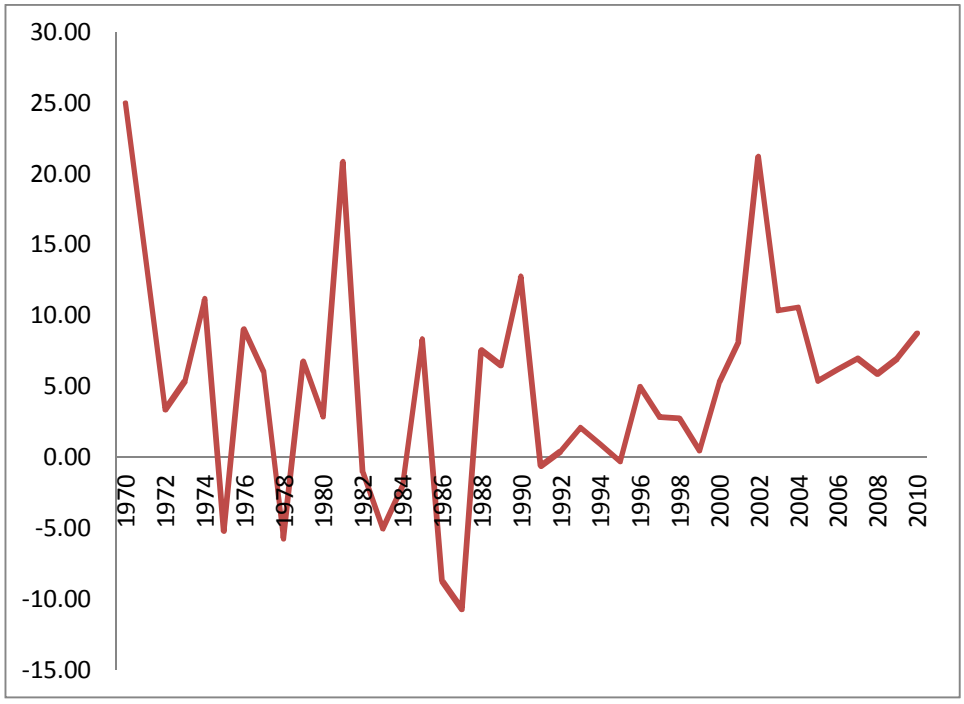


Source: Computed by the author from CBN's data.

Figure 2.4 shows the GDP growth rate in Nigeria between 1970 and 2010. Within this period of study, the GDP growth rate is characterized with high degree of periodic fluctuations. In order words, there is a poor GDP growth rate within this period. The early 1970s witness the highest growth in GDP accompanied by a sharp decline within the same period. Towards the late 1970s, the Nigerian economy witnessed a negative GDP growth rate. These developments in the economy are likely as a result of oil price shocks at the international market. The economy witnessed a revival in the early 1980s which is accompanied by a highest decline in the mid

1980s. This again could be as a result of the adoption of SAP in the economy. The 1990s witnessed insignificant or a relatively zero level of GDP growth rate. This again could be as a result of military intervention in the economy. In early 2000, the economy witness another era of revival which is accompanied by sharp and downward swings till date. The possible reason for this could be as a result of new democracy that is growing.

Figure 2.4: GDP Growth Rate in Nigeria.

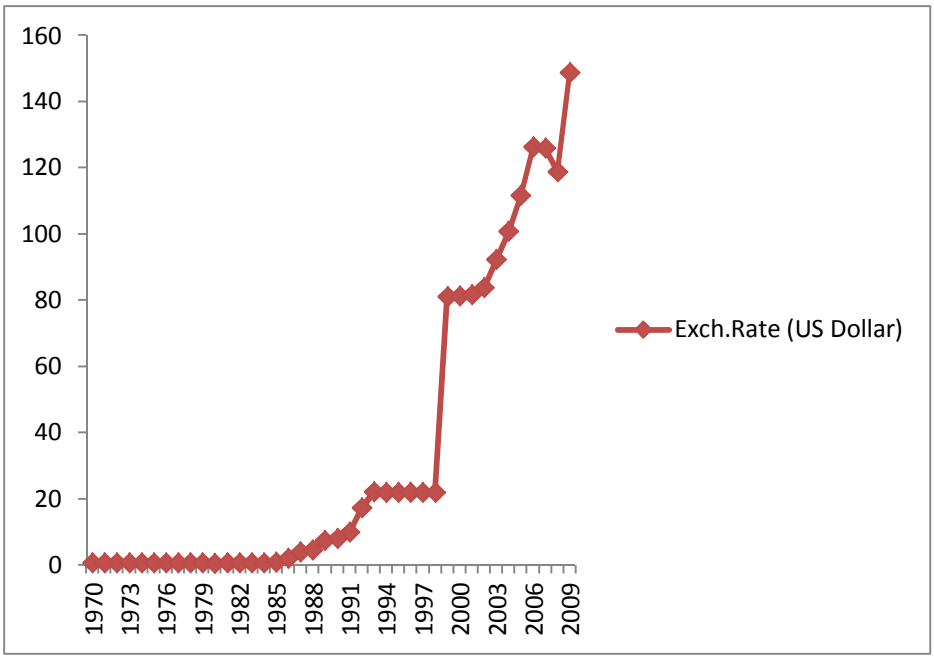


Source: Computed by the author using data from CBN's data.

Figure 2.5 shows patterns of exchange rate of Naira to US Dollar between 1970 and 2009. Between 1970 and 1985, the exchange rate of Naira to US Dollar was relatively stable. Within this period, the exchange rate fluctuates between 0.71% and 0.89%. Between 1986 and 2009, shows an upward trend in the exchange rate with periodic swings. This continues increase and fluctuations in exchange rate could be as a result of the adoption of the Structural

Adjustment Programme (SAP) in 1986 by the Nigerian government. The SAP era witnessed a shift from fixed exchange rate regime to floating exchange rate regime.

Figure 2.5: Exchange Rate of Naira to US Dollar.



Source: Computed by the author from CBN's data.

2.4 Empirical Literature

Elhiraika (2007) investigated the relationship between fiscal decentralization and public service delivery in South Africa. The selected sectors for the study are education and health of nine provinces in the economy. The education and health equations estimated are as shown below;

$$E = a_1 + a_2OS + a_3TR + a_4Y + u \quad (2.1)$$

$$H = b_1 + b_2OS + b_3TR + b_4Y + u \quad (2.2)$$

Where E is education sector, H is health sector, Y is GDP per capita, OS is share of own-revenue in total revenue, TR is share of transfers in total revenue, and u is the random term. Using cross-

sectional data for the nine provinces, for the period 1996-2005, the random and fixed effect models were used for the estimation. The findings show that own-revenue have negative impact on education and health across the nine provinces.

Iqbal and Nawaz (2011) investigated the impact of fiscal decentralization on macroeconomic stability. Their empirical models are as shown below;

$$MI = \alpha_1 + \alpha_2(M_2) + \alpha_3(Inv) + \alpha_4(Open) + \alpha_5(FD_R) + \varepsilon \quad (2.3)$$

$$MI = \alpha_1 + \alpha_2(M_2) + \alpha_3(Inv) + \alpha_4(Open) + \alpha_5(FD_E) + \varepsilon \quad (2.4)$$

$$MI = \alpha_1 + \alpha_2(M_2) + \alpha_3(Inv) + \alpha_4(Open) + \alpha_5(FD_R) + \alpha_6(FD_E) + \varepsilon \quad (2.5)$$

Where,

MI = Misery index; M_2 = Money supply; Inv = Investment; Open = Openness; FD_R, FD_E = Fiscal decentralization measures (Revenue and Expenditure).

Using GMM technique, the evidence that has been presented reveals a significant positive impact of fiscal decentralization on macroeconomic stability of Pakistan, although the results are much weaker for expenditure decentralization. Revenue decentralization is more effective than expenditure decentralization.

Feltenstein and Iwata (2005) conducted a research on the impact of decentralization on macro-economic performance in China. The model is as shown below;

$$\begin{bmatrix} y1t \\ y2t \end{bmatrix} = \begin{bmatrix} \beta 10 \\ \beta 20 \end{bmatrix} + \begin{bmatrix} \beta 11 \\ \beta 21 \end{bmatrix} w1, t-1 + \begin{bmatrix} \beta 12 \\ \beta 22 \end{bmatrix} w2, t-1 + \sum_{j=1}^{p} \begin{bmatrix} y11j & y12j \\ y21j & y22j \end{bmatrix} \begin{bmatrix} y1, t-j \\ y2, t-j \end{bmatrix} + \begin{bmatrix} u1t \\ u2t \end{bmatrix}$$

. (2.6)

Where, y1 and y2 stand for the GNP growth rate and the rate of inflation, respectively, and u1 and u2 are serially uncorrelated errors with mean zero vector and nonsingular covariance matrix. The variables w1 and w2 are unobservable variables representing the two types of decentralization mentioned previously. Using a VAR model with latent variables, their

econometric investigation offers strong evidence that there is a connection between decentralization and macroeconomic performance in China. Economic decentralization appears to be positively related to growth in real output for the entire postwar period in China. Fiscal decentralization seems to have adverse implications for the rate of inflation, especially after the late 1970s. Decentralization would therefore seem to be good for growth and bad for price stability.

Examining the impact of fiscal decentralization on local public goods in China, a cross-sectional analysis of 31 regions for the period 1994-2003 was conducted by (Xin-Qiao, and Bai, 2005). Five sectors were used for the analysis- Education, Medical care, Road construction, Capital construction/Urban maintenance, and Government administration. The general model estimated is as shown below;

$$Y_{it} = a_1 region + a_2 region^* + a_3 pgdp_{it} + a_4 pgdp_{it}^* + a_5 pbe_{it} + a_6 pbe_{it}^* + a_7 pee_{it} + a_8 pee_{it}^* + a_9 \delta_t + \varepsilon_{it} \quad (2.7)$$

Using fixed and random effects technique, the findings support the claim that fiscal decentralization is related to higher provision of local public goods in China.

Smith and Jimenez (2005) study the decentralization of health care and its impact on health in Canada. The empirical model of the study is as shown below;

$$INFMORT_{it} = \alpha_0 + \alpha_1 INC_{it} + \alpha_2 TRANSF_{it} + \alpha_3 DEC_{it} + \alpha_4 PRIV_{it} + \alpha_5 F\ EDEXP_{it} + \alpha_6 MUNEXP_{it} + \alpha_7 EDUC_{it} + \alpha_8 LOWBIRTH_{it} + \lambda t + \nu i + E_{it} \quad (2.8)$$

Using panel data for the period 1975-1995, results from the fixed effects model support the argument that decentralization in Canada has a positive and substantial effect on the provision of public services.

Plekhanov and Freinkman (2009) examined fiscal decentralization and quality of public services in Russian regions. The two models estimated are as follows:

$$INP_{it} = \alpha_1 + \beta_1 EXP_{it} + \gamma_1 DEC_{it} + \delta INP_{it} + \varepsilon_{it} \quad (2.9)$$

Where, *INP* are the key physical inputs in region *i* in year *t*, *EXP* is regional government spending in the relevant sector per user of services, *DEC* is a measure of fiscal decentralization in the region (either sectoral or broadly defined), *X* is a set of control variables (Index of democracy, number of regions, investment risk index, and urbanization), and ε is the residual.

$$PERF_{it} = \alpha_2 + \beta_2 EXP_{it} + \gamma_2 DEC_{it} + \delta_I NP_{it} + \theta Z_{it} + \eta_{it} \quad (2.10)$$

Where *PERF* is an indicator of sector performance, *Z* is a set of control variables (Index of democracy, number of regions, investment risk index, and urbanization), η is the residual, and other variables are defined as above.

Panel data were used for the period 2003-2007. Using the random effects model, it was found that there is an inconclusive relationship between fiscal decentralization and the quality of public service in Russian regions.

In a more recent study using the random effect models, Akpan 2010 investigated the impact of fiscal decentralization and social outcomes in Nigeria. Panel data for the 36 states of the federation including the federal capital territory were collected for the analysis from 2002-2009. Variables included in the model were; revenue and expenditure decentralization measures, infant mortality rate, literacy rate, and population rate. Included observation is 296. The two models estimated are as shown below;

$$\log IMR_{it} = a_o + a_1 \log S_{it} + a_2 \log POPN_{it} + a_3 \log OS + vi + e_{it} \quad (2.11)$$

$$\log LR_{it} = b_o + b_1 \log S_{it} + b_2 \log POPN_{it} + b_3 \log OS + vi + e_{it} \quad (2.12)$$

The study finds that higher fiscal decentralization is associated with higher social service delivery in Nigeria.

Aigbokhan (1999) examined fiscal federalism and economic growth in Nigeria by applying a simple endogenous growth model to investigate the pattern of fiscal decentralization in Nigeria and its impact on growth. A single equation model was adopted with three different measures of decentralization; Sub national own-source (internally generated revenue) revenue as a ratio of total central (federal) revenue; Sub-national expenditure as a ratio of total federal expenditure, and Sub national own-source as a ratio of total federal expenditure. The estimated basic growth equation use is as shown below;

$$Y = L + K + FDC \quad (2.13)$$

Where, L is Labour, K is capital, and FDC is the fiscal decentralization measures.

The structural form of the equation is given as;

$$Y = a + bL + cK + dFDC + e \quad (2.14)$$

Ordinary Least Squares technique was used to estimate the model. His findings suggest that the existing pattern of fiscal decentralization in Nigeria has a negative impact on growth.

Philip (2011) examined the relative effects of fiscal centralization on economic growth in Nigeria. Macroeconomic models for five different sectors were specified. These include, aggregate demand sector, Nigeria's fiscal system, production sector, financial sector, and external sector. Annual time series data ranging from 2001 to 2008 were collected and used for the estimation of the models. The simulation analysis revealed that the present fiscal centralization in Nigeria can not be sustained because the cost of maintaining the system is huge.

Akin *et al* (2001) examined decentralization and government provision of public goods in Uganda. The key sector of the study is the health sector. Panel data were collected across the 45

districts in Uganda between the periods 1995-1998. The empirical results using the fixed effects model are supportive of this hypothesis that there is a negative impact of decentralization on public goods provision.

Akramov and Asante (2009) developed a simple framework that explains disparities in local public services between decentralized districts. The result of their finding suggests that geography and ethnic diversity are important determinants of local public service delivery.

Feld, L.P. (2009) conducted a research on Fiscal Decentralization and economic growth in 23 OECD countries using a panel data. The key variables used in the model are; Intergovernmental Revenue Share, Secondary Education, Population Growth, GDP, Openness, Inflation, Revenue Decentralization1, Revenue Decentralization 2, and a Dummy variable.

The model used is specified as shown below:

$$\text{Economic Growth}_{it} = \beta_0 + \beta_1 \text{Decentralization}_{it} + \beta_2 \text{Economic Controls}_{it} + u_{it} \qquad (2.15)$$

Using OLS regression technique, he concludes that fiscal decentralization has a negative relationship with economic growth. In other words, fiscal decentralization is unrelated to economic growth.

Akinlo (1999) examined the fiscal responsiveness of state governments to formal intergovernmental flows in aggregate, and according to central government assistance schemes. The research was conducted using the 1980 data for 19 states in a cross-sectional analysis. The conventional constrained maximization model was used with a Simple Linear Ordinary Least Squares (OLS) technique. The variables incorporated in the model include: per capita federal funds, statutory grants, non-statutory loans, population growth rate, population density, geographical area, total feral funds, level of education, recurrent expenditures, capital expenditures, developmental expenditures and non-developmental expenditure. The key findings

of the research reveal that the state government fiscal expenditure was stimulated by grants. Total federal funds have a highly significant effect on developmental expenditure. This suggests a high level dependence of the state governments on the federally allocated revenue.

Ekpo and John (1996) used the Nigerian data to study the fiscal operations in Nigeria from 1960 to 1990, using a historical (political economy approach). The study covered ten states namely; Anambra, Bendel, Cross-River, Lagos, Ogun, Kano, Kaduna, Plateau, and Rivers. Their findings show that state government depends on the federally allocated revenue before the economic crisis of 1979\80, suggesting some evidence of centralization. The study also revealed that fiscal federalism in Nigeria is more influenced by non-economic factors such as the agitation for more states.

Jimoh (2003) examined the Nigerian experience with fiscal federalism since Nigeria became a federal state in 1954. The equations estimated are as follows:

RGDP = RGDP (L, K*, Openness index, NDR, M_2, POSTAR, MINDEX, STATE, LGA, FEDEXS, FEDREVS, STAUTO) (2.16)

$RGDP_t$ = RGDP (L, K*, Openness index, NDR, M_2, POSTAR, MINDEX, STATE, LGA, FEDEXS, FEDREVS, STAUTO) +ß ECM_{t-1} (2.17)

POVERTY = RGDP + POP + STATE + LGA + FEDEXS + FEDREVS + STAUTO (2.18)

The variables were defined as follows:

Real GDP (RGDP), labour (L), capital (K)*, Openness index, exchange rate (NDR), level of money supply (M2), dollar price of oil in the world market (POSTAR), extent of malaria prevalence index (MINDEX), STATE, LGA, expenditure concentration ratio (FEDEXS), revenue concentration ratio (FEDREVS) and fiscal autonomy ratio (STAUTO), number of states (STATE), number of local governments (LGA), POVERTY, and expansion in population (POP).

He used a time series data from 1970-2000. The variables were subjected to the usual Dickey Fuller (DF) and Augmented Dickey-Fuller (ADF) tests of stationarity, Dickey and Fuller, 1979; Engle and Granger, 1987; etc. Results from the OLS estimation finds that while the assignment of expenditure responsibilities among tiers of government appears to accord with the conventional wisdom on such as well as with the pattern in majority of federal arrangements around the world, revenue collection appears to be over concentrated in the hands of federal government and vertical arrangements appear to have left proportionately more than needed at center and too little for states and local governments. Similarly, arrangements for horizontal allocation of revenues appear, over the years, to be continually reviewed to ensure that the interests of the three dominant ethnic groups are in no way injured.

Olowononi (1999) examined the revenue and function sharing arrangement among the three levels of government in Nigeria. The study used regression analysis to evaluate the extent of fiscal decentralization in the country. The study also evaluated the impact of the various changes in revenue allocation formular on expenditure and revenue decentralization, using secondary data from 1970-1997. He used a constrained utility maximization model, with variables such as; state and local government expenditures (E), state and local government taxes (T), state and local construction (capital) outlays (C), state and local borrowing (B), federal government transfers to state and local governments (G), an income variable, GDP (Y), the legal matching ratio for matching grants-in-aid (&). Using 2 stage least square techniques, the findings show that there was overwhelming evidence in favour of fiscal centralization. The state and local governments depended more heavily on the federal sources than on internal sources for their expenditure funds.

Chen (2004) conducted a research on the public sector in China's transitional economy, with the aim of testing the validity of a variety of hypotheses, namely the Brennan and Buchanan (1980, The Power to Tax: Analytical Foundations of a Fiscal Constitution, CUP, Cambridge); Oates–Wallis (1985), version of the decentralization hypothesis and the Brennan and Buchanan collusion hypothesis, on the impact of fiscal decentralization at the provincial level. Pooled cross-section (province) and time-series data are employed with the period under consideration being 1986–1998. The variables used for testing these hypothesis' include; provincial extra budgetary funds (COL) as share of local government revenue, and services as collusion measure, per capita real GDP (PNI) for each province deflated by retail price index (1980 = 100), population (POP) for each province, provincial government expenditure (PGOV) as a share of China's GDP, and the key independent variable is the measure of decentralization (DEC).

The model is specified as follows:

$$\text{PGOVit} = \alpha o + \alpha 1 DECit + \alpha 2 COLit + \alpha 3 PNIit + \alpha 4 POPit + \varepsilon it \quad (2.19)$$

$$\varepsilon it = \mu it + uit + wit \quad (2.20)$$

Where i, is the index of provinces, and t, is the index of years.

An error components technique is also used for the empirical testing. The empirical results provide evidence to support both the Oates–Wallis hypothesis and the collusion hypothesis that an increase in fiscal decentralization leads to a higher level of provincial government expenditure. The study also finds that the central and provincial governments are provided with an incentive to form collusive agreements through extra-budgetary funds.

2.5 Implication of the Literature

The literature on the potential macroeconomic effects of fiscal federalism is quite vast but mixed. Decentralization may improve allocative efficiency, but it may also make stabilization policies more difficult to carry out (Tanzi, 1995). There are a lot of contending issues about the effect of federalism on economic growth and macro-economic performance around the globe. Some studies observed that there is a positive relationship between federalism and the provision of social services. These include, among others, Malik *et al* (2005), who used a time series data from 1971-2005 in Pakistan; Jimoh (2003), who used time series data from 1970-2000 in Nigeria; Thieben (2003), who used panel data from 1973-1998 in 11OECD countries; Brueckner (2005); Akai *et al* (2007), who used a time series data from 1992-1997 in the United States of America; Akpan (2010), confirms a similar results in Nigeria; Feltenstein and Iwata (2004), who used time series data in China from 1952-1996, etc.

Other studies have identified a negative relationship between fiscal decentralization and economic growth. These include, Aigbokhan (1999), who used time series data in Nigeria; Yilmaz *et la* (2004); Zhang and Zou (1998), who used a panel of 28 Chinese provinces; Ravillion (1998), in Argentina; Azfaz and Livingstone (2002), in Uganda; West and Wong (1995), in China, etc.

Some studies failed to identify any relationship or have observed ambiguous relationship. These include, Bodman (2009), who used time series data from 1972-2005 in Australia; Thornton (2007), who used panel data from 1980-2000 for 19 OECD countries; Markus *et al* (2004), Elhiraika (2007) in South Africa; Azfar *et al* (2000) in Philipines and Uganda; Winkler and Rounds (1996) in Chile; Asante and Akramov (2009) in Ghana, etc.

2.6 Gap in the Literature

Most of the studies reviewed on fiscal federalism and macro-economic performance the world over capitalized on growth only using GDP as a proxy. But this study has gone a step further to examine the impact of fiscal federalism on macroeconomic stability using (inflation and exchange rate). According to Musgrave (1959), the three traditional roles of government are efficient allocation of resources, equitable distribution of income and wealth, and economic stabilization. Base on this proposition, when revenues are transferred to the sub national governments from the federation account without monitoring their excesses, they lavished the money on unproductive expenditures which may undermine economic stability. In the same vein, sub national governments may decide to put these monies in the foreign exchange market in other to optimize the opportunities that exist in the capital market. Over floating the market with money may affect the exchange rate of naira negatively in favour of other currencies.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Theoretical Framework

The theoretical framework that this research work is based on is the theory of fiscal federalism by (Musgrave, 1959). This theory is also known as the "Trilogy". According to this theory, the roles of the state in the economy include; efficient allocation of resources, equitable distribution of income and wealth, and stabilization (maintaining full employment levels of employment and output at stable prices). The theoretical framework in question was basically a Keynesian one which canvassed for an activist role of the state in economic affairs. The theory posits that role of allocation of resources is best performed by the sub-national governments, while later two roles (stabilization and re-distribution) are best perform by the central government. According to the theory, when this is obtained in an economy, it will expand the capacity of sub-national governments'. Increase economic activities at sub-national level and results to monetary expansion. The implication of this is that the resulting monetary expansion would have effects on indicators of macroeconomic performance; inflation rate, interest rate, exchange rate, and economic growth. The effects of the monetary expansion on these macroeconomic variables could be positive or negative. This study assumes that the monetary expansion would lead to increased inflation and interest rate, depreciation of the exchange rate, while the higher output of both the public and private enterprises cause an increase in aggregate real income (that is economic growth).

3.1.1 Fiscal Federalism and Economic Growth

The two-sector production function framework by Barro (1990) was adopted as the theoretical framework for the study. Barro's framework provides a set of models for investigating the relationship between fiscal federalism and macroeconomic performance indicators such as growth of aggregate output, inflation rate, interest rate, and exchange rate. The model assumes that macroeconomic performance is influenced by policy variables other than the technical relationship between capital and labour (Barro, 1990; Aigbokhan, 1999). The flexibility introduced by policy variables has made the model popular in the analysis of macroeconomic performance of nations especially developing countries (Aigbokhan, 1999).

The model developed in this study is an extension of the models adopted by Aigbokhan, (1996) and (1999). The model assumes that the economy consists of two broad sectors, public (G) and private (P) whose output depends on labour (L) and capital (K). In addition, the output of G exercises some externality effect on output in P. The production function of the economy is thus:

$$Y = f(L, K_P, K_G) \quad (3.1)$$

Where, the subscripts denote sectoral inputs:

K_P = Private capital per labor

K_G = Public capital per labor

The production functions of the respective sectors are thus:

$$Y_P = P(L_P, K_P, G) \quad (3.2)$$

$$Y_G = G(L_G, K_G) \quad (3.3)$$

Total inputs are given as:

$$L_T = L_P + L_G \quad (3.4)$$

$$K_T = K_P + K_G \quad (3.5)$$

Total output Y is given as the sum of sectoral output or a function of sectoral inputs:

$$Y = Y_P + Y_G \quad (3.6)$$

The model further assumes that the public sector comprises of three subsectors and, by extension, that public spending is carried out by three levels of government: federal (f), state (s), and local (m).

Thus:

$$Y = a_0 + L_T + K_T + G_T + \mu \quad (3.7)$$

The study assumes that the size of government tends to influence growth rate Aigbokhan (1996) and that fiscal decentralization tends to reduce the size of government (Ehdaie, 1994; Aigbokhan, 1999). Drawing on the foregoing evidence, the study postulates that fiscal decentralization has an impact on economic growth. Theoretically, fiscal decentralization is expected to foster growth through allocative efficiency and efficiency of service delivery. However, there is no consensus in the empirical literature on the direction of impact. A strand of the empirical literature reveals that increased decentralization tends to impact negatively on growth (Zhang and Zou, 1996; Davoodi and Zou, 1997; Aigbokhan, 1999). Another strand of the empirical literature reveals that decentralization has a positive impact on economic growth (Chete, 1998; Feltenstein and Iwata, 2005). Thus, the impact of fiscal decentralization on growth is an empirical issue.

The nature of intergovernmental fiscal arrangement or fiscal federalism is therefore expected to influence output of G (Aigbokhan, 1999). By introducing fiscal decentralization (FDC) as a policy variable into the model on the basis of equation (3.7)

$G_t = f(FDC)$ (3.8)

Equation (3.8); $Y= f(L_t, K_t, G_t)$ becomes

$Y = f(L_t, K_t, FDC_t)$ (3.9)

The study postulates that output, that is growth, is positively affected by money supply (MS). By introducing money supply into the model, equation (3.9) becomes;

$Y = f(L_t, K_t, MS_t, FDC_t)$ (3.10)

Equation (3.10) is the estimated basic growth equation. Its explicit form is:

$Y = \alpha_0 + \alpha_1 L_t + \alpha_2 K_t + \alpha_3 MS_t + \alpha_4 FDC_t + \mu_t$ (3.11a)

From equation (3.11a), a VAR Model with j lags can be expressed as;

$y_t = \alpha_1 y_{t-1} + \alpha_2 y_{t-2} + \ldots + \alpha_j y_{t-j} + \mu_t$ (3.11b)

3.1.2 Fiscal Federalism and Inflation Rate

According to the Monetarist School of thought, inflation (INF) is a monetary phenomenon. There is evidence to suggest that monetary expansion will lead to increased inflation (Feltenstein and Iwata, 2005).

Thus:

$INF = f(MS)$ (3.12)

The model assumes that there are two sectors, private P and public G whose output depends on labour (L) and capital (K), and that there is a negative relationship between output and price movement (inflation rate). Drawing on the foregoing evidence, the study postulates that labour and capital have an impact on price level (inflation). In fact there is evidence to suggest that

factor productivity tends to impact positively on price level (Iqbal and Nawaz, 2011). Equation (3.12) becomes:

$$INF = f(MS_t, L_t, K_t) \quad (3.13)$$

There are links between decentralization and inflation (Feltenstein and Iwata, 2005; Jin, *et al*, 1999; Iqbal and Nawaz, 2011). By introducing fiscal decentralization (FDC) as a policy variable into the model, equation (3.13) becomes:

$$INF = f(MS_t, L_t, K_t, FDC_t) \quad (3.14)$$

Equation (3.14) is the estimated basic inflation equation. Its explicit form is;

$$INF = \beta_0 + \beta_1 MS_t + \beta_2 L_t + \beta_3 K_t + \beta_4 FDC_t + \mu_t \quad (3.15a)$$

From equation (3.15a) a VAR model with j lags can be expressed as;

$$INF_t = \beta_1 INF_{t-1} + \beta_2 INF_{t-2} + \ldots + \beta_j INF_{t-j} + \mu_t \quad (3.15b)$$

3.1.3 Fiscal Federalism and Exchange Rate

The model assumes a flexible exchange rate determined by market forces (Ige 2006, Afolabi, 1999). In addition, the study postulates that exchange rate (EXC) will be negatively affected by inflation and increase in money supply, and therefore states that:

$$EXC = f(INF, MS) \quad (3.16)$$

The study assumes that the size of government tends to influence exchange rate, and that fiscal decentralization has a negative correlation with the size of government, that is increase in decentralization would reduce the size of government (Aigbokhan, 1999; Chete, 1998). Theoretically, fiscal decentralization may have a negative impact on exchange rate if there is lack of fiscal discipline at sub-national levels of government (Tanzi, 1995). By introducing fiscal decentralization (FDC) as a policy variable into the model, equation (3.16) becomes,

$EXC = f(INF_t , MS_t , G_t)$, or (3.17)

$EXC = f(INF_t , MS_t , FDC_t)$ (3.18)

Equation (3.18) is deduced from (3.17) on the basis of the argument above that size of G depends to a certain degree on FDC. Equation (3.18) is the estimated basic exchange rate equation. Its explicit form is:

$EXC = \delta_0 + \delta_1 INF_t + \delta_2 MS_t + \delta_3 FDC_t + \mu_t$ (3.19a)

From equation (39a), a VAR model with j lags can be expressed as;

$EXC_t = \delta_1 EXC_{t-1} + \delta_2 EXC_{t-2} + \ldots + \delta_j EXC_{t-j} + \mu_t$ (3.19b)

3.2 Model Specification

The empirical models of this study are derived from the theoretical framework discussed in section 3.2. The empirical models are grouped into three sets of equations comprising of Growth equations (Model 3.20), Inflation equations (Model 3.21), and Exchange rate equations (Model 3.22). The interaction of the variables in the model will have important implications for both estimation and interpretation of the model's parameters. The models are re-specified as shown below with the inclusion of internally generated revenue (FDC1), and M2 as suggested by the literature.

3.2.1 Model 1: Fiscal Federalism-Growth Model

The tests are based on the regressions;

$$\Delta GDP_t = \alpha_0 + \alpha_1 GDP_{t-1} + \sum_{j=1}^{L} \alpha_j \Delta GDP_{t-j} + \sum_{j=1}^{L} \alpha_2 \Delta L_{t-j} + \sum_{j=1}^{L} \alpha_3 \Delta K_{t-j} + \sum_{j=1}^{L} \alpha_4 \Delta MS_{t-j} + \sum_{j=1}^{L} \alpha_5 \Delta FDC1_{t-j} + \sum_{j=1}^{L} \alpha_6 \Delta FDC2_{t-j} + \sum_{j=1}^{L} \alpha_7 \Delta FDC3_{t-j} + \mu_t \quad (3.20)$$

Where GDP is Real Gross Domestic product, L is labour force, K is capital (proxied as gross fixed capital formation), MS is broad money supply (M2), FDC1 is ratio of sub national

government internally generated revenue to total government revenue, FDC2 is ratio of sub national government expenditure to total government expenditure, and FDC3 is ratio of sub national government revenue from federation account to total government revenue, Δ stands for difference, and L is the maximum lag length. Model 1 is intended to find out the impact of fiscal federalism on Gross Domestic Product (GDP). In a VAR model, all variables are taken as endogenous.

3.2.2 Model 2: Fiscal Federalism-Inflation Model

The tests are based on the regressions;

$$\Delta INF_t=\beta_0+\beta_1 INF_{t-1}+\sum_{j=1}^{L}\beta_j\Delta INF_{t-j}+\sum_{j=1}^{L}\beta_2\Delta MS_{t-j}+\sum_{j=1}^{L}\beta_3\Delta L_{t-j}+\sum_{j=1}^{L}\beta_4\Delta K_{t-j}+\sum_{j=1}^{L}\beta_5\Delta FDC1_{t-j}+\sum_{j=1}^{L}\beta_6\Delta FDC2_{t-j}+\sum_{j=1}^{L}\beta_7\Delta FDC2_{t-j}+\mu_t \quad (3.21)$$

Where INF is inflation rate, L is labour force, K is capital (proxied as gross fixed capital formation), MS is broad money supply (M2), FDC1, 2, and 3 are measures of fiscal federalism as defined in model 1, Δ stands for difference, Δ stands for difference, and L is the maximum lag length. Model 2 is intended to find out the impact of fiscal federalism on inflation rate. Note that all variables in a VAR model are taken as endogenous.

3.2.3 Model 3: Fiscal Federalism-Exchange Rate Model

The tests are based on the regressions;

$$\Delta EXR_t=\lambda_0+\lambda_1 EXR_{t-1}+\sum_{j=1}^{L}\lambda_j\Delta EXR_{t-j}+\sum_{j=1}^{L}\lambda_2\Delta INF_{t-j}+\sum_{j=1}^{L}\lambda_3\Delta MS_{t-j}+\sum_{j=1}^{L}\lambda_4\Delta FDC1_{t-j}+\sum_{j=1}^{L}\lambda_5\Delta FDC2_{t-j}+\sum_{J}^{L}\lambda_6\Delta FDC3_{t-j}+\mu_t \quad (3.22)$$

Where EXR is exchange rate, INF is inflation rate, MS is broad money supply (M2), FDC 1, 2 and 3 are measures fiscal federalism as defined in model 1, Δ stands for difference, and L is the maximum lag length. Model 3 is intended to find out the impact of fiscal federalism on exchange rate. Note that all variables in the VAR model are taken as endogenous.

3.3 Estimation Technique

3.3.1 Unit Root Tests

Time series data are always non-stationary due to fluctuations, innovations or changes over time. Therefore, it is important to first conduct preliminary diagnostics on the time series properties of the variables before further evaluation.

On that note, the Augmented Dickey Fuller (ADF) test has been conducted to test for unit root based on equations of the following form:

$$Y_t = \alpha + \beta Y_{t-1} + \sum_{i=1}^{n} \beta_j \Delta Y_{t-i} + \varepsilon \quad (3.23)$$

$$Y_t = \alpha + \gamma t + \beta Y_{t-1} + \sum_{i=1}^{n} \beta_j \Delta Y_{t-i} + \varepsilon \quad (3.24)$$

Where, equation (3.23) signifies ADF with intercept only, while equation (3.24) signifies ADF with trend and intercept.

Thus, the null hypothesis for ADF unit root test is $\beta = 0$ (presence of unit root), and the alternative hypothesis is $\beta \neq 0$ (absence of unit root).

3.3.2 Vector Autoregressive (VAR) Description

The VAR model demands that all variables most be endogenous, dependent, have some links. The advantage of VAR model over the other techniques is that the variables that make up the system express themselves simultaneously in function of the others. VAR is not restricted to a theory, that is, its applicability is encompassing. In estimating the VAR model, all the variables most be stationary.

The strength of VAR method rests on the following three tenets;

i. There is no a priori endogenous-exogenous dichotomy in the system.

ii. There are no zero-type restrictions.

iii. There is no strict underlying economic theory on which the model is based.

3.3.3 Impulse Response Functions and Variance Decomposition Analysis

The impulse response functions trace the responsiveness of dependent variable(s) in the VAR to a unit shock in the error terms. In order words, the impulse response function measures how macro-economic variables respond to different shocks. Where as, the variance decomposition function measures the relative importance of the different shocks on the macro-economic variables. Categorically, the impulse response and the variance decomposition will be used to examine the shocks imposed on the stated macroeconomic variables over the period of study.

3.4 Definition of Fiscal Federalism Measures

Table 3.1: Summary of Fiscal Federalism Variables

VARIABLES	DEFINITION
Fiscal Federalism (FDC1).	Sub-national governments' own source (internally generated revenue) as a ratio of total government revenue. Signifying taxing power.
Fiscal Federalism (FDC2).	Sub-national governments' total expenditure as a ratio of total federal expenditure.
Fiscal Federalism (FDC3).	Sub-national governments' revenue from federation account as a ratio of total federal revenue.

Source: Philip, 2011

3.5 Sources of data

Purely secondary data (time series annual data) was used for purpose of analysis in this research work. Data from various sources such as Central Bank of Nigeria (CBN) annual statement of accounts/statistical bulletins (various issues), National Bureau of Statistics (NBS), World Development Index (WDI), Global Competitive Index, and other relevant sources was employed. The data used cover period between 1970 and 2010.

CHAPTER FOUR

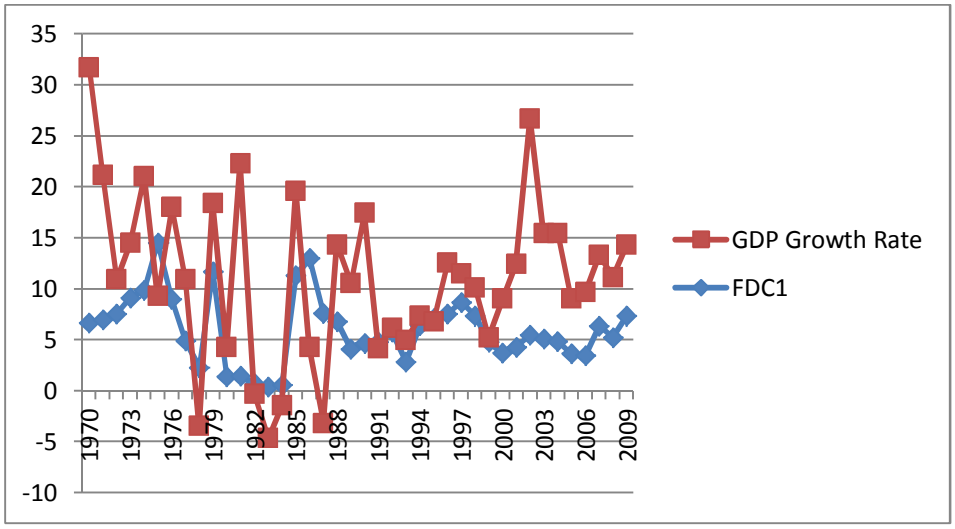
EMPIRICAL RESULTS AND DISCUSSION

4.1 Trend Relationship between Fiscal Federalism Measures and Macroeconomic Variables in Nigeria (1970-2009)

Figures 4.1 to 4.9 show the trend relationship between fiscal federalism measures and three macroeconomic variables (GDP, Inflation and Exchange rate) in Nigeria between 1970 and 2009.

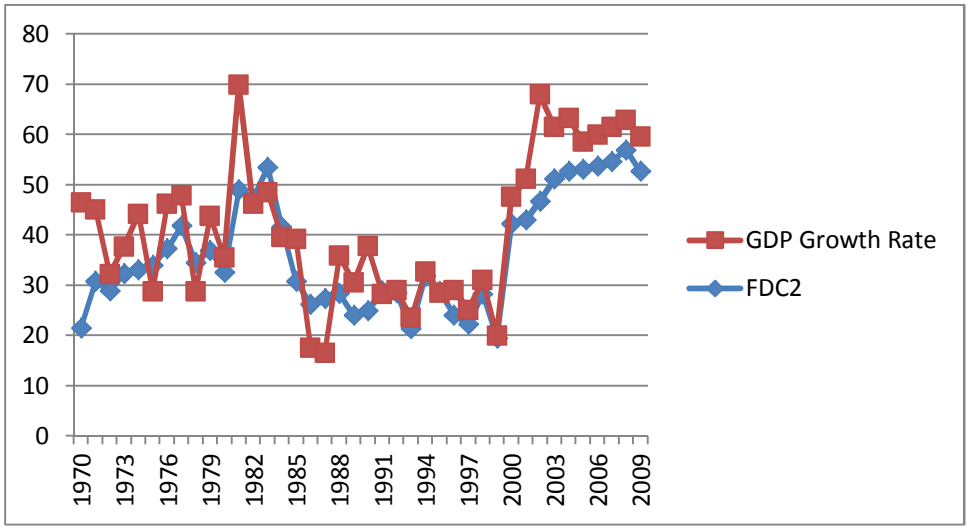
The relationship between FDC1, FDC2, FDC3 and GDP is highly volatile. In other words, there is both positive and negative fluctuation between the fiscal decentralization measures and GDP. See figures 4.1, 4.2, and 4.3.

Figure 4.1: Relationship between FDC1 and Economic Growth in Nigeria.



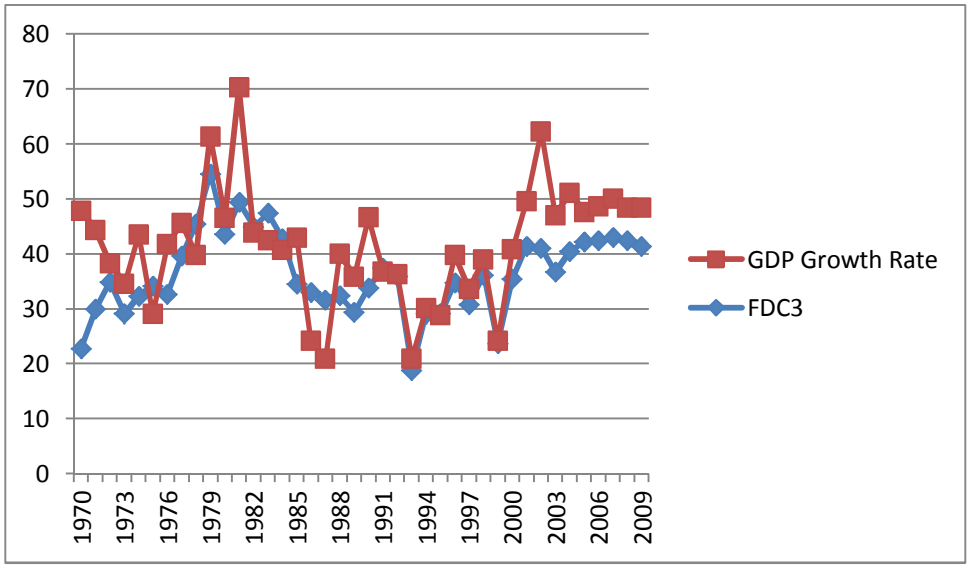
Source; Author's computation

Figure 4.2: Relationship between FDC2 and Economic Growth in Nigeria.



Source; Author's computation

Figure 4.3: Relationship between FDC3 and Economic Growth in Nigeria.



Source; Author's computation

Likewise, the relationship between FDC1, FDC2, FDC3 and inflation (INF) has been positive and highly volatile over the period of study. See figures 4.4, 4.5, and 4.6.

Figure 4.4: Relationship between FDC1 and Inflation Rate in Nigeria.

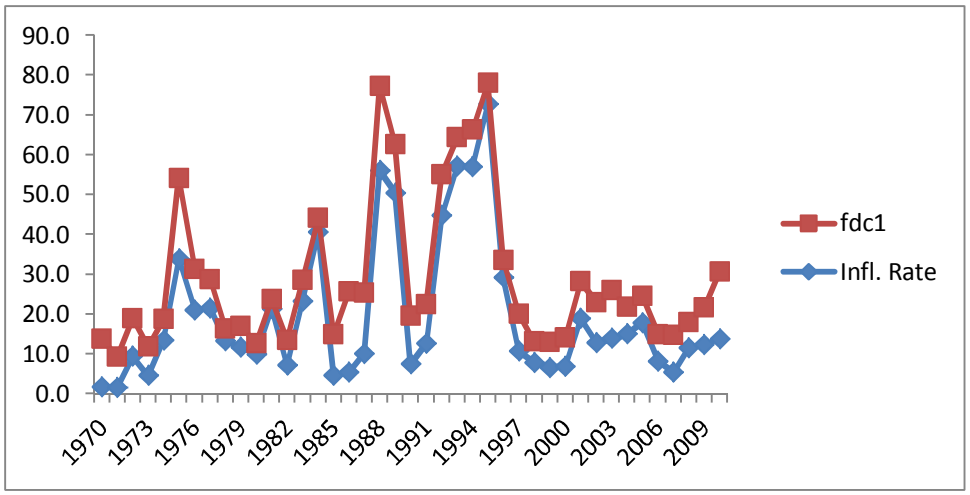
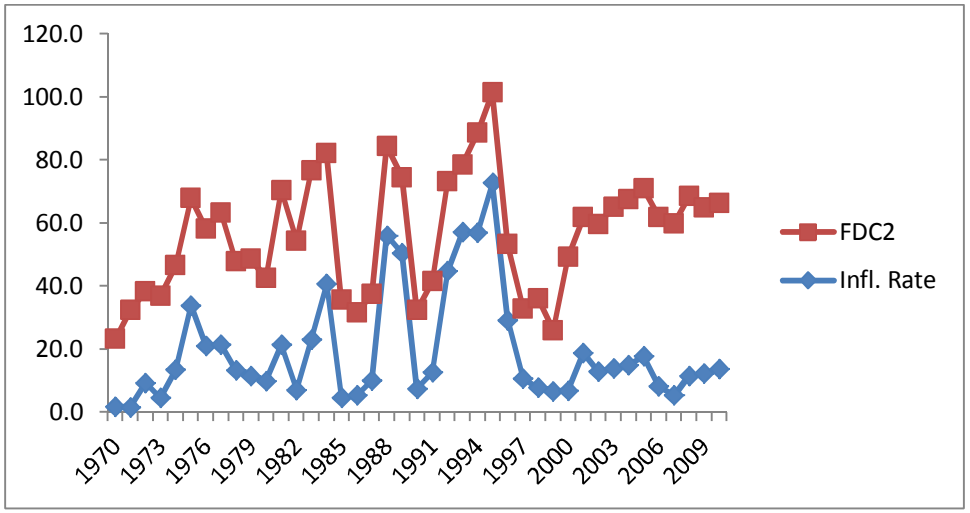
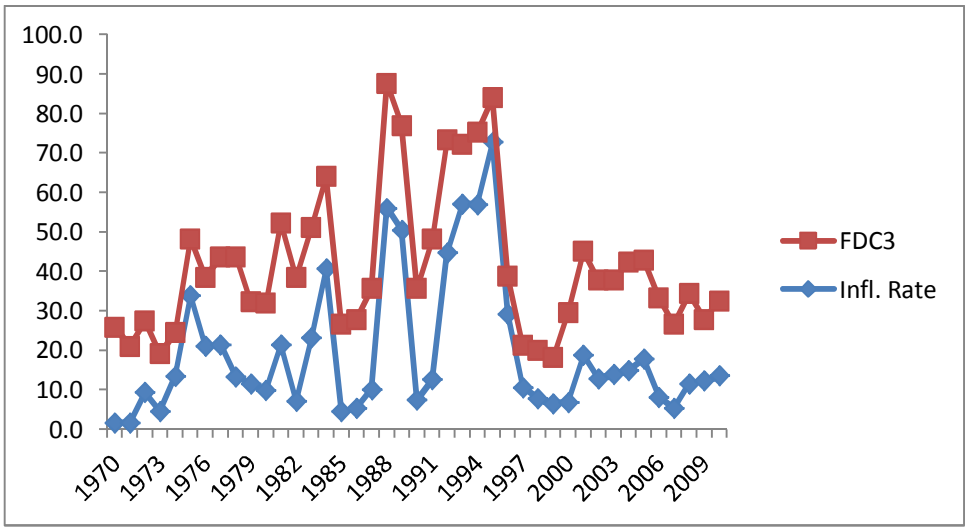


Figure 4.5: Relationship between FDC2 and Inflation Rate in Nigeria.



Source; Author's computation

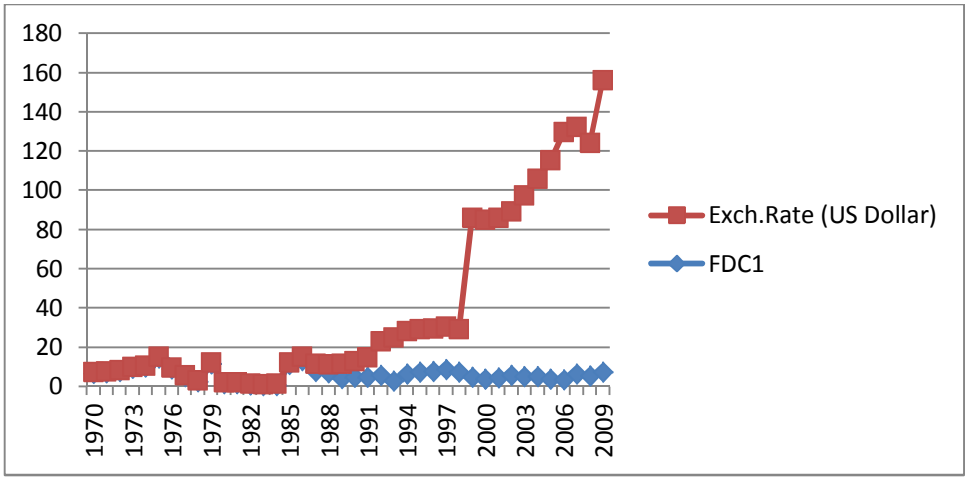
Figure 4.6: Relationship between FDC3 and Inflation Rate in Nigeria.



Source; Author's computation

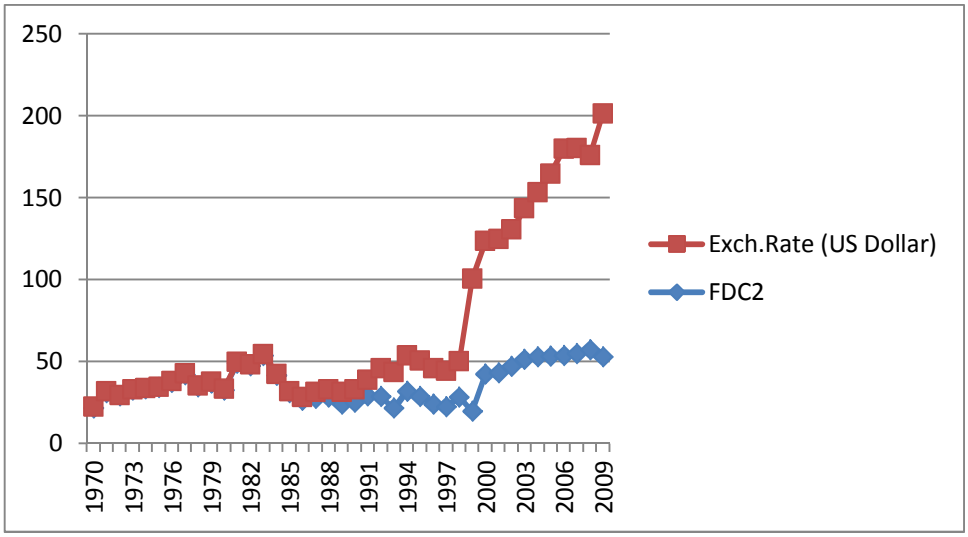
On the other hand, the trend between FDC1, FDC2, FDC3 and exchange rate (EXR) shows that there is a positive relationship. See figures 4.7, 4.8, and 4.9.

Figure 4.7: Relationship between FDC1 and Exchange Rate in Nigeria.



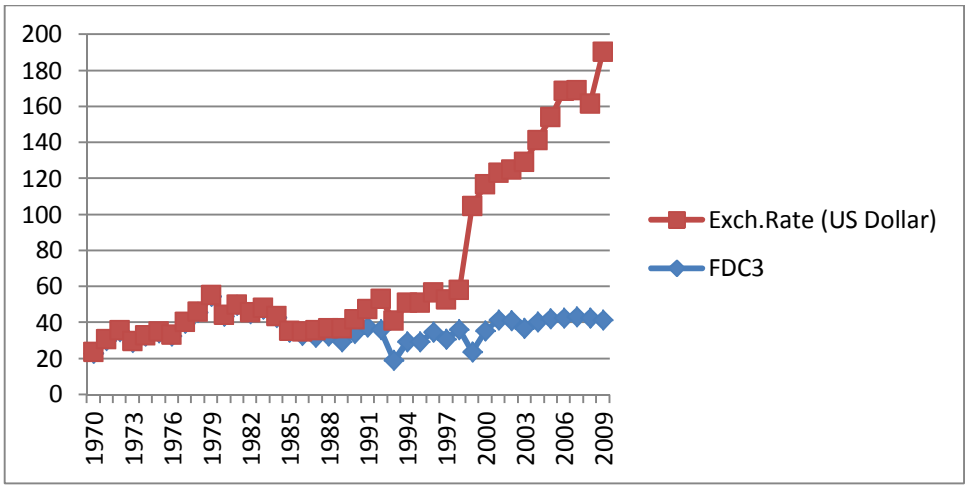
Source; Author's computation

Figure 4.8: Relationship between FDC2 and Exchange Rate in Nigeria.



Source; Author's computation

Figure 4.9: Relationship between FDC3 and Exchange Rate in Nigeria.



Source; Author's computation

4.2 Unit Root Test

Unit root test was conducted to make the series stationary and to identify the order of integration after which the Vector Autoregressive (VAR) model was estimated. Both the Augmented Dickey-fuller (ADF) and the Phillips-Perron (PP) standard tests for stationarity were used to establish the order of integration of the series. Both tests indicates that all the variables in the three models are integrated of order one I(1)[3], see table 4.1. This finding implies a test is needed to see whether there is co-integration among the variables. In order word, a test for co-integration is needed to see whether the variables in the model will be converging in the long-run. This will also tell us whether the restricted or unrestricted VAR is appropriate for estimating the model. The test for co-integration was therefore conducted in the next section.

Table 4.1: Summary of Unit-Root Test Result

	Level		First Difference		
Variable	ADF	PP	ADF	PP	Remarks
LFDC1	-2.5712	-2.7652	-5.6464**	-8.1402**	I(1)
LFDC2	-1.2001	-1.8921	-4.0364**	-7.8991**	I(1)
LFDC3	-2.6587	-2.7388	-5.0797**	-6.2915**	I(1)
LGFCF	-1.2629	-1.0662	-4.4899**	-4.9193**	I(1)
LM2	-1.5926	-1.5062	-4.3999**	-5.7146**	I(1)
LRGDP	-2.3272	-1.9591	-5.1071**	-6.2192**	I(1)
LTLF	-2.4889	-2.3839	-5.2465**	-8.3795**	I(1)
LINF	-1.9962	-1.8854	-3.6322**	-4.0175**	I(1)
LEXR	-0.8805	-0.8391	-5.6298**	-7.8924**	I(1)

Note: For the levels, we included trend and intercept, the 5% critical value is -3.3512. Also, for the first difference trend and intercept is included, the 5% critical value is -2.9422. (**) denotes rejection of unit root at 5% for both Augmented Dickey Fuller (ADF) and Phillips-Perron (PP).

Source: Author's computation

[3]The ADF and PP tests statistic are less than the absolute values of the critical values at 5% level of significance, thus we cannot reject the null hypothesis that there is presence of unit root in the series. However, after the first difference, both the ADF and PP tests statistic are found to be greater than the critical values at 5% level of significance. Thus, we reject the null hypothesis that there is presence of unit root in the series.

4.3 Co-integration Test Results

The Johansen co-integration test has been conducted having confirmed that variables included in the model are integrated of order one I(1). Using the model selection information criteria (AIC, SIC, and HQIC). It is observed that the optimal lag lengths that make the residuals of models 1, 2 and 3 free from serial correlation are 1, 1 and 2 respectively.

The test for co-integration using the Johansen maximum Likelihood approach suggests that there is evidence of co-integration among variables in the three models. Model 3.20 in chapter 3 was estimated and the summary is found in table 4.2.

Table 4.2 shows that Trace test indicates 3 co-integrating equations at 5% and 3 at 1% levels. While Maximum Eigen test indicates 3 co-integrating equations at 5% and 3 at 1% levels between GDP and other variables in the model.

The result from table 4.2 also shows that increase in the variables of interest FDC1, FDC2, and FDC3 have impacted both positively and negatively on economic growth. The impact is found to be statistically significant. For instance, the co-integrating vector (CV) shows that a 100% increase in FDC1 and FDC2 has impacted negatively on growth, that is, -22% and -158% respectively. This finding is in tandem with the findings of (Aigbokhan, 1999; Tanzi, 1995). While, a 100% increase in FDC3 has impacted positively on economic growth by 75%. This supports the findings of (Plekhanov and Freikman, 2009; Feltenstein and Iwata 2005). It also supports the theory of public goods by Musgrave (1959), which states that increase in fiscal decentralization will increase economic growth. The findings of this model are not surprising because the Nigerian fiscal system is more of fiscal fragmentation than fiscal decentralization.

Table 4.2: Co-integration Test Result for RGDP Model

Trace Rank Test				
Hypothesis	r=0*	r≤1*	r≤ 2*	r≤3
Trace stat.	194.25	125.65	82.96	41.86
5%	124.24	94.15	68.52	47.21
1%	133.57	103.18	76.07	54.46
Maximum Eigen Value				
Hypothesis	r=0*	r≤1*	r≤2*	r≤3
Maximum Eigen Stat	68.59	42.69	41.09	19.72
5%	45.28	39.37	33.46	27.07
1%	51.57	41.10	38.77	32.24

Estimate of the (Identified) Long-run Equilibrium							
	LRGDP	LM2	LTLF	LGFCF	LFDC1	LFDC2	LFDC3
CV	1.00	0.25	-0.95	-0.13	-0.22	-1.58	0.75
t-stat		(2.0959)	(-12.5919)	(-0.9489)	(-2.3489)	(-5.9749)	(4.1258)
Adj.α	-0.02	0.17	0.79	0.25	0.24	0.20	-0.004
t-stat	(-0.1307)	(1.1076)	(2.7774)	(2.8850)	(0.6540)	(2.3305)	(-0.0334)

Note: Trace test indicates 3 co-integrating equation(s) at 5% and 3 at 1% levels. Maximum Eigen test indicates 3 co-integrating equation(s) at 5% and 3 at 1% levels[4].
Source: Author's computation

Table 4.3 is the summary estimation of model 3.21 in chapter 3. The result shows that Trace test indicates 3 co-integrating equations at 5% and 2 at 1% levels. While Maximum Eigen test indicates 2 co-integrating equations at 5% and 1 at 1% levels between inflation (CPI) and other variables in the model.

[4] The null hypothesis that there is no co-integrating equation has been rejected. This is because the values of trace statistic in all the three instances are greater than the critical value at both 5% and 1% level. Likewise, the values of the Eigen statistic are greater than critical value at both 5% and 1%.

Table 4.3: Co-integration Test Result for Inflation Model

Trace Rank Result				
Hypothesis	r=0*	r≤1*	r≤2*	r≤3
Trace Stat	192.28	122.79	73.16	37.07
5%	124.24	94.15	68.52	47.96
1%	133.57	103.18	76.07	54.46

Maximum Eigen Test				
Hypothesis	r=0*	r≤1*	r≤2	r≤3
Max Eigen Stat	69.48	49.64	36.08	14.56
5%	45.28	39.37	33.46	27.07
1%	51.57	45.10	38.77	32.24

Estimate of the (Identified) Long run Equation							
	LCPI	LM2	LTLF	LGFCF	LFDC1	LFDC2	LFDC3
CV	1.00	0.74	-0.68	-1.92	-0.19	0.02	-0.02
t-stats		(3.6437)	(-5.7951)	(-8.0648)	(-5.6708)	(2.0831)	(-1.5380)
Adj. α	-0.15	-0.18	0.34	0.26	2.54	0.34	1.28
t-stat	(-3.1157)	(-1.8082)	(0.5118)	(1.1161)	(2.8838)	(0.4127)	(0.7437)

Note: Trace test indicates 3 co-integrating equation(s) at 5% and 2 at 1% levels. Maximum Eigen test indicates 2 co-integrating equation(s) at 5%, and 1 at 1% levels.
Source: Author's computation

The result in table 4.3 also shows that increase in FDC1, FDC2 and FDC3 have both positive and negative impact on inflation. The impact is found to be statistically significant. For instance, the co-integrating vector (CV) shows a striking result that a 100% increase in FDC1 and FDC3 has reduce inflation in Nigeria within the period of study by -19% and -2% respectively. But a 100% increase in FDC2 has increased inflation by 2% within the study period in Nigeria. But the inference from this finding is that fiscal decentralization is bad for price stability (control of inflation) when the provisions of federalism are violated. The finding is in tandem with the findings of (Feltenstein and Iwata 2005; Tanzi 1995).

Table 4.4 is the summary of the estimation of model 3.22 in chapter 3. The result shows that Trace test indicates 1 co-integrating equations at 5% and 1% levels. While Maximum Eigen

test indicates 2 co-integrating equations at 5% and 1 at 1% levels between exchange rate and other variables in the model.

Table 4.4 Co-integration Test Result for Exchange Rate Model

Trace Rank Test				
Hypothesis	r=0*	r≤1	r≤2	r≤3
Trace Stat	131.22	64.33	28.71	15.38
5%	94.15	68.52	47.21	29.68
1%	103.18	76.07	54.46	35.65

Maximum Eigen Rank Test				
Hypothesis	r=0*	r≤1*	r≤2	r≤3
Max Eigen stat	66.89	35.62	13.32	8.41
5%	39.37	33.46	27.07	20.97
1%	45.10	38.24	32.24	25.52

Estimate of the (Identified) Long run Equation						
	LEXR	LM2	LCPI	LFDC1	LFDC2	LFDC3
CV	1.00	0.05	-1.14	-0.65	1.87	-1.68
t-stat		(0.2015)	(-3.4564)	(-4.4051)	(4.3666)	(-4.4574)
Adj.α	-0.16	0.03	0.009	0.89	-0.036	0.07
t-stat	(-1.5385)	(0.2297)	(0.1405)	(3.6963)	(-0.4770)	(0.6749)

Note: Trace test indicates 1 co-integrating equation(s) both at 5% and 1% levels. Maximum Eigen test indicates 1 co-integrating equation(s) at 5% and 1% level.
Source: Author's computation

The result in table 4.4 also shows that FDC1, FDC2 and FDC3 have both positive and negative impact on exchange rate in Nigeria. The impact is found to be statistically significant. For instance, the co-integrating vector (CV) shows that a 100% increase in FDC1 and FDC3 has led to about 65% and 168% depreciation in exchange rate respectively. While, a 100% increase in FDC2 has led to about 187% appreciation in exchange rate within the period of study.

4.4 Vector Error Correction Estimates

The co-integrating vectors in the models have been identified. In order to capture both the short run and long run relationships, the VEC model of RGDP is summarized in table 4.5 was estimated with an optimal lag length of one. The full estimates of the VEC are reported in appendix (A); however the short run adjustment equation for DLRGDP, DCPI, and DEXR, are reported in tables 4.5, 4.6, and 4.7 respectively.

Table 4.5 is the summary of the estimation of model 3.20 in chapter 3. The estimated specification in table 4.5 suggests that the speed of adjustment (error correction mechanism) to the long run equilibrium is low. To be specific, about 2% of the disequilibrium errors which occurred in the previous period are corrected in the current period. The short run adjustment model suggests that past changes in economic growth (RGDP) are positively related to current changes in RGDP, but it is not statistically significant. This is not true with lagged changes in M2, TLF, GFCF, FDC2, and FDC3 which are negatively related to current changes in RGDP, but not statistically significant. However, lagged changes in FDC1 are negative and statistically significant. This means that in the short run, an increase in FDC1 in the previous period is followed by decrease (appreciation) in economic growth (RGDP) in the current period. Therefore, short run adjustment mechanism seems to be via FDC1.

Table 4.5: Error Correction Result of ΔRGDP

Regressor	Coefficient	t-values
Intercept	**0.15**	**1.6282**
LRGDP(-1)	**0.13**	**0.5874**
LM2(-1)	**-0.03**	**-0.1459**
LTLF(-1)	**-0.20**	**-0.6926**
LGFCF(-1)	**-0.02**	**-0.1826**
LFDC1(-1)	**-0.19**	**-2.5965**
LFDC2(-1)	**-0.06**	**-0.1682**
LFDC3(-1)	**-0.26**	**-0.4589**
ECM(-1)	**-0.02**	**-0.1307**

Adj. R-squared = 0.32; S.E = 0.2906; f-stats = 2.1385

Source: Computed by the Author

In a similar vein, the estimated specification in table 4.6 suggests that the speed of adjustment of (error correction mechanism) to the long run equilibrium is very low. Specifically, about 15% of the disequilibrium errors which occurred in the previous period are corrected in the current period. The short run adjustment model suggests that past changes in inflation are positively related to current changes in INF, and it is statistically significant. This is also true of lagged changes in FDC2. The lagged changes in M2 are also positive, but statistically insignificant. This is not true of lagged changes in TLF, GFCF, and FDC3 which are negatively related to current changes in INF, and not statistically significant. However, lagged changes in FDC1 are negative and statistically significant. This means that in the short run, an increase in

FDC1 in the previous period is followed by decrease (appreciation) in inflation in the current period. Therefore, short run adjustment mechanism seems to be via FDC1.

Table 4.6: Error Correction Result of ΔINF

Regressor	Coefficient	t-values
Intercept	0.10	2.3426
LINF(-1)	0.56	3.5219
LM2(-1)	0.009	0.1017
LTLF(-1)	-0.03	-1.6762
LGFCF(-1)	-0.26	-0.7162
LFDC1(1)	-0.005	-2.5409
LFDC2(-1)	0.009	2.1793
FDC3(-1)	-0.002	-0.3252
ECM(-1)	-0.15	-3.1157

Adj. R-squared = 0.7354; S.E. = 3.5445; f-stat = 13.5446
Source: Computed by the Author.

Also, the estimated specification in table 4.7 suggests that the speed of adjustment (error correction mechanism) to the long run is low. To be specific, about 17% of the disequilibrium errors which occurred in the previous period are corrected in the current period. The short run adjustment model suggests that past changes in exchange rate (EXR) are negatively related to current changes in EXR, but it is statistically insignificant. This is also true of lagged changes in INF, M2, and FDC3. The lagged changes in FDC1 are also positive, but statistically insignificant. However, lagged changes in FDC2 are negative and statistically significant. This means that in the short run, an increase in FDC2 in the previous period is followed by decrease

(appreciation) in exchange rate (EXR) in the current period. Therefore, short run adjustment mechanism seems to be via FDC2.

Table 4.7: Error Correction Result of ΔEXR

Regressor	Coefficient	t-values
Intercept	0.22	2.3095
LEXR(-2)	-0.04	-0.1927
LINF(-2)	-0.22	-0.6388
LM2(-2)	-0.05	-0.3194
LFDC1(-2)	0.10	1.3529
LFDC2(-2)	-0.09	-2.2556
LFDC3(-2)	0.07	-0.2366
ECM(-1)	-0.17	-1.5385

Adj. R-squared = 0.01; S.E. = 10.8758; f-stat = 1.0729
Source: Computed by the Author.

4.5 Impulse Responses to Generalized One S.D. Innovations

Tables 4.8, 4.9, 4.10 shows the impulse response to generalized standard deviation (SD) innovation of the three macro economic variables of interest within a period of ten quarters. The responses are for particular variables to a one-time shock in each variable in the system. The detailed estimates of impulse response are found in appendices (C, F and I).

Table 4.8 presents the dynamic response of RGDP to generalize one standard deviation (SD) shock of fiscal decentralization and other variables in the model within a horizon of 10 periods. The expenditure measure of fiscal decentralization (FDC2) and the transfer measure of

revenue decentralization (FDC3) have changed from negative to positive impact on economic growth (RGDP). These changes can be seen from periods 4 and 6 respectively. This is expected because expenditure as a component of national income has a direct impact on economic growth. In the same vein, increase transfers from the federation account to the sub national government have indirect impact on economic growth via productive expenditure. This implies that FDC2 and FDC3 have a positive long-run impact on economic growth over the period of study. On the other hand, the own-source revenue measure of decentralization (FDC1) is consistently negative especially from period 2 to period 10. This is expected because sub national governments' in Nigeria over the years have depended heavily on revenue from the federation account and have not fully harnessed the resources available to them. Thus, its contribution is negative and on growth (GDP). This finding is in tandem with the finding of (Aigbokhan, 1999).

Table 4.8: Response of DLRGDP

period	LRGDP	LM2	LTLF	LGFCF	LFDC1	LFDC2	LFDC3
T = 1	0.3448	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T = 2	0.7249	0.0071	0.0532	-0.0008	-0.1220	-0.0259	-0.0235
T = 4	1.4858	0.0230	0.2021	-0.0013	-0.3659	-0.0047	-0.1218
T = 6	2.2519	0.0407	0.3369	-0.0101	-0.6072	0.0061	-0.2140
T = 8	3.0165	0.0572	0.4826	-0.0174	-0.8488	0.0127	0.6407
T = 10	3.7810	0.0074	0.6288	-0.0247	-1.0917	0.0209	0.8406

Source: Author's computation

Table 4.9 presents the response of inflation to generalized one standard deviation (SD) innovation of fiscal decentralization and other variables in the model within a horizon of 10 periods. The effect of fiscal decentralization on inflation is found to be consistent. For instance, the response of inflation to changes in FDC1 and FDC2 has remained consistently positive from the first to tenth period. This implies that FDC1 and FDC2 have a positive impact on inflation

within the period of study. The policy implication of this finding is that excessive fiscal decentralization without prudent management of resources and expenditure could lead to inflationary pressures on the economy. This has validated the finding of (Felteinsten and Iwata, 2005), that fiscal decentralization is bad for the control of inflation when the provisions of federalism are violated. But another striking result is transfers from the federation account (FDC3) to the sub national governments' has consistently contributed negatively on inflation within the period of study. The justification for this relationship has not been documented in the literature.

Table4.9: Response of DINF

Period	LINF	LM2	LTLF	LGFCF	LFDC1	LFDC2	LFDC3
T = 1	0.1664	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T = 2	0.4467	0.0139	0.0262	0.0106	0.0353	0.0129	-0.0371
T = 4	0.9931	0.0004	0.1199	0.0938	0.1181	0.1023	-0.0920
T = 6	1.6546	-0.0680	0.1664	0.1876	0.2777	0.3027	-0.1498
T = 8	2.4512	-0.2523	0.2354	0.2366	0.4683	0.5189	-0.2199
T = 10	3.3060	-0.4844	0.3579	0.2523	0.6539	0.7763	-0.3040

Source: Author's computation

Table 4.10 presents the responses of exchange rate (EXR) to generalized one standard deviation (SD) shocks of fiscal decentralization and other variables within a horizon of 10 periods. The response of EXR to FDC1 and FDC2 is found to be consistent and positive, while the response of EXR to FDC3 is found to be declining to a negative digit. This implies that FDC1 and FDC2 have a long-run positive impact on exchange rate over, while FDC3 has a negative long-run impact on exchange rate over the period over the period of study.

Table 4.10: Response of EXR

Period	EXR	INF	LM2	FDC1	FDC2	FDC3
T = 1	10.8758	0.0000	0.0000	0.0000	0.0000	0.0000
T = 2	20.2824	3.2386	-0.6591	0.5569	1.7537	1.0681
T = 4	38.6095	14.7146	-0.3022	3.9450	5.3790	3.8614
T = 6	58.2452	30.2264	2.1724	6.0506	9.2390	3.5085
T = 8	80.7262	50.1945	6.9115	8.2823	14.4717	0.7519
T = 10	104.4567	73.8489	13.2533	10.7654	20.3388	-3.3056

Source: Author's computation

4.6 Variance Decomposition

Variance decomposition provides information on the dynamic behaviour of variables in the model. The full estimate of variance decomposition is found in appendix (C, F, and I). However, the variance decomposition of real gross domestic product (RGDP), inflation (CPI), and exchange rate (EXR) are found in tables 4.11, 4.12 and 4.13 respectively.

Table 4.11 presents variance decomposition of RGDP. Own shocks constitute a significant source of variation in growth (GDP) forecast error, declining from 100% in the first period to 87.8% in the tenth period. Fiscal decentralization shocks of the own-source revenue (FDC1) constituted the highest variation in growth (GDP), followed by revenue from the federation account (FDC3), while the expenditure decentralization measure (FDC2) has the least impact. The own source revenue decentralization measure (FDC1) has increased consistently from 5.27% to 8.13% in periods 2 and 10 respectively, and constitutes the highest source of variation in growth (GDP) within the period of study. The policy implication of this finding is that there is a strong linkage between internally generated revenue of the sub national government' and economic growth (GDP) in Nigeria.

Table 4.11: Variance Decomposition of RGDP

Period	S.E.	LRGDP	LM2	LTLF	LGFCF	FDC1	FDC2	FDC3
T = 1	0.3448	100.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T = 2	0.5314	93.2718	0.0180	1.0041	0.0002	5.2729	0.2373	0.1957
T = 4	0.7871	89.2429	0.0290	2.3339	0.0005	7.2047	0.2688	0.9201
T = 6	0.9776	88.5459	0.0352	2.4748	0.0054	7.7169	0.1803	1.0414
T = 8	1.1367	88.1199	0.0366	2.6529	0.0061	7.9679	0.1351	1.0816
T = 10	1.2763	87.8436	0.0373	2.7605	0.0064	8.1319	0.1092	1.1109

Source: Author's computation

Table 4.12 presents variance decomposition of inflation. Own shocks constitute a significant source of variation in inflation forecast errors declining from 100% in the first period to 83.9% in the tenth period. This suggests that change in inflation is persistent. Among the fiscal decentralization measures, expenditure measure (FDC2) constitutes the highest source of variation in inflation (CPI), followed by the own-source revenue decentralization measure (FDC1), and finally, transfers from the federation account (FDC3). Specifically, FDC2, FDC1, FDC3 constitutes about 0.2% to 5.9%, 1.12% to 3.9%, 1.3% to 3.1% of the variation in inflation between period 2 and 10 respectively. Thus, FDC1, FDC2 and FDC3 affect inflation positively in the long run.

Table 4.12: Variance Decomposition of Inflation (INF)

Period	S.E.	LCPI	LM2	LTLF	LGFCF	LFDC1	LFDC2	LFDC3
T = 1	0.1664	100.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
T = 2	0.3317	96.5647	0.1782	0.6232	0.1024	1.1299	0.1505	1.2511
T = 4	0.5293	91.3158	0.7749	1.8516	1.6358	1.7423	1.5643	1.1152
T = 6	0.7380	87.4849	0.9727	1.1856	1.6864	3.2806	4.5057	2.8924
T = 8	0.9631	85.6116	2.4417	0.9782	1.1260	3.8841	5.1687	3.0666
T = 10	1.1754	83.9253	3.5989	1.2023	0.7649	3.8539	5.8685	3.1556

Source: Author's computation

Table 4.13 presents variance decomposition of exchange rate (EXR) in Nigeria. Own shocks constitute a significant source of variation in EXR forecast error declining from 100% in period 1 to 80.3% in period 10. The three fiscal decentralization measures FDC1, FDC2 and FDC3 constitute significantly in explaining the variation in EXR. But own-source decentralization measure (FDC1) constitutes the highest (3.1% to 9.8%) between period 2 and period 10 respectively within the period of study.

Table 4.13: Variance Decomposition of Exchange Rate (EXR)

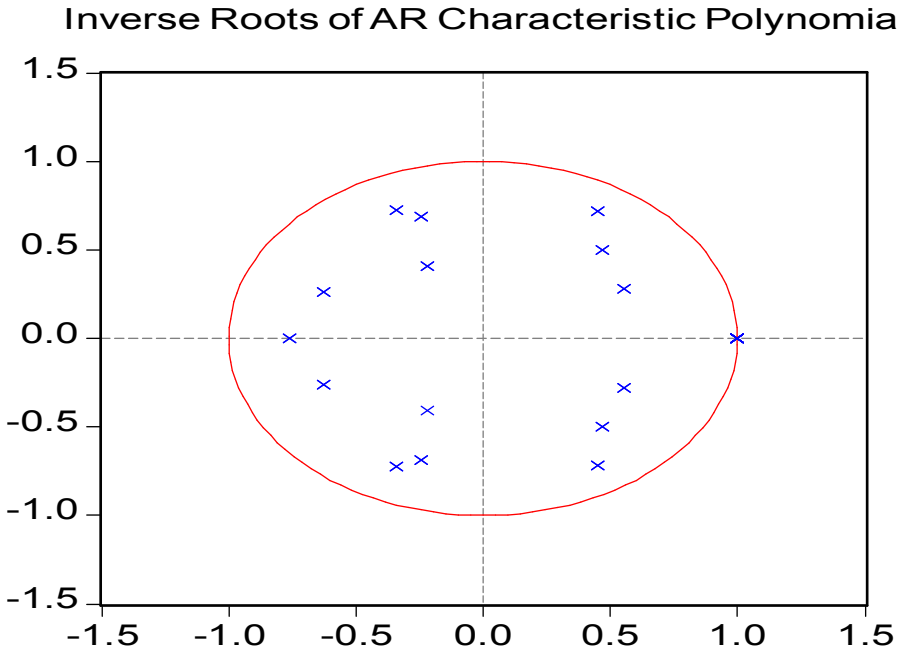
Period	S.E.	LEXR	LCPI	LM2	LFDC1	LFDC2	LFDC3
T = 1	0.2746	100.00	0.0000	0.0000	0.0000	0.0000	0.0000
T = 2	0.4253	94.0075	0.0117	2.1100	3.0829	1.3839	2.2485
T = 4	0.6250	85.2471	0.0121	0.1511	7.3146	2.0477	6.9426
T = 6	0.7571	82.3311	0.0242	0.2707	8.7646	2.1482	8.3629
T = 8	0.8688	81.0273	30.9581	0.3233	9.4285	2.4065	8.9829
T = 10	0.9682	80.2699	35.7637	0.3534	9.8156	2.5399	9.3464

Source: Author's computation

4.7 Robustness Test(s) of the Three Models

Figure 4.10 shows the inverse roots of AR polynomial. Thus, the VAR model of fiscal federalism-economic growth satisfied the stability condition because all the Eigen values of the residuals lay within the unit circle. Hence, the RGDP model is stable and suitable for policy.

Figure 4.10 Stability Test for Fiscal Federalism-Economic Growth Model



Source: Author's computation

Table 4.14 presents a test for the presence of serial correlation in the fiscal federalism-economic growth model within the period of study. The result shows that there is no autocorrelation in the fiscal federalism-economic growth model. This is because the probability values of the LM statistic are less than unity. Therefore, the null hypothesis of no serial correlation has been accepted.

Table 4.14: LM Residual Test

H0: no serial correlation at lag order h

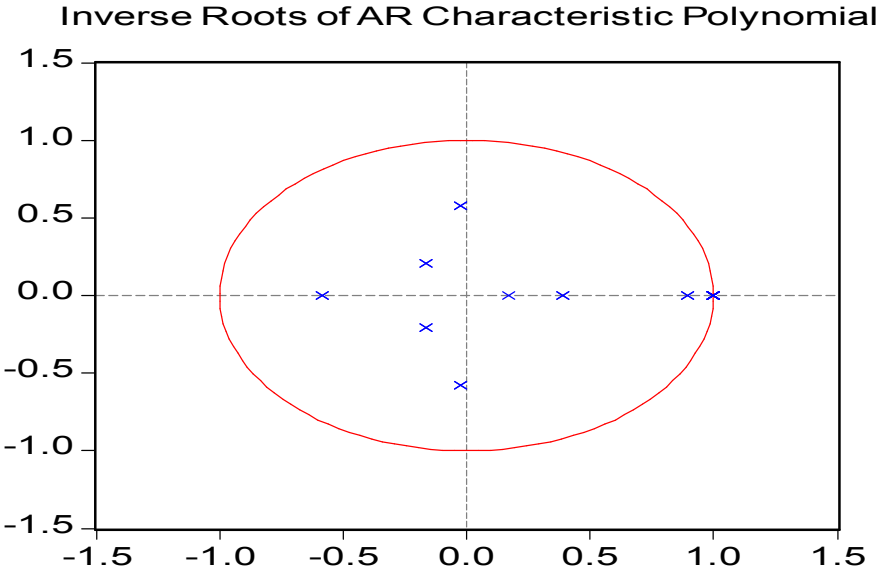
Lags	LM-Stat	Prob
1	41.96274	0.7517
2	45.87045	0.6008
3	42.91307	0.7171
4	49.90197	0.4373
5	54.22284	0.2821
6	48.82194	0.4803
7	63.02289	0.0859
8	60.65653	0.1227
9	46.06177	0.5930
10	42.59845	0.7287
11	49.18095	0.4659
12	50.02761	0.4324

Probs from chi-square with 49 df.

Source: Author's computation

Figure 4.11 shows the inverse roots of AR polynomial. Thus, the VAR model of fiscal federalism-inflation satisfied the stability condition because all the Eigen values of the residuals lay within the unit circle.

Figure 4.11 Stability Test for Fiscal Federalism-Inflation Model



Source: Author's computation

Table 4.15 presents a test for the presence of serial correlation in the inflation model within the period of study. The result shows that there is no autocorrelation in the fiscal federalism-inflation model. This is because the probability values of the LM statistic are less than unity. Therefore, the null hypothesis of no serial correlation has been accepted.

Table 4.15 LM Residual Test

H0: no serial correlation at lag order h

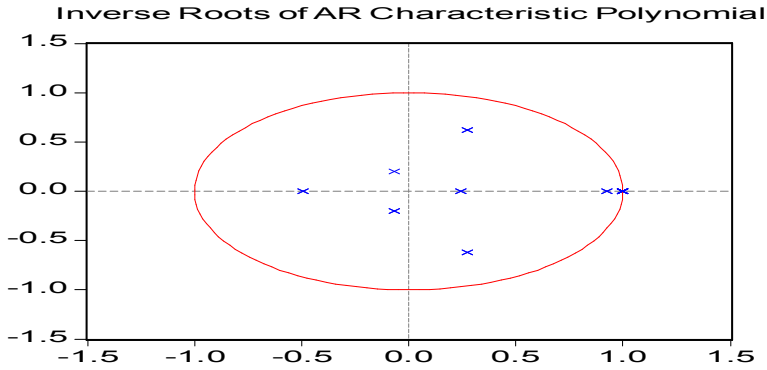
Lags	LM-Stat	Prob
1	37.39575	0.8871
2	65.09193	0.0616
3	49.87727	0.4383
4	36.74855	0.9015
5	51.80985	0.3648
6	53.79772	0.2958
7	50.20494	0.4254
8	67.20394	0.0431
9	75.25962	0.0093
10	47.56972	0.5312
11	32.02578	0.9710
12	60.27204	0.1297

Probs from chi-square with 49 df.

Source: Author's computation

Figure 4.12 shows the inverse roots of AR polynomial. Thus, the VAR model of fiscal federalism-exchange rate satisfied the stability condition because all the Eigen values of the residuals lay within the unit circle.

Figure4.12: Stability Test for Fiscal Federalism-Exchange Rate Model



Source; Author's computation

Table 4.16 presents a test for the presence of serial correlation in the exchange rate model within the period of study. The result shows that there is no autocorrelation in the fiscal federalism-exchange rate model. This is because the probability values of the LM statistic are less than unity. Therefore, the null hypothesis of no serial correlation has been accepted.

Table 4.16: LM Residual Test

H0: no serial correlation at lag order h

Lags	LM-Stat	Prob
1	25.70411	0.8984
2	27.39275	0.8481
3	24.18968	0.9333
4	22.56402	0.9606
5	44.52153	0.1558
6	27.46040	0.8459
7	30.52095	0.7264
8	39.62878	0.3113
9	76.56571	0.0001
10	26.23391	0.8839
11	32.63707	0.6293
12	26.50061	0.8762

Probs from chi-square with 36 df.

Source: Author's computation

4.8 Summary of the Research Findings

From the econometric and literature investigations on the relationship between fiscal federalism and macroeconomic performance in Nigeria, the following major findings were made;

a. The ratio of state governments' expenditure to total government expenditure (FDC2) and the ratio of state governments' revenue from the federation account to total government revenue (FDC3) have a long-run positive impact on economic growth, while the ratio of state governments' internally generated revenue to total government revenue (FDC1) has a long-run negative impact on economic growth over the period of study. This finding is confirmed by both the Johansen co-integration test and the impulse response functions of the VAR model. This contradicts the finding of Aigbohkan, (1999).

b. FDC1 and FDC2 have a long-run positive impact on inflation, while FDC3 has a long-run negative impact on inflation over the period of study. This finding is confirmed by both the Johansen co-integration test and the impulse response functions of the VAR model.

c. FDC1 and FDC2 have a long-run positive impact on exchange rate, while FDC3 has a long-run negative impact on exchange rate over the period of study. This finding is confirmed by both the Johansen co-integration test and the impulse response functions of the VAR model.

d. There has been increased in fiscal fragmentation within the period of study rather than fiscal decentralization. Tables 2.1 and 2.4 support this finding.

e. The LM autocorrelation stability test, AR root stability tests confirmed that the three models estimated are robust and suitable for policy. This is because the models have satisfied the stability condition and are free from serial correlation.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION(S)

5.1 Summary

The study aimed at analyzing the relationship between fiscal federalism and macroeconomic performance in Nigeria. In chapter one, a concise background of the study was presented. In chapter two, the theoretical and empirical literature was reviewed. The conflicting theoretical propositions in the area of fiscal decentralization led many to question the linkage of fiscal federalism to macroeconomic performance across the globe. A strand of the literature argued that fiscal federalism has a positive impact on macroeconomic performance. Another strand of the literature argued that fiscal federalism has a negative impact on macroeconomic performance. The third strand of the literature argued that fiscal federalism has a mixed impact on macroeconomic performance. This study is in tandem with the third strand of the literature.

Chapter three discussed the methodology adopted in order to empirically test the hypothesis. VAR model was considered suitable and conducive for the estimation of our model due to its diverse properties. In chapter four, trend analysis was conducted to examine the relationship between fiscal federalism and macroeconomic variables (GDP, Inflation and Exchange rate) over the study period. Vector Error Correction model (VEC) was estimated because co-integration was found to exist among the variables in the three models. Impulse response and variance decomposition functions were also used to examine the relationship that exists between fiscal federalism, real GDP, inflation, and exchange rate in Nigeria.

5.2 Conclusion

From the co-integration test and Vector Error Correction techniques (VEC) used, the following major conclusions were inferred;

i. The ratio of state governments' expenditure to total government expenditure (FDC2) and the ratio of state governments' revenue from the federation account to total government revenue (FDC3) have a long-run positive impact on economic growth, while the ratio of state governments' internally generated revenue to total government revenue (FDC1) has a long-run negative impact on economic growth over the period of study. This finding is confirmed by both the Johansen co-integration test and the impulse response functions of the VAR model. This contradicts the finding of Aigbohkan, (1999).

ii. FDC1 and FDC2 have a long-run positive impact on inflation, while FDC3 has a long run negative impact on inflation over the period of study. It implies that FDC1 and FDC2 have increased inflation over the study period. This finding is confirmed by both the Johansen co-integration test and the impulse response functions of the VAR model.

iii. FDC1 and FDC2 have a long-run positive impact on exchange rate, while FDC3 has a long-run negative impact on exchange rate over the period of study. This implies that fiscal decentralization has led to naira devaluation over the period of study. This finding is confirmed by both the Johansen co-integration test and the impulse response functions of the VAR model.

iv. There has been increased in fiscal fragmentation within the period of study rather than fiscal decentralization. Tables 2.1 and 2.4 support this finding.

v. The LM autocorrelation stability test, AR root stability tests confirmed that the three models estimated are robust and suitable for policy. This is because the models have satisfied the stability condition and are free from serial correlation.

5.3 Recommendation(s)

Based on the findings, the following policy measures are recommended;

i. More fiscal powers should be devolve to the lower tiers of government taking into consideration the trade-offs of fiscal decentralization on real GDP, inflation, and exchange rate. In other word, the impact of fiscal decentralization is not in all cases good on the economy, because it could result to economic growth that is accompanied with inflation and naira devaluation. Thus, fiscal federalism in Nigeria should be decentralize taking note of its trade-offs.

ii. Government at all levels should be made to face the consequences of their decisions to ensure fiscal discipline. This is possible if the federal government does not bail the state and local debts and the central bank does not act as a lender of last resort to the federal government. This will reduce the trade-offs and increase the gains of fiscal decentralization.

REFERENCES

Adeleke, S. (2011). Taxation, Revenue Allocation and fiscal Federalism sin Nigeria: Issues, Challenges and Policy Options. *Economic Annals*, 16(189): 29-31.

Adesopo, A.A. (2004). Centralization of Intergovernmental Fiscal Power and the lower levels of government in a Federation: The Nigerian Experience. *Journal of Social Sciences*, 8(3): 179-195.

Afolabi, L. (1999). Monetary Economics Ibadan: Intec Printers Limited, 357-365.

Aigbokhan, B.E. (1996). Government Size and Economic Growth: The Nigerian Experience. Proceedings of the Annual Conference of Nigerian Economic Society, 505-523.

Aigbokhan, B.E. (1999). Fiscal Federalism and Economic Growth in Nigeria. In: Fiscal Federalism and Economic Development. Proceedings of Annual Conference of the Nigerian Economic Society, 333-352.

Akai, S. Nishimura, Y. and Sakata, M. (2007). Fiscal Decentralization and Economic Volatility-Evidence from State-level Cross-section Data of the United States. Research Paper No. 40.

Akin, J. Hutchinson, P. and Strumpt, K. (2001). Decentralization and Government Provision of Public Goods: The Public Health Sector in Uganda. Working Paper No. HRN A-00-97-00018-00. USAID Sponsored.

Akinlo, A.E. (1999). A Cross-sectional Analysis of the Expenditure Responsiveness of States to Federal Allocations during Civilian Era in Nigeria. Proceedings of the Annual Conference of the Nigerian Economic Society, 421-436.

Akpan, E.O. (2010). Fiscal Decentralization and Social Outcomes in Nigeria. *European Journal of Business and Management, 3(4): 167-183.*

Akramov, T.K. and Asante, F. (2009). Decentralization and Local Public Services in Ghana: Do Geography and Ethnic Diversity Matter? IFPRI Discussion Paper 00872.

Alade, S.O. Ebajemito, J.O. Rapu, S.C. and Tule, M. (2003). 'Fiscal Federalism and Macroeconomic Governance'. In: Nnanna, O.J. et al (Eds.) Contemporary Economic Policy Issues. Central Bank of Nigeria Publication.

Anyanwu, J.C. (1999). Fiscal Relations among the Various Tiers of Government in Nigeria. Proceedings of Annual Conference of the Nigerian Economic Society.

Arowolo, D. (2011). Fiscal Federalism in Nigeria: Theory and dimensions. *Afro Asian Journal of Social Sciences,* 2(2): 1-21.

Ayodele, J. (2003). Fiscal Policy and Growth in Africa: Fiscal Federalism, Decentralization and the Incidence of Taxation. Paper presented at the Ad-Hoc Expert Meeting on 'Fiscal Federalism: The Nigerian Experience', held at Addis Ababa, Ethiopia', 7-9 October.

Azfaz, O. and Livingstone, J. (2002). Federalist Discipline or Local Capture? An Empirical Analysis of Decentralization in Uganda. IRIS University of Maryland.

Baro, R. (1990). Government Spending in a Simple Model of Endogenous Growth. *Journal of Political Economy, 98(5): 103-125.*

Ben, O. and Agba, V.A. (2006). Oil Management and Fiscal Decentralization: The Nigerian Experience.

Besley, T. and Coate, S. (2003). Centralized versus Decentralized Provision of Local Public Goods: A Political Economy Approach. *Journal of Public Economy, 87(12): 2611-2637.*

Bodman, P. Heaton, K. and Hogde, A. (2009). Fiscal Decentralization and Economic Growth: A Bayesian Model Averaging Approach. A Research Paper, University of Queensland.

Brennan, G. and Buchanan, J.M. (1980). The Power of Tax: Foundation of Fiscal Constitution. New York: Cambridge University.

Brueckner, J. K. (2005). Fiscal Decentralization and Economic Growth in the USA.

Chen, C.H. (2004). Fiscal Decentralization, Collusion and Government Size in China's Transition Economy. Applied Economics Letters, 11, 699-705.

Chete, L.N. (1998). Fiscal Decentralization and Macroeconomic Management.

Chukwuemeka, E. O. and Amobi, S. C. (2011). The Politics of Fiscal Federalism in Nigeria: Diagnosing the Elephantine Problem. *International Journal of Business Management*, 6(1): 1-11.

Dye, T.R. (1990). The Consequences of Inter-governmental Competition. *Cato Journal*, 10(1): 59-73.

Ebel, R.D. and Yilma, S. (2002). On the Measurement and Impact of Fiscal Decentralization. *Policy Research Working Paper 2809 of World Bank Institute.*

Ehdaie, J. (1994). Fiscal Decentralization and the Size of Government: An extension with Evidence from Nigeria. A Paper Presented at the Annual Conference of the Nigerian Economic Society.

Eiya, O. and Okafor, C. (2011). Determinants of Growth in Government Expenditure: An Empirical Analysis of Nigeria. *Research Journal of Business Management*, 5(1): 44-50.

Eldon, J. and Waddington, C. (2007). Federalism, Sub-national Financing and Aid Effectiveness. Technical Approach Paper.

Elhiraika, B.A. (2007). Fiscal Decentralization and Public Service Delivery in South Africa. African Trade Policy Center (ATPC), No. 58.

Emmanuel, R.A. (2002). Decentralizing Public Sector Collective Bargaining and Contradictions of Federal Practice in Nigeria. African Study Monographs, 23(1): 11-29.

Enemuo, F.C. (1996). Decentralization, Governance and Local Government in Africa: Impediments and Prospectics, Paper Presented at the Conference of Governance Issue in Africa and Tanzania, Aprail, 12-16.

Feld, L.P. and Baskaran, T. (2009). Fiscal Decentralization and Economic Growth in OECD Countries: Is there a Relationship? CESIFO Working Paper No. 2721, < SSRN: http//ssrn.com/abstract=1441152>.

Feltenstein, A. and Iwata, S. (2005). Decentralization and Macro-economic Performance in China: Regional Autonomy has its Costs. *Journal of Development and Economics, 76(2005): 481-501.*

Garba, A.G. (1999). Regime Change, External Shocks and Federal Fiscal Operations in Nigeria: 1975-1993. Proceedings of Annual Conference of the Nigerian Economic Society, 353-378.

Heng, F.U. and Jing, J. (2001). How does Fiscal Decentralization affect Aggregate, National, and Sub-national Government Size? *Journal of Urban Economics*, 52(2002): 270-293.

Ige, C.S. (2006). Macroeconomics of Commercial Banks Re-Capitalization in Nigeria. Covenant Journal of Business and Social Sciences 1(1): 5-19.

Jacob, O. I. (2002). Fiscal Federalism and Local Government Finances in Nigeria. The *Nigerian Journal of Business Administration,* 2(7): 100-109.

James, T.D. (2004). Intergovernmental Fiscal Relations in Developing Countries: Brazil, South Africa, Peru, and Senegal. Unpublished P.HD Thesis. Woodrow Wilson School of Public and International Affairs.

Jin, J. and Heng-fu, Z. (2001). How does Decentralization affect Aggregate, National and Sub-national Government Size. *Journal of Urban Economics*, 52(2002): 270-293.

Jin, Y. (2009). A Comparative Study of Decentralization in India and China. Unpublished P.HD Thesis. Department of Economics, Georgia State University.

Jin, Y. (2009). A Comparative Study of Fiscal Decentralization in China and India. Unpublished PhD Thesis , Georgia State University, USA.

John, T. (2006). Fiscal Decentralization and Economic Growth Reconsidered. *Journal of Urban Economics*, 61(2007): 64-70.

Kim, H.A. (2006). Local Decentralization and Economic Growth in Korea. A Research Paper, No. 60.

Lars, P.F. and Schnellenbach, J. (2010). Fiscal Federalism and Long-run Macro-economic Performance. Working Paper No. 10-09. Andrew Young School of Policy Studies at Georgina State University.

Malik, S., Hassan, M., and Hussain, S. (2005). Fiscal Decentralization and Economic Growth in Pakistan. Research Paper, No.20.

Markus, E. and Fritz, B. (2004). Fiscal Decentralization and Economic Growth: Is there really a link? *Journal of International Comparisons*, 2(1): 3-9.

Mbanefoh, G.E. (1993). Unsettled Issues in Nigerian Fiscal Federalism and the national Question: In NES, Ibadan.

Nasir, I. and Nawaz, S. (2011). Fiscal Decentralization and Macro-economic Stability: Theory and Evidence from Pakistan. Working Paper No. 20-08: Pakistan Institute of Development Economics (PIDE).

Oates, W.E. (1968). The Theory of Public Finance in a Federal System. *The Canadian Journal of Economics*, 1(1): 37-54.

Oates, W.E. (1972). Fiscal Federalism. New York: Harcourt Brace Jovanovich.

Oates, W.E.(1999). An Essay on Fiscal Federalism. *Journal of Economic Literature, 37(3): 1120-1149.*

Okafor, C. and Eiya, O. (2011). Determinants of Growth in Government Expenditure: An Empirical Analysis of Nigeria. *Research Journal of Business Management,* 5(1): 44-50.

Olowononi, G.D. (1999). Federalism and Vertical Intergovernmental Financial Imbalance in Nigeria. Proceedings of Annual Conference of the Nigerian Economic Society, 189-213.

Philip, A.T. (2011). An Empirical Analysis of the Relative Effects of Fiscal Centralization on Economic Growth in Nigeria. Unpublished P.HD Thesis. Department of Economics, Ahmadu Bello University, Zaria.

Prud'Homme, R. (1995). Conflict and Dilemmas of Decentralization. In: Annual World Bank Conference on Development Economics. World Bank Publication, 331-350.

Qian, Y. and Weingart, B.R. (1997). Federalism as a Commitment to Preserving Market Incentives. *Journal of Economic Perspectives, 11(4): 83-92.*

Rondinelli, D.A. (1989). Analysis of Decentralization Politics in Developing Countries: A Political Economy Framework. Journal of Development and Change, 20(1): 45-60.

Samuelson, P.A. (1954). The Pure Theory of Public Expenditure, Review of Economics and Statistics, 36, PP. 387-389.

Santos, B.D.S. (1998). Participatory Budget in Porto Alegre: Towards A Redistributive Democracy. Politics and Society, 28(4).

Schelker, M. (2005). Distributional Effects of Fiscal Federalism: Empirical Evidence from Switzerland. A Paper Presented at the Annual Meeting of the Public Choice Society.

Smith, C.P. and Jimenez, D. (2005). Decentralization of Health Care and its Impact on Health Outcomes. Research Paper, Center for Health Economics, University of York, United Kingdom.

Stigler, G. (1955). The Tenable Range of Functions of Local Government: In US Congress, Joint Economic Committee, Federal Expenditure Policy for Economic Growth and Stability. Washington DC.

Taiwo, O.I. (1999). Fiscal Federalism: A Theoretical Framework. Proceedings of Annual Conference of the Nigerian Economic Society, 3-23.

Tanzi, V. (1995). Fiscal Federalism and Decentralization: A Review of Efficiency and Macroeconomic Aspects. In: Bruno, M. and B., Leskovic, eds. Op. cit, 295-316.

Thieben, U. (2003). Fiscal Decentralization and Economic Growth in High Income OECD countries. Research Paper 33.

Thornton, J. (2007). Fiscal Decentralization and Economic Growth Reconsidered. *Journal of Urban Economics*, 61(2007): 64-70.

Tiebout, C.M. (1956). A Pure Theory of Local Expenditures. *Journal of Political Economy, 64(10): 416-424.*

Todaro, M.P. and Smith, S.C. (2009). The Theory of Economic Development. Tenth Edition. Pearson Education Ltd. USA. Pp. 151-154.

Treisman, D. (2006). Explaining Fiscal Decentralization: Geography, Colonial History, Economic Development, and Political Institutions. *Journal of Commonwealth and Comparative Politics*, 44(3): 10-20.

Uche, O.C. and Uche, C.U. (2004). Oil and the Politics of Revenue Allocation in Nigeria. ASC Working Paper No. 54.

West, L. and Wong, C. (1995). Fiscal Decentralization and Regional Disparities in Rural China: Some Evidences in the Provision of Social Services. Oxford Review of Economic Policy, 11(4): 70-84.

Winkler, D. and Rounds, T. (1996). Municipal and Private Sector Responses to Decentralization and Social Choice. Economics of Education Review 15(4), pp 139-148.

Xin-Qiao, P. and Bai, J. (2005). Fiscal Decentralization and Local Public Goods Provision in China. Working Paper No. E2005004, China Center for Economic Research (CCER).

Yilmaz, S., Vaillancourt, F. and Meloche, J.P. (2004). Decentralization or Fiscal Autonomy? What does Really Matter? World Bank Policy Research Working Paper 3254.

Yilmaz,S. and Ebel, R.D. (2004). On the Measurement of the Impact of Fiscal Decentralization. World Bank Research Working Paper, No. 2809.

Zhang, J. (2008). China's Economic Growth. World Institute of Economic Research (WIDER). www.wider.unu.edu

APPENDICES

Appendix A: VEC Estimate for Fiscal Fed-Economic Growth Model

Vector Error Correction Estimates
Date: 10/19/12 Time: 14:36
Sample(adjusted): 1972 2010
Included observations: 39 after adjusting endpoints
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LRGDP(-1)	1.000000
LM2(-1)	0.254589 (0.12147) [2.09588]
LGFCF(-1)	-0.132224 (0.13935) [-0.94885]
LTLF(-1)	-0.938951 (0.07457) [-12.5919]
LFDC1(-1)	-0.211812 (0.09018) [-2.34874]
LFDC2(-1)	-1.577232 (0.26398) [-5.97486]
LFDC3(-1)	0.747334 (0.18114) [4.12583]
C	5.548136

Error Correction:	D(LRGDP)	D(LM2)	D(LGFCF)	D(LTLF)	D(LFDC1)	D(LFDC2)	D(LFDC3)
CointEq1	0.021398 (0.16372) [0.13070]	0.166548 (0.15037) [1.10762]	0.253564 (0.08789) [2.88503]	0.798547 (0.28752) [2.77741]	0.243440 (0.37221) [0.65404]	0.200064 (0.08585) [2.33047]	-0.004120 (0.12350) [-0.03336]
D(LRGDP(-1))	0.126307 (0.21501) [0.58743]	-0.022670 (0.19747) [-0.11480]	-0.223695 (0.11542) [-1.93803]	0.295390 (0.37759) [0.78231]	0.091721 (0.48881) [0.18764]	-0.045835 (0.11274) [-0.40655]	0.169114 (0.16218) [1.04272]
D(LM2(-1))	-0.030039 (0.20580) [-0.14596]	0.047203 (0.18901) [0.24974]	0.035260 (0.11048) [0.31916]	-0.089575 (0.36140) [-0.24785]	-0.143985 (0.46786) [-0.30775]	-0.061321 (0.10791) [-0.56827]	-0.061208 (0.15523) [-0.39430]

D(LGFCF(-1))	-0.200280	0.047867	0.206239	-0.943242	-0.704643	0.040442	0.099172
	(0.28917)	(0.26558)	(0.15523)	(0.50782)	(0.65740)	(0.15163)	(0.21812)
	[-0.69260]	[0.18024]	[1.32857]	[-1.85745]	[-1.07186]	[0.26672]	[0.45467]
D(LTLF(-1))	-0.022402	0.053984	0.147377	0.043389	-0.043955	0.122669	0.016410
	(0.12269)	(0.11268)	(0.06586)	(0.21546)	(0.27892)	(0.06433)	(0.09254)
	[-0.18259]	[0.47909]	[2.23765]	[0.20138]	[-0.15759]	[1.90682]	[0.17732]
D(LFDC1(-1))	-0.189680	0.075737	0.070362	-0.103739	-0.204521	-0.069599	-0.057889
	(0.07305)	(0.06709)	(0.03922)	(0.12829)	(0.16607)	(0.03830)	(0.05510)
	[-2.59654]	[1.12886]	[1.79426]	[-0.80866]	[-1.23150]	[-1.81702]	[-1.05059]
D(LFDC2(-1))	-0.056629	0.116367	-0.021091	-0.972504	-1.060917	-0.383585	-0.423529
	(0.33662)	(0.30916)	(0.18070)	(0.59114)	(0.76527)	(0.17650)	(0.25391)
	[-0.16823]	[0.37640]	[-0.11672]	[-1.64513]	[-1.38633]	[-2.17323]	[-1.66803]
D(LFDC3(-1))	-0.125538	-0.139167	-0.040034	0.016778	0.236395	0.127158	0.146734
	(0.27356)	(0.25124)	(0.14685)	(0.48040)	(0.62190)	(0.14344)	(0.20634)
	[-0.45891]	[-0.55392]	[-0.27261]	[0.03492]	[0.38011]	[0.88650]	[0.71112]
C	0.153549	0.244520	0.118343	0.296037	0.162612	0.020983	-0.012514
	(0.09430)	(0.08661)	(0.05062)	(0.16561)	(0.21439)	(0.04945)	(0.07113)
	[1.62822]	[2.82321]	[2.33766]	[1.78756]	[0.75848]	[0.42434]	[-0.17592]
R-squared	0.206623	0.097339	0.391827	0.465265	0.200513	0.395151	0.148057
Adj. R-squared	-0.004944	-0.143370	0.229647	0.322669	-0.012684	0.233858	-0.079128
Sum sq. resids	3.566356	3.008170	1.027734	10.99833	18.43215	0.980520	2.029113
S.E. equation	0.344788	0.316658	0.185089	0.605484	0.783840	0.180787	0.260071
F-statistic	0.976631	0.404385	2.416007	3.262823	0.940507	2.449895	0.651702
Log likelihood	-8.694266	-5.375124	15.56741	-30.65514	-40.72403	16.48447	2.302678
Akaike AIC	0.907398	0.737186	-0.336790	2.033597	2.549950	-0.383819	0.343452
Schwarz SC	1.291297	1.121085	0.047109	2.417496	2.933849	8.01E-05	0.727351
Mean dependent	0.130838	0.273461	0.151165	0.157562	0.000103	0.013763	-0.000682
S.D. dependent	0.343938	0.296140	0.210880	0.735703	0.778916	0.206544	0.250355

Determinant Residual Covariance	5.04E-08
Log Likelihood	-23.90478
Log Likelihood (d.f. adjusted)	-59.71750
Akaike Information Criteria	6.652180
Schwarz Criteria	9.638059

Appendix B: Co-integration Test for Fiscal Fed-Economic Growth Model

Date: 10/18/12 Time: 05:39
Sample(adjusted): 1973 2010
Included observations: 38 after adjusting endpoints
Trend assumption: Linear deterministic trend
Series: LRGDP LM2 LGFCF LTLF FDC1 FDC2 FDC3
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.835556	194.2506	124.24	133.57
At most 1 **	0.674833	125.6537	94.15	103.18
At most 2 **	0.660907	82.96383	68.52	76.07
At most 3	0.404856	41.86751	47.21	54.46
At most 4	0.261399	22.14734	29.68	35.65
At most 5	0.210703	10.63343	15.41	20.04
At most 6	0.042294	1.642165	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Trace test indicates 3 cointegrating equation(s) at both 5% and 1% levels

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.835556	68.59698	45.28	51.57
At most 1 *	0.674833	42.68983	39.37	45.10
At most 2 **	0.660907	41.09632	33.46	38.77
At most 3	0.404856	19.72017	27.07	32.24
At most 4	0.261399	11.51391	20.97	25.52
At most 5	0.210703	8.991263	14.07	18.63
At most 6	0.042294	1.642165	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Max-eigenvalue test indicates 3 cointegrating equation(s) at the 5% level
Max-eigenvalue test indicates 1 cointegrating equation(s) at the 1% level

Appendix C: Impulse Response and Variance Decomposition

1. Impulse Response of RGDP

Period	LRGDP	LM2	LTLF	LGFCF	LFDC1	LFDC2	LFDC3
1	0.344788	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.724888	0.007132	0.053245	-0.000771	-0.122017	-0.025887	-0.023507
3	1.107917	0.016224	0.111095	-0.002135	-0.242599	0.004323	-0.085262
4	1.485780	0.023033	0.202073	-0.001331	-0.365902	-0.004740	-0.121782
5	1.870334	0.032646	0.261948	-0.007917	-0.482560	0.000636	-0.167848
6	2.251977	0.040657	0.336862	-0.010117	-0.607150	0.006109	-0.214025
7	2.634029	0.048851	0.410619	-0.013501	-0.727582	0.009395	-0.258788
8	3.016475	0.057204	0.482602	-0.017438	-0.848771	0.012718	-0.303698
9	3.398809	0.065444	0.555320	-0.021089	-0.970332	0.017209	-0.349352
10	3.781028	0.073620	0.628812	-0.024733	-1.091700	0.020855	-0.394480

2. Variance Decomposition of RGDP

Period	S.E.	LRGDP	LM2	LTLF	LGFCF	LFDC1	LFDC2	LFDC3
1	0.344788	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.531368	93.27175	0.018017	1.004068	0.000210	5.272910	0.237338	0.195705
3	0.672131	90.77061	0.029558	1.368340	0.000543	6.514084	0.350353	0.966509
4	0.787074	89.24292	0.029039	2.333986	0.000500	7.204678	0.268754	0.920118
5	0.887044	89.05514	0.034606	2.293159	0.005907	7.401816	0.215263	0.994107
6	0.977683	88.54594	0.035202	2.474802	0.005369	7.716950	0.180333	1.041403
7	1.060125	88.29733	0.035913	2.588912	0.005586	7.853901	0.154337	1.064017
8	1.136711	88.11992	0.036637	2.652829	0.006058	7.967900	0.135095	1.081561
9	1.208529	87.96649	0.037061	2.708947	0.006272	8.060787	0.120897	1.099544
10	1.276282	87.84356	0.037334	2.760546	0.006439	8.131980	0.109218	1.110928

Appendix D: VEC Estimate of Fiscal Fed-Inflation Model

Vector Error Correction Estimates
Date: 10/19/12 Time: 11:02
Sample(adjusted): 1972 2010
Included observations: 39 after adjusting endpoints
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LCPI(-1)	1.000000
LM2(-1)	0.743586 (0.20407) [3.64373]
LGFCF(-1)	-1.922182 (0.23834) [-8.06484]
LTLF(-1)	-0.684360 (0.11809) [-5.79512]
FDC1(-1)	-0.192027 (0.03386) [-5.67076]
FDC2(-1)	0.021691 (0.01041) [2.08313]
FDC3(-1)	-0.023217 (0.01509) [-1.53803]
C	21.95258

Error Correction:	D(LCPI)	D(LM2)	D(LGFCF)	D(LTLF)	D(FDC1)	D(FDC2)	D(FDC3)
CointEq1	-0.152729 (0.04902) [-3.11569]	-0.175687 (0.09716) [-1.80815]	0.033509 (0.06547) [0.51181]	0.260217 (0.23316) [1.11605]	2.539508 (0.88062) [2.88378]	0.835275 (2.02397) [0.41269]	1.275404 (1.71496) [0.74369]
D(LCPI(-1))	0.557964 (0.15842) [3.52199]	-0.023097 (0.31402) [-0.07355]	0.269910 (0.21160) [1.27559]	-0.277064 (0.75353) [-0.36769]	-4.366025 (2.84603) [-1.53408]	-10.78293 (6.54117) [-1.64847]	-8.531446 (5.54250) [-1.53928]
D(LM2(-1))	0.008795 (0.08650) [0.10168]	0.143443 (0.17146) [0.83660]	0.122726 (0.11553) [1.06225]	0.178696 (0.41144) [0.43432]	0.065832 (1.55396) [0.04236]	1.271543 (3.57154) [0.35602]	-0.723688 (3.02626) [-0.23914]
D(LGFCF(-1))	-0.257510 (0.15363)	-0.196984 (0.30451)	0.417945 (0.20519)	-0.046678 (0.73072)	2.608146 (2.75986)	8.483930 (6.34314)	4.954189 (5.37471)

	[-1.67621]	[-0.64688]	[2.03686]	[-0.06388]	[0.94503]	[1.33750]	[0.92176]
D(LTLF(-1))	-0.028769	-0.080764	0.039129	-0.151086	0.205684	0.473202	0.685044
	(0.04040)	(0.08008)	(0.05396)	(0.19216)	(0.72578)	(1.66810)	(1.41343)
	[-0.71210]	[-1.00854]	[0.72515]	[-0.78624]	[0.28340]	[0.28368]	[0.48467]
D(FDC1(-1))	-0.004766	0.006236	0.012849	0.014529	-0.049027	-0.450170	-0.275081
	(0.00881)	(0.01747)	(0.01177)	(0.04191)	(0.15830)	(0.36382)	(0.30828)
	[-0.54087]	[0.35706]	[1.09179]	[0.34666]	[-0.30971]	[-1.23733]	[-0.89231]
D(FDC2(-1))	0.009679	0.003804	-0.006508	-0.036090	-0.182659	-0.466815	-0.155382
	(0.00444)	(0.00880)	(0.00593)	(0.02112)	(0.07978)	(0.18337)	(0.15538)
	[2.17929]	[0.43210]	[-1.09711]	[-1.70847]	[-2.28943]	[-2.54574]	[-1.00004]
D(FDC3(-1))	-0.001833	-0.009509	0.006907	0.012917	0.033193	0.213027	-0.026804
	(0.00563)	(0.01117)	(0.00753)	(0.02680)	(0.10122)	(0.23265)	(0.19713)
	[-0.32523]	[-0.85142]	[0.91777]	[0.48197]	[0.32792]	[0.91565]	[-0.13597]
C	0.103391	0.274951	0.016166	0.215415	0.397394	0.965663	0.776207
	(0.04414)	(0.08748)	(0.05895)	(0.20993)	(0.79288)	(1.82232)	(1.54410)
	[2.34258]	[3.14287]	[0.27424]	[1.02613]	[0.50120]	[0.52991]	[0.50269]
R-squared	0.443514	0.174292	0.260649	0.229616	0.396775	0.269661	0.153744
Adj. R-squared	0.295117	-0.045897	0.063488	0.024180	0.235915	0.074904	-0.071924
Sum sq. resids	0.700368	2.751721	1.249408	15.84512	226.0302	1193.987	857.2370
S.E. equation	0.152793	0.302860	0.204076	0.726753	2.744875	6.308689	5.345518
F-statistic	2.988711	0.791557	1.322013	1.117701	2.466586	1.384602	0.681285
Log likelihood	23.04577	-3.637567	11.75879	-37.77495	-89.60219	-122.0577	-115.5966
Akaike AIC	-0.720296	0.648080	-0.141477	2.398715	5.056523	6.720907	6.389568
Schwarz SC	-0.336397	1.031979	0.242422	2.782614	5.440421	7.104806	6.773467
Mean dependent	0.158790	0.273461	0.151165	0.157562	0.000599	0.561200	-0.013023
S.D. dependent	0.181989	0.296140	0.210880	0.735703	3.140160	6.559121	5.163068

Determinant Residual Covariance	0.125191
Log Likelihood	-311.0381
Log Likelihood (d.f. adjusted)	-346.8508
Akaike Information Criteria	21.37696
Schwarz Criteria	24.36284

Appendix E: Co-integration Test for Fiscal Fed-Inflation Model

Date: 10/19/12 Time: 11:07
Sample(adjusted): 1973 2010
Included observations: 38 after adjusting endpoints
Trend assumption: Linear deterministic trend
Series: LCPI LM2 LGFCF LTLF FDC1 FDC2 FDC3
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.839318	192.2752	124.24	133.57
At most 1 **	0.729205	122.7988	94.15	103.18
At most 2 *	0.613103	73.15587	68.52	76.07
At most 3	0.318365	37.07120	47.21	54.46
At most 4	0.284275	22.50726	29.68	35.65
At most 5	0.222879	9.797801	15.41	20.04
At most 6	0.005661	0.215727	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Trace test indicates 3 cointegrating equation(s) at the 5% level
Trace test indicates 2 cointegrating equation(s) at the 1% level

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.839318	69.47643	45.28	51.57
At most 1 **	0.729205	49.64291	39.37	45.10
At most 2 *	0.613103	36.08467	33.46	38.77
At most 3	0.318365	14.56393	27.07	32.24
At most 4	0.284275	12.70946	20.97	25.52
At most 5	0.222879	9.582074	14.07	18.63
At most 6	0.005661	0.215727	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Max-eigenvalue test indicates 3 cointegrating equation(s) at the 5% level
Max-eigenvalue test indicates 2 cointegrating equation(s) at the 1% level

Appendix F: Impulse Response and Variance Decomposition of Fiscal Fed-Inflation Model

Period	LCPI	LM2	LGFCF	LTLF	LFDC1	LFDC2	LFDC3
1	0.166414	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.446653	0.013999	0.010614	0.026183	0.035256	0.012869	-0.037098
3	0.706563	0.037897	0.029747	0.080243	0.066420	0.047157	-0.053596
4	0.993072	0.000421	0.093816	0.119993	0.118070	0.102312	-0.092019
5	1.293524	-0.014006	0.150737	0.152993	0.186944	0.195881	-0.117619
6	1.654583	-0.068028	0.187640	0.166431	0.277735	0.302664	-0.149795
7	2.041034	-0.146583	0.217634	0.190043	0.373022	0.411314	-0.179919
8	2.451199	-0.252313	0.236606	0.235412	0.468302	0.518996	-0.219937
9	2.875208	-0.359604	0.244905	0.292086	0.560747	0.644243	-0.262043
10	3.306063	-0.484359	0.252283	0.357851	0.653876	0.776340	-0.304042

1. Variance Decomposition

Period	S.E.	LCPI	LM2	LGFCF	LTLF	LFDC1	LFDC2	LFDC3
1	0.166414	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.331672	96.56469	0.178154	0.102419	0.623207	1.129936	0.150537	1.251051
3	0.428764	94.52901	0.417259	0.260398	1.962626	1.204416	0.729614	0.896673
4	0.529341	91.31582	0.774977	1.635814	1.851565	1.742294	1.564340	1.115190
5	0.623830	88.94439	0.611474	2.010348	1.612969	2.473374	3.376105	0.971344
6	0.738017	87.48485	0.972705	1.686422	1.185612	3.280615	4.505689	0.884105
7	0.850549	86.51069	1.585342	1.394053	0.969711	3.725036	5.024098	0.791073
8	0.963089	85.61157	2.441696	1.126092	0.978242	3.884085	5.168665	0.789651
9	1.071505	84.82249	2.975217	0.915742	1.070049	3.882201	5.541939	0.792360
10	1.175410	83.92529	3.598974	0.764937	1.202280	3.853938	5.868450	0.786135

Appendix G: VEC Estimate of Fiscal Fed-Exchange Rate Model

Vector Error Correction Estimates
Date: 10/19/12 Time: 14:20
Sample(adjusted): 1973 2010
Included observations: 38 after adjusting endpoints
Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1
LEXR(-1)	1.000000
LM2(-1)	0.052416 (0.26009) [0.20153]
LCPI(-1)	-1.141514 (0.33026) [-3.45642]
LFDC1(-1)	-0.648755

	(0.14727)
	[-4.40512]
LFDC2(-1)	1.868550
	(0.42792)
	[4.36657]
LFDC3(-1)	-1.679761
	(0.37685)
	[-4.45742]
C	-0.001538

Error Correction:	D(LEXR)	D(LM2)	D(LCPI)	D(LFDC1)	D(LFDC2)	D(LFDC3)
CointEq1	-0.167083	0.032677	0.009111	0.870267	-0.036308	0.070010
	(0.10860)	(0.14226)	(0.06485)	(0.23544)	(0.07611)	(0.10372)
	[-1.53847]	[0.22970]	[0.14050]	[3.69628]	[-0.47703]	[0.67499]
D(LEXR(-1))	0.016401	0.104531	0.234136	-0.773517	0.234546	0.121017
	(0.20354)	(0.26662)	(0.12154)	(0.44126)	(0.14265)	(0.19439)
	[0.08058]	[0.39207]	[1.92643]	[-1.75298]	[1.64426]	[0.62255]
D(LEXR(-2))	-0.042291	-0.078601	0.137551	1.093636	0.151013	0.193762
	(0.21943)	(0.28743)	(0.13103)	(0.47571)	(0.15378)	(0.20956)
	[-0.19273]	[-0.27346]	[1.04979]	[2.29896]	[0.98200]	[0.92459]
D(LM2(-1))	-0.034419	0.121805	0.068202	-0.252609	0.071159	-0.059536
	(0.16078)	(0.21061)	(0.09601)	(0.34857)	(0.11268)	(0.15355)
	[-0.21407]	[0.57835]	[0.71038]	[-0.72471]	[0.63151]	[-0.38772]
D(LM2(-2))	-0.050798	-0.069398	-0.035376	-0.148462	0.022907	0.138161
	(0.15903)	(0.20831)	(0.09496)	(0.34477)	(0.11145)	(0.15188)
	[-0.31942]	[-0.33314]	[-0.37253]	[-0.43061]	[0.20553]	[0.90967]
D(LCPI(-1))	-0.090558	0.184582	0.461256	-0.381483	-0.467656	-0.558896
	(0.33525)	(0.43915)	(0.20019)	(0.72681)	(0.23495)	(0.32018)
	[-0.27012]	[0.42032]	[2.30411]	[-0.52487]	[-1.99041]	[-1.74556]
D(LCPI(-2))	-0.216115	-0.237199	-0.083820	1.938519	0.016883	0.279093
	(0.33830)	(0.44313)	(0.20200)	(0.73340)	(0.23709)	(0.32309)
	[-0.63884]	[-0.53528]	[-0.41494]	[2.64320]	[0.07121]	[0.86384]
D(LFDC1(-1))	0.056678	0.061728	0.063081	0.139352	-0.074105	-0.036176
	(0.07340)	(0.09614)	(0.04383)	(0.15912)	(0.05144)	(0.07010)
	[0.77223]	[0.64206]	[1.43935]	[0.87579]	[-1.44070]	[-0.51609]
D(LFDC1(-2))	0.100874	-0.028104	-0.056435	0.105694	-0.009459	0.049179
	(0.07456)	(0.09766)	(0.04452)	(0.16164)	(0.05225)	(0.07121)
	[1.35296]	[-0.28777]	[-1.26763]	[0.65390]	[-0.18102]	[0.69066]
D(LFDC2(-1))	0.113779	0.070304	0.350845	-3.388344	-0.295966	-0.481118
	(0.37481)	(0.49096)	(0.22381)	(0.81256)	(0.26268)	(0.35796)
	[0.30356]	[0.14320]	[1.56761]	[-4.16995]	[-1.12673]	[-1.34406]

D(LFDC2(-2))	-0.093382	-0.188057	0.096885	0.435151	0.336889	-0.120039
	(0.36533)	(0.47855)	(0.21815)	(0.79201)	(0.25603)	(0.34891)
	[-0.25561]	[-0.39298]	[0.44412]	[0.54942]	[1.31580]	[-0.34404]
D(LFDC3(-1))	0.066400	-0.117901	-0.159167	1.834668	0.019283	0.123600
	(0.28070)	(0.36769)	(0.16761)	(0.60854)	(0.19672)	(0.26808)
	[0.23655]	[-0.32065]	[-0.94961]	[3.01487]	[0.09802]	[0.46105]
D(LFDC3(-2))	0.005589	0.040853	-0.000246	-0.278330	-0.300328	0.013681
	(0.25948)	(0.33989)	(0.15494)	(0.56253)	(0.18185)	(0.24781)
	[0.02154]	[0.12020]	[-0.00159]	[-0.49478]	[-1.65152]	[0.05521]
C	0.220598	0.267776	0.029129	-0.124016	0.003877	-0.006181
	(0.09552)	(0.12512)	(0.05704)	(0.20708)	(0.06694)	(0.09122)
	[2.30945]	[2.14015]	[0.51070]	[-0.59888]	[0.05792]	[-0.06776]
R-squared	0.387900	0.076192	0.492736	0.635676	0.456648	0.314374
Adj. R-squared	0.056346	-0.424203	0.217968	0.438333	0.162332	-0.057006
Sum sq. resids	1.786337	3.065029	0.636932	8.395628	0.877367	1.629321
S.E. equation	0.272820	0.357365	0.162907	0.591454	0.191199	0.260554
F-statistic	1.169944	0.152264	1.793282	3.221184	1.551559	0.846501
Log likelihood	4.171299	-6.086611	23.76522	-25.23204	17.68025	5.919375
Akaike AIC	0.517300	1.057190	-0.513959	2.064844	-0.193697	0.425296
Schwarz SC	1.120621	1.660511	0.089362	2.668165	0.409624	1.028617
Mean dependent	0.142606	0.276614	0.160196	-0.002570	0.015836	0.001217
S.D. dependent	0.280847	0.299451	0.184217	0.789190	0.208905	0.253430

Determinant Residual Covariance	5.86E-08
Log Likelihood	45.25423
Log Likelihood (d.f. adjusted)	-7.132458
Akaike Information Criteria	5.112235
Schwarz Criteria	8.990728

Appendix H: Co-integration Test Fiscal Fed-Exchange Rate Model

Date: 10/19/12 Time: 11:32
Sample(adjusted): 1973 2010
Included observations: 38 after adjusting endpoints
Trend assumption: Linear deterministic trend
Series: EXR LCPI LM2 FDC1 FDC2 FDC3
Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.827988	131.2192	94.15	103.18
At most 1	0.608387	64.33197	68.52	76.07
At most 2	0.295745	28.70766	47.21	54.46
At most 3	0.198600	15.38428	29.68	35.65
At most 4	0.132370	6.971250	15.41	20.04
At most 5	0.040616	1.575619	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Trace test indicates 1 cointegrating equation(s) at both 5% and 1% levels

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	5 Percent Critical Value	1 Percent Critical Value
None **	0.827988	66.88723	39.37	45.10
At most 1 *	0.608387	35.62431	33.46	38.77
At most 2	0.295745	13.32338	27.07	32.24
At most 3	0.198600	8.413025	20.97	25.52
At most 4	0.132370	5.395631	14.07	18.63
At most 5	0.040616	1.575619	3.76	6.65

*(**) denotes rejection of the hypothesis at the 5%(1%) level
Max-eigenvalue test indicates 2 cointegrating equation(s) at the 5% level
Max-eigenvalue test indicates 1 cointegrating equation(s) at the 1% level

Appendix I: Impulse response and Variance Decomposition of Fiscal Fed-Exchange Rate Model

1. Impulse Response

Period	LEXR	LM2	LCPI	LFDC1	LFDC2	LFDC3
1	0.274583	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.582202	-0.000195	0.004593	0.074672	0.034274	0.063768
3	0.880015	-0.008496	0.003111	0.182617	0.037220	0.176818
4	1.152617	-0.031331	0.007990	0.289142	0.047967	0.278187
5	1.417108	-0.052900	0.014011	0.394356	0.054022	0.382756
6	1.679623	-0.075177	0.021440	0.497263	0.062852	0.482141
7	1.943416	-0.096212	0.028559	0.599790	0.070519	0.582361
8	2.208092	-0.117328	0.035696	0.701842	0.078871	0.681511
9	2.473423	-0.138177	0.042640	0.803937	0.086949	0.781078
10	2.738927	-0.159097	0.049568	0.906037	0.095193	0.880517

2. Variance Decomposition

Period	S.E.	LEXR	LM2	LCPI	LFDC1	LFDC2	LFDC3
1	0.274583	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000
2	0.425280	94.00753	2.11E-05	0.011664	3.082959	0.649485	2.248337
3	0.542280	87.97892	0.023443	0.007921	5.858499	0.402412	5.728804
4	0.625031	85.24714	0.151120	0.012056	7.314605	0.332475	6.942608
5	0.695099	83.40579	0.218481	0.017253	8.205421	0.276414	7.876640
6	0.757082	82.33105	0.270748	0.024172	8.764455	0.246607	8.362964
7	0.814780	81.56540	0.300414	0.028504	9.150494	0.221772	8.733419
8	0.868753	81.02728	0.323323	0.031821	9.428746	0.204315	8.984517
9	0.919793	80.60581	0.339816	0.034086	9.643434	0.189981	9.186869
10	0.968182	80.26998	0.353385	0.035885	9.815648	0.178716	9.346387