The effect of government expenditure on economic growth: an empirical analysis in Liberia

BY

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DECLARATION

I, **P. Mah Kruah**, declare that this dissertation is entirely and exclusively my own undertaking and has not been done by anyone else or presented previously for any other purpose. Except for references, where due credits are given, this dissertation is my original work and has been approved as meeting the academic requirement in partial fulfillment of the Award of Master of Arts in Economics of Makerere University.

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……. ……..

Bruno L. Yawe (PhD) Date
Supervisor

……. ……..

James Wilson Muwanga (PhD) Date
Supervisor

DEDICATION

To my late, caring mother: Ma Luo-Gevon, with whom I would love to share this joyful moment had she been alive;

and

To my father: Kruah Dayen, whose foresight has placed me in the class of the educated.

I salute you both, for the wonderful and loving supports.

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First and foremost, I take this opportunity to register my profound gratitude to God Almighty; whose divine blessing and mercy have brought me to this crucial moment in my life.

Let me also register my deepest thanks and appreciations to my supervisors, Dr. Bruno L. Yawe and Dr. James Wilson Muwanga whose extensive guidance and supervisions have shaped my sense of direction in the process of this research exercise. Though, very rigid their supervisions were, they academically inspired and shaped my ideas and thus improved the quality of this work. I am indebted to Professor J. Ddumba Ssentamu, whose high level of administrative prudence; perfect instructional skill and good sense of humor ensure our successes at Makarere University. May I also hasten to express my sincere appreciations to Dr. John Mutenyo, who also provided immense guidance at the preliminary stage of this research work. I also recognize the countless contributions of the entire instructional staff of the Faculty of Economics and Management (FEMA) for their efforts in molding our minds into useful economists of Africa. You are truly good torch bearers. And to the warm and friendly people of Uganda, I salute you. You made us feel at home away from home.

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Finally, to my course mates, friends, relatives and well wishers, I recognize your contributions and prayers and may God Almighty continue to strengthen us all and provide for our individual needs as we meet the challenges that await us, for the rest of our lives.

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ACRONYMS

ADF	-	Augmented Dickey Fuller: a procedure used to test for unit root
ECM	-	Error Correction Model/Mechanism
ECOWAS	-	Economic Community of West African States
Eviews	-	Economics Views: a software program used to analyze the result of this study
1st diff.	-	First Difference
FDI	-	Foreign Direct Investment
FY	-	Fiscal Year; thus FY09 means Fiscal Year 2009
GDP	-	Gross Domestic Product: the total value of goods and services produced within the border of a country in a given year
GDPPC	-	Gross Domestic Product per capita
GEMAP	-	Governance and Economic Management Assistance Program
GOL	-	Government of Liberia
IID	-	Identically and independently distributed
I(0)	-	Integrated of Order zero; if a variable is integrated of order zero, it is stationary at level
I(1)	-	Integrated of order one; if a variable is integrated of order one, it is stationary only after it is first differenced.
LD/L$	-	Liberian Dollars
LDCs	-	Least Developed Countries
LM	-	Lagrange Multiplier
LRC	-	Liberia Revenue Code
OLS	-	Ordinary Least Square

OECD	-	Organization of Economic Cooperation and Development
PFM	-	Public Financial Management
PRC	-	People Redemption Council
RESET	-	Regression Specification Error Test
RSS	-	Residuals Sum Square
RSS_R	-	Restricted Residuals Sum Square
RSS_{UR}	-	Unrestricted Residuals Sum Square
SEE	-	South Eastern Europe
UN	-	United Nations
US	-	United States
USD/US$	-	United States Dollars

ABSTRACT

The Liberian government expenditure is largely composed of recurrent spending which reduces growth according to economic theory. Thus, the objective of this study is to analyze the effect of government expenditure on economic growth in Liberia using time series data. To achieve this objective, the study employs secondary annual time series data for Liberia for the period 1970 to 2007. The neoclassical aggregate production function is used as the methodology to analyze the relationship between government expenditure and growth. Government expenditure was disaggregated into consumption and total investment expenditures. The Johansen Maximum Likelihood approach is used to test for long-run relationship between the dependent and independent variables. The results indicated that, such a long-run equilibrium relationship exists. Therefore, an error correction model is used to determine the relationship between government expenditure and economic growth.

The empirical findings show that government consumption expenditure, private consumption and exports are positively related to growth in Liberia but foreign aid has negative impact. However, total domestic investment, foreign direct investment and population growth rates are insignificant. Thus, the main policy recommendation is that, improving economic growth in Liberia requires improving expenditures which have positive impacts. However, the impact of government expenditure is modest compared to private sector expenditure. Thus to maximize economic growth, more resources should be directed into the private rather than into the public sector. The caveat to this policy recommendation is that, government expenditure cannot be increased to the point where deficits will result. Financing such a deficit is most likely to result into increase in interest rate or inflation that may harm rather than improve growth.

CHAPTER ONE

INTRODUCTION

1.1 Background

The correlation between government expenditure and economic growth remains an important topic of analysis and debate in economic literature. The fundamental issue is whether government expenditure enhances economic growth or not. Generally, the view is that public expenditure on infrastructures and human capital development improves economic growth. On the other hand, government consumption expenditure has been viewed to be growth-retarding, (Folster and Henrekson, 1998). According to economic theory, consumption expenditure reduces economic growth because it crowds out private investment. It also reduces economic growth because of the economic disincentives associated with the financing of such expenditure. Despite these views, the actual relationship between government expenditure and economic growth is not very clear and needs more robust empirical research, (Grier and Tullock, 1989).

Kweka and Morrissey (2000) indicated that government activity may directly or indirectly increase output through its interaction with the private sector. They also outlined some ways in which government expenditure increases growth. These include the provision of pubic goods and infrastructures, social services and targeted intervention including the provision of subsidies to increase exports. Albatel (2000) also indicated that in addition to providing national security and economic infrastructures to facilitate economic growth and enhance private sector productivity, government expenditures for health care, education and public information can have significant beneficial impacts on economic growth through improved labor force productivity. Lindauer and Valenchik (1992) and Kweka and Morrissey (2000) also showed that the relationship between public expenditure and economic growth is very crucial, particularly, for the less developed

countries which have experienced rising levels of public expenditure over time. This is because rising level of public expenditure is most likely to be accompanied by fiscal deficit, which indicates the lack of capacity to generate sufficient revenue to finance higher levels of expenditure. And rising deficit has been found by Kneller et al, (1998) to adversely affect growth in OECD countries.

Considering the case of Liberia in the 1960s and 1970s the country witnessed impressive economic growth following the adoption of the Open Door Policy, by President William V.S. Tubman, which was meant to bridge the capital gap that existed in the country. This led to massive foreign capital inflows into the country to extract iron ore and natural rubber products resulting into the expansion of exports. National income therefore grew above an annual rate of six percent, with a peak of 6.7 percent in 1970, (Republic of Liberia National Human Development Report, 2006). The expansion of investment activities in the country and the resulting increase in GDP led to the expansion of government activities as hypothesized by Wagner's law of increasing state activity. Unfortunately, the welfare of the ordinary Liberians did not show any improvement (only the elite few benefitted) in the face of the economic boom and the expansion of government activities and the country had to nurture civil strife, (Republic of Liberia National Human Development Report, 2006). However, following the coup d'état in 1980 GDP growth rate drastically fell, fluctuating in negative values, mainly due to the decline in the demand for iron ore on the world market and the political upheavals in the country. For example, during the period 1980-1995, the lowest and highest growth rates of GDP at current prices recorded were -51.03 and -0.84, respectively. The growth rate of -51.03 may appear unrealistic but the fact is that at the inception of the civil conflict in 1990 nominal GDP dropped

from US$ 996.44 million to approximately US$ 487.13 million. Thus, calculating the growth rate of nominal GDP for the period, 1990, [applying $(GDP_t - GDP_{t-1})/GDP_{t-1}$] will yield the growth of approximately -51.03. (UN National Accounts Online Database, 2009).

However to clearly show the movement between government expenditure and Economic growth, Table 1.1 show a-five-year average growth rates of government consumption expenditure and GDP at current prices for Liberia.

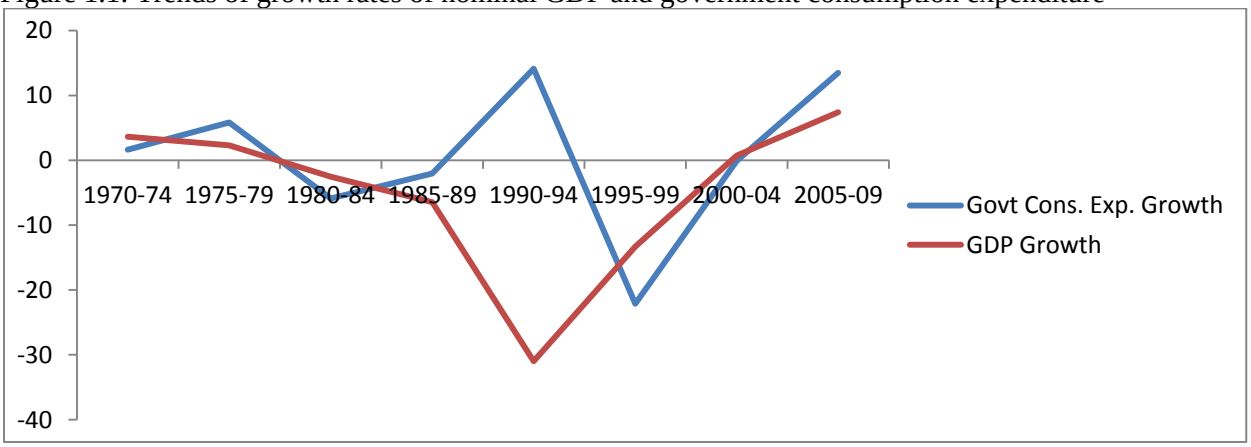
Table 1.1: A-five-year average growth rate of government consumption expenditure and GDP

	1970-74	1975-79	1980-84	1985-89	1990-94	1995-99	2000-04	2005-09
Govt Cons. Exp. Growth	1.63	5.82	-5.88	-2.04	14.12	-22.14	-0.1	13.48
GDP Growth	3.64	2.3	-2.54	-6.45	-31	13.33	0.72	7.4

Source of Data: UN National Accounts Main Aggregates Database and World Development Indicators (WDI)

The relationship between the growths of nominal GDP and government consumption in Table 1.1 is more clearly visualized by the trends in figure 1.1.

Figure 1.1: Trends of growth rates of nominal GDP and government consumption expenditure



Source: own computation from excel

of the decline in GDP growth, led to fiscal deficits of more than 10 percent of GDP notably in the 1980s and 2000s. This poor fiscal performance

was marked by both decline in revenue and rise in government expenditure, (IMF Country Report No. 05/167, 2005). Table 1.2 summarizes the fiscal performance in the 1980s and 2000s.

Table 1.2: Fiscal Performance in Liberia in the 1980s and 2000s, in millions of L$[1]

Year	Total Revenue	Total Expenditure	Fiscal Balance
1981/82	279.3	370.6	-91.3
1982/83	257.4	390.4	-133
1983/84	260.1	344.1	-84
1984/85	217	382.6	-165.6
1985/86	205.6	310.5	-104.9
1986/87	234.6	366.3	-131.7
2000	3308.3	3395.5	-87.2
2001	2981.2	3142.7	-161.5
2002	3959.7	4260.3	-300.6
2003	2499.9	2606.3	-106.4
2004	3408	3613.6	-205.6
2005	3968	4036.1	-68.1

Source: IMF Country Report No. 05/167, 2005; Central Bank of Liberia and Third UN Conference Report on LDCs, 2001. (Notice that in Table 1.1, a fiscal year in the 1980s runs from July to June of the following year while a fiscal year in 2000-05 runs from January to December of the same year).

The issue of rising government expenditure (deficit) of which recurrent expenditure made up larger percentage has become an issue of concern to policy makers in Liberia and the government has instituted a number of fiscal reform measures to curb it. The measures include the institution of the Governance and Economic Management Assistance Program (GEMAP) adopted in 2006 by the Liberian Government in collaboration with its international development partners and the cash-based budget program, among others. Table 1.3 shows the government yearly (current and capital) expenditures in millions of US dollars and the exchange rates (period/yearly average) between the Liberian and United States dollars for each year.

Table 1.3: GOL Yearly Expenditure, in millions US$ and Exchange Rate between the L$ & US$.

[1]Table 1.2 comprises of information from two different time periods. In the 1980s, the official exchange rate between the LD and USD was one to one whereas exchange rate from 2000-2005 between the LD and USD ranges between 40-60LD to 1USD

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Current exp	42.68	55.54	44	33.5	25	43	63.5	66.5	87	140	201
Capital exp	11.25	10.93	34	43.5	37	15	10.5	8.5	11	20	30
Total exp	53.93	66.47	78	77	62	58	74	75	98	160	231
Ex. Rate	1.00	1.00	41.51	41.9	40.95	48.58	61.75	59.38	54.91	60.8	63.3

Sources of data: African Statistical Yearbook, 2009; Liberia Economic Review, UNDP, 1999 and International Financial Statistics (IFS). Note that, both the Liberian and United States dollars are legal tender currencies in Liberia and that the official exchange rate between them before the year 2000 was fixed and therefore one to one.

These reform measures are intended to ensure fiscal discipline by making sure that government expenditure does not exceed available revenue. The reform measures are also intended to ensure that the economy and hence the people benefit from the government activities, implying that public expenditure policies can have remarkable influences on economic growth and development. Thus knowing the impact of government expenditure is central in this regard, to maximize the benefit of such reform measures. This will enable the government to figure out which expenditure component must be increased to improve growth and development and the welfare of the people of Liberia.

Thus, this study is intended to establish the effect of government expenditure on economic growth in Liberia. To achieve this objective, the study employs time series analysis in the neoclassical growth model methodology. In this time series methodology, a unit root analysis and other relevant tests are conducted. It was shown that some of the time series variables are integrated of order I(0) while others were integrated of order I(1) implying that their linear combination is integrated of order I(1), Gujarati (2003). Therefore, all the variables were differenced once. The co-integration test result indicates that there is a long run equilibrium relationship between the dependent and independent variables. Thus, the study employs an error

correction model to estimate the relationship between government expenditure and economic growth.

1.2 Research Problem Statement

Large proportion of the Liberian government expenditure is recurrent compared to capital expenditure (see table 1.3). This kind of expenditure which includes spending on consumption goods and services, welfare and salary payment reduces economic growth because it crowds out private investment, reduces government savings and constrains development expenditure, (Folster and Henrekson, 1998; Kweka and Morrissey, 2000).

The government spending largely increased from the 1980s as the result of salary increment, increase in prices of petroleum products, etc., resulting into large deficits. With these increases in government expenditure, GDP growth rates of the economy generally remained low, fluctuating in negative values, throughout the 1980s and the first half of the 1990s, (UN National Account Online Database, 2009).

The increase in the government recurrent expenditure may pose a threat to economic growth. A recurrent spending may increase households' income and hence increases their savings in line with the Keynesian school of thought. However, this is true if the public has a saving culture. But in Liberia, the public to some extent lost confidence in the banking system due to the civil war and the failure of the government to redeem the saving bonds issued in 1984. Thus, an increase in government activity has little impact on public savings and hence poses threat to investment. Besides, the increase in government recurrent expenditure was offset by the high cost of living

and did not have any significant impact on household's savings and hence investment and economic growth.

With these economic theories that government consumption reduces economic growth while government investment increases growth, the empirical question is: what is the effect of government expenditure on economic growth in Liberia?

1.3 Objective of the Study

The general objective of this study is to examine the effect of government expenditure on economic growth in the Liberian economy. The specific objectives of the study are as follows:

i. To analyze the effect of government recurrent or consumption expenditure on economic growth in Liberia.
ii. To analyze the effect of total investment expenditure on economic growth in Liberia.

1.4 Hypotheses

This study tests the following hypotheses:

i. An increase in government consumption spending reduces economic growth in Liberia.
ii. An increase in total domestic investment improves economic growth in Liberia.

1.5 Significance of the Study

To the best of my knowledge, there is yet no empirical study which has analyzed the effect of government expenditure on economic growth in Liberia using time series data. However, Liberia was among 58 countries on which Baum and Lin (1993) determined the effects of government education, welfare and defense expenditures on growth using cross country analysis. Thus, this study is significant, because it may be the first known empirical evidence of the effect of government expenditure on growth in Liberia using time series analysis. This study is also significant, because it intends to capture effects of the war years and regime change on growth in Liberia, if any, which can serve as a useful lesson against instability to guide policy making.

Grier and Tullock (1989) showed that the actual relationship between government expenditure and economic growth is not clear and requires more robust empirical research. Thus, this study is also significant, because it intends to analyze the relationship and therefore contribute to existing empirical knowledge.

1.6 Scope of the Study

This study mainly focuses on analyzing the effect of government expenditure on the growth rate of the Liberian economy and covers the period, 1970-2007.

1.7 Organization of the Study

This study is divided into six chapters. Chapter one looks at the introductory aspect. Chapter two gives a bird's eyes view of the Liberian economy, chapter three provides previous and related empirical evidence and the knowledge gap that need to be bridged. Chapter four outlines the methodology used to achieve the study's objectives. Chapters five analyses the empirical results

and finally chapter six presents the conclusions and policy recommendations of the study. Chapter six also presents the limitations of this study as well as the areas for further research.

CHAPTER TWO

AN OVERVIEW OF THE LIBERIAN ECONOMY

2.1 Introduction

This chapter is intended to provide a bird's eyes view of the Liberian economy. It therefore highlights the structure, some shortfalls and recent macroeconomic developments in the Liberian economy.

2.2 Structure of the Economy

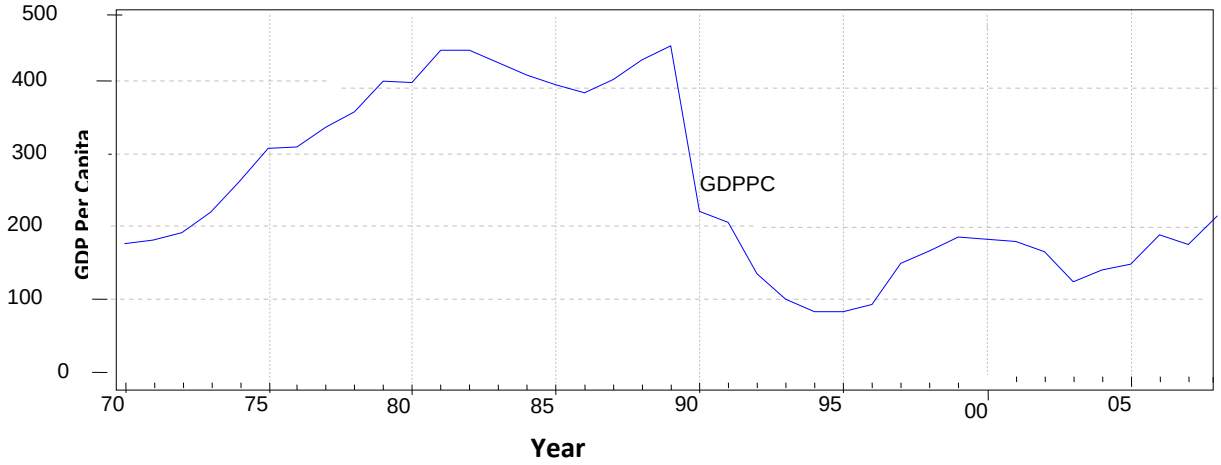
The Liberian economy is mainly characterized by two sectors namely: the modern and the traditional sectors. The modern sector generally comprises of foreign investments and technologies that focus on the extraction of iron ore, rubber and forest products. The manufacturing and financial service sub-sectors also form part of the modern sector. The modern sector had basically accounted for 70 percent of the export earnings and 50 percent of GDP prior to the civil conflict. On the other hand, the traditional sector, which makes up about 70 percent of the population is basically rural and depends on traditional method of agriculture and rudimentary technology. That is, the traditional sector engages in subsistence agriculture mainly for consumption and not for trade. The relationship between the modern sector and the rest of the economy is mainly in the form of profit sharing with the government, payment of income tax and duties on imported materials, (Third UN Conference of LDCs, 2001).

Like many economies in Sub-Saharan Africa, the Liberian economy heavily relies on trade in primary products and foreign aid. The heavy dependence on the exportation of primary products

makes the economy vulnerable to fluctuations in prices on the world market. Also, the dependence on foreign aid makes the country more susceptible to the prevailing financial situations and the economic and political policies in donor countries. With these conditions, an efficient management of the economy is crucial but unfortunately, gross economic mismanagement and lack of political will plunged the economy deeper into a state of anarchy and war, (Third UN Conference of LDCs, 2001).

The civil war has had a number horrifying effects on the economy and the people of Liberia. The conflict destroyed approximately 270,000 lives. Institutions and infrastructures were also destroyed. The economy collapsed impoverishing many of the surviving Liberians. There was a massive exodus of skilled individuals from the country. GDP fell tragically by 90 percent between 1987 and 1995, one of the major economic collapses ever recorded, as average income in Liberia was one-fourth of the level in 1987, (Poverty Reduction Strategy, Republic of Liberia, 2008). Figure 2.1 gives a visual picture of the acute decline in per capita Gross Domestic Product as the result of mismanagement and the war.

Figure 2.1: Trend in GDP Per Capita 1970-2008 (as generated by Eviews 3.1)



Data Source: National Accounts Main Aggregates Database, UN Statistics Division

Agricultural production (including rubber and forest products), mining activities, manufacturing and financial services as well as all revenue generating activities were reported to have fallen beyond 60 percent each between 1987 and 2005. Electricity production also ceased as the nation's only power source was damaged. Thus, Liberians turned to the use of charcoal, fuel wood and later to 'tiger generators' to meet their basic energy requirements, (Poverty Reduction Strategy, Republic of Liberia, 2008).

2.3 External Trade

Given the tragic decline in the real (agricultural) and mining sectors which accounted for 70 percent of exports earnings, the economy has been virtually reduced to an import-oriented economy. Data available on external trade shows that imports have exceeded exports since 1991, (Third UN Conference of LDCs, 2001). Table 2.1 summarizes recent trade developments in the economy.

Table 2.1: Trade Data 2000-2009, in millions US$

	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**
Exports	67.7	127.9	176.1	108.9	103.8	131.3	180.8	200.2	242.4	148.0
Imports	146.4	228.7	178.2	169.7	336.8	309.9	443.8	501.5	813.5	565.2
Trade Bal	-78.7	-100.8	-2.1	-60.8	-223	-178.6	-263.0	-301.3	-571.1	-417.2

Sources of data: Central Bank of Liberia and Liberia National Human Development Report 2006

2.4 Fiscal Policy

Liberia had in the past scored poorly in Transparency International's Corruption Perception Index, for instance, 2.1 out of 10 in 2007, (World Bank and African Development Bank Joint Country Assistance Strategy for the Republic of Liberia for the FY09-FY11, 2007). However,

some improvements in the fiscal policy management have been reported beginning 2006. The government has indicated through its Poverty Reduction Strategy to strengthen and ensure transparent Public Financial Management (PFM). The government is pursuing tax reform to broaden the tax base with minimum tax burden on the poor and to allocate expenditure to the highest priority needs.

To this end, the government has begun to implement some financial management programs to reduce corruption and economic mismanagement. These reform measures include control measures to prevent the accumulation of domestic debts, regular fiscal reporting, new fiscal law, maintaining a balanced cash-based budget and with the help of the international development partners introduced the Governance and Economic Management Assistance Program (GEMAP). Also, the government has reportedly embarked on the following short to medium term tax policy reforms, (Poverty Reduction Strategy, Republic of Liberia, 2008).

i. Amending the Liberia Revenue Code (LRC) to remove discretionary tax exemptions for investors.
ii. Reduce corporate and income tax rates.
iii. Reduce the tax rate for the poor by introducing a baseline for income tax.
iv. Harmonize Liberia import tariffs with the ECOWAS common external tariff.
v. Bring the mineral and petroleum tax system to international standard.
vi. Implementing the Liberia Extractive Industry Transparency Initiative (LEITI) to ensure that all revenues from the mining, petroleum and forestry sectors are publicly disclosed.

Table 2.2 summarizes the current tax rates of Liberia.

Table 2.2: Current Tax Rates of Liberia

Tax	**Rate**	**Comment**

Personal income tax	2 – 35%	-
Business tax	4 – 30%	Depends on business size
Customs	2.5 – 25%	-
Excise	5 – 30%	50% for arms and ammunitions
Real estate tax	1 – 2%	-
Timber production	Varies	Different levels for severance, reforestation and conservation

Source: World Bank and African Development Bank Joint Country Assistance Strategy for the Republic of Liberia for the FY09-FY11, Report No. 47928-LR, 2007

2.5 The Banking Sector

The Liberian financial system immediately prior to the civil war consisted of 14 commercial and development banks, several informal financial intermediaries and the National Bank of Liberia. The National Bank of Liberia was created in 1974 to serve as the Central Bank. Until 1999, when it was granted full central bank status, it had been performing only limited central banking functions due to the lacked of adequate resources to serve as a lender of last resort to commercial banks operating in Liberia. Currently the number of commercial banks operating in Liberia has increased from six in 2008 to eight in 2009, (Central Bank of Liberia's Annual Report, 2009).

2.6 Macroeconomic Development Indicators in the Liberian Economy

2.6.1 Inflation Rate

Consumer price inflation reduced in December 2009 with the average rate of 7.4 percent, from the previous rate of 17.5 percent in 2008. The reduction is due to low oil and food prices on the world market, (Central Bank of Liberia's Annual Report, 2009). Table 2.3 gives the averages of inflation rates from 2007-2009.

Table 2.3: Year on Year Inflation Rates (2007-2009), Yearly Averages

Year	Inflation Rate (averages)
2007	11.4
2008	17.5
2009	7.4

Source: Central Bank of Liberia

2.6.2 Exchange Rate

Exchange rate is one key policy option being used by the Central Bank of Liberia to ensure that inflation or deflation of prices of essential commodities is minimized on the Liberian market. This task is achieved by auctioning of both the Liberian and the US dollars. Table 2.4 shows the period averages of exchange rate in Liberia from 2007-2009.

Table 2.4: Exchange Rate, Period (Yearly) Averages (L$ per US$)

Year	Exchange Rate
2007	60.77
2008	63.29
2009	67.81

Source: Central Bank of Liberia

2.6.3 Real Sector Performance

The growth of the economy during 2009 is 4.6 percent which is lower than the projection for the year. However, the slowdown in economic activities was mainly due to the delay in the resumption of activities in the mining and forestry sectors. Foreign direct investment in these areas was lower than expected mainly because of the global economic slowdown, due to weak external demand and low prices for primary commodity exports such as coffee, cocoa, rubber, logs, diamond etc. This affected revenue generation and lowered the level of employment in key

sectors. However, the economy is projected to grow at 7.7 percent in 2010, (Central Bank of Liberia's Annual Report, 2009). Table 2.5 shows sectors' contributions to GDP at 1992 constant prices for 2007-2009.

Table2.5: Sectors' Contributions to GDP, in millions of US$

Sector	**2007**	**2008**	**2009**
Agriculture &Fisheries	210.4	213.8	221.3
Forestry	81.1	97.5	105.4
Mining	0.8	0.8	0.8
Manufacturing	60.8	64.3	62.7
Services	120.9	130.7	140.1
Real GDP	473.9	507.1	530.4

Source: Central Bank of Liberia

2.6.4 Level of Employment in the Economy

Another macroeconomic indicator of the performance of an economy is the unemployment rate which shows the level of unemployment in the economy. Full employment is a situation in which all qualified individuals who are willing, seeking and able to work are employed. In the Liberian economy, the aggregate formal sector employment in 2009 was 124,755 compared to 106,968 in 2008, representing an increase of 16.6 percent. Public sector employment accounted for 34,000 from the total 124,755, while private sector employment stood at 90,755. However, a close look at the ratio of formal employment in 2009 to population shows that one out of every 28 Liberians is formally employed suggesting a large dependency ratio in the population. That is, in the Liberian population of 3.5 million people, 27 persons are in essence depending on one person in terms of income from formal employment. However, employment in the informal sector is

estimated at 569,790 in 2009, from 487,000 in 2008, (Central Bank of Liberia's Annual Report, 2009). Table 2.6 summarizes the number of employees in the economy by sector.

Table 2.6: Total Number of Employees in the Economy by Sector, from 2007-2009

Sector	**2007**	**2008**	**2009**
Government	31,900	47,681	34,000
Private	109,681	59,287	90,755
Total	141,581	106,968	124,755
Informal	480,000	487,000	569,790

Source: Central Bank of Liberia

2.6.5 Interest rates

Interest rate (particularly, lending rate) is a macroeconomic indicator capable of impacting domestic investment. A high interest rate scares investors away and reduces total domestic investment. On the other hand, a reasonably low level of interest rate attracts investors and increases the level of total investment in a country. Table 2.7 gives the average rates of interest in the Liberian economy for the year 2009.

Table 2.7: Average Interest Rates, 2009

Interest Rate	**2009**
Lending Rate	14.24
Personal Loan Rate	14.66
Mortgage Loan Rate	14.60
Saving Rate	2.00
Time Deposit Rate	4.10
Certificate of Deposit	3.00

Source: Central Bank of Liberia

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

In this chapter, the review of literature on the relationship between public expenditure and economic growth is presented. The review of literature covers both theoretical and empirical literature. In the former, government sector growth theories beginning with Wagner's law of expanding state activity are considered. Secondly, the role of government in economic growth and the simple versions of the neoclassical and endogenous growth models are also considered. In the latter, empirical investigations and recent evidence from studies that examined the growth effects of increasing public expenditure are also considered to provide insights into this study. The chapter ends with the conclusion of literature reviewed.

3.2 Theories of Expanding Public Sector

3.2.1. Wagner's Law

Before Wagner's law was formulated, the prevailing economic view was the notion that as a country grows richer, government activities decline (Henrekson, 1993). To a large extent this view is still prevalent in modern economic thought as some economists, in the debate on the role of government, maintain that the expansion of government activity associated with the Keynesian revolution is an unfortunate irregularity, (Peters, 1996).

The law states that there is a long run propensity for the scope of government to increase with higher levels of economic development (Peters, 1996). This implies that as the per capita income

grows in an economy, the magnitude of public expenditure also grows. As real income rises, the demand for all goods and services also rises. If the income elasticity for government services is greater than unity then government services become more important relative to the private goods and services, implying that the income elasticity for government services must exceed one for the public sector to be expending more than the private sector, (Gamariel, 2006).

Some reasons in support of this hypothesis include the following. As nations develop, they experience complex legal system and communications, increased urbanization and population density leading to greater public expenditure on law and order, and economic regulation due to the risk associated with conflict in densely populated urban communities. Secondly, as the economy grows, there are needs for more productions of social and culture goods and services including education and entertainment. The provision of these goods and services no doubt requires increasing public expenditure. Education and welfare are services whose income elasticity of demand is greater than one, implying that these services are very efficient when collectively provided than when provided privately. Finally as a society grows larger there is also an increasing need for the state to manage and finance natural monopolies and to ensure the smooth operation of market forces (Bird, 1971). Thus, as nations become more advanced, the number of market failures would force them to become more regulatory in nature, thereby expanding their role and this would inevitably involve higher public expenditures, (Peters, 1996).

3.2.2 Displacement Effect

Other theories explain the growth of government expenditure as a result of unexpected happenings. Government spending is somewhat modest in normal circumstances. However,

during periods of shocks like civil conflict, drought, etc., it becomes absolutely necessary to increase government expenditure. After the shocks, public spending does not return to the previous level because of inertia. Peacock and Wiseman (1961) referred to this as the "displacement effect."

3.2.3 Political and public choice theory

This theory states that a government has the preference to spend on the provision of public goods and services. In contrast, the general public is unwilling to finance the expenditure though taxes. High expenditure can only come from taxes and the public (partially) resists this preference. These competing objectives are moderated by the government's desire to be re-elected. This desire makes the government to take the public's interest into account. The resulting equilibrium level of public sector expenditure is determined by the balance between these competing forces, (Theories of the Public Sector, University of London External Program, 2005).

3.2.4 Baumol's Law

Baumol's law provides a supply-side explanation of expenditure growth. It does this by focusing on the technology of the public sector. Baumol's law begins by emphasizing that the production technology in the public sector has the following characteristics. It is labor-intensive relative to that of the private sector, it has little scope to increase productivity and it is difficult to substitute capital for labor. In the private sector, capital can be substituted for labor when the relative cost of labor increases. Furthermore, technological advances in the private sector lead to increases in productivity and rising wage rate. Since the public sector cannot substitute capital for labor, the wage increases in the private sector translate into cost increases in the public sector. Therefore,

maintaining a constant level of output in the public sector results into increasing public expenditure, (Theories of the Public Sector, University of London External Program, 2005).

3.2.5 Population and technology growths

Public expenditure growth is known to be influenced by several factors including population and technology growths. Musgrave and Musgrave (1989) mentioned that a population increase leads to greater level of social security and health care spending. Further, urbanization affects the level of public expenditure, because it leads to increased demand for infrastructures and public services. Such need calls for public provision of flood control, transportation and other services. Musgrave and Musgrave (1989) also indicated that technological development has major bearing on government expenditure and alters the process of production. This is evident by the wide spread use of automobiles, machineries and changes in military technology and hardware.

3.3 Government Role in the Process of Economic Growth

The classical economists recognized little or no role for a government in an economy. However, the failure of the classicalists to adequately explain factors that led to the Great Depression gave rise to the Keynesians who recognized government role in correcting market failure. Thus, as nations industrialize, governments should take leading role in the allocation of resources for more developments and to compensate for market failure (Gamariel, 2006). Thus, government intervention must seek to correct for the distortions created by market failures and to improve efficiency in market operations. Therefore, government may seek to influence the followings: correct externalities, provide public goods and services, ensure that rules of law and property rights are adhere to, control information asymmetry and regulate monopolies in the market.

3.4 Models of Economic Growth

3.4.1 The Neo-classical growth model

This model makes three assumptions. First, it assumes that growth comes in three ways: increases in labor supply, capital stocks and technological progress, (Sjoberg, 2003). Increases in labor supply and capital stock generate larger output. Capital stock consists of both physical and human capitals. Physical capital increases output because it directly improves productivity of labor and provides valuable services that a person would otherwise take longer time to complete. Thus, physical capital enhances labor efficiency by reducing the amount of hours that could have been devoted to work. Human capital promotes economic growth, because people with skills are more productive than those without them. Technological progress explains the increase in output that is not due to increases in labor supply and capital stock. It affects productivity in two ways: through advancement in knowledge called invention and the use of knowledge called innovation, which leads to efficient production, (Burda and Wyplosz, 2001).

Second, the model assumes that poor countries with less capital per person will grow faster, because each investment in capital will produce a higher return than rich countries with ample capital.

Third, because of diminishing returns to capital, economies will eventually reach a point at which no new increase in capital will create economic growth. This point is called a "steady state," (Economic Growth, 2010, Wikipedia article)**.** The model also noted that, countries can overcome this steady state and continue to grow by inventing new technology or knowledge.

3.4.2 The Endogenous growth model

In this model, the rate of growth is determined by the growth model rather than being determined from outside of the model. It is also a situation in which technological progress is treated endogenously rather than exogenously.

Endogenous growth model is concerned with the question of why the rich countries get richer and why the supply of capital does not flow from the rich to the poor countries. These questions came as a result of the neoclassical prediction of convergence of income per capita between rich and poor countries. It is also concerned with the removal of the assumption of diminishing returns to capital by considering technology as endogenous (Pentecost, 2000). With endogenous growth model, if productivity is to increase, labor force, physical and human capitals as well as knowledge (technology) must be available. Thus, endogenous growth model implies that growth is achieved by the accumulation of factors of production, while accumulation in turn is a result of investment in the private sector, (Sjoberg, 2003).

Given these models of growth, this study adopts the neo-classical growth model, since it assumes that growth is brought about by increase in factors such as capital (investment) and labor supply, an assumption that coincides with that of this study.

3.5 Evidence from Empirical Literature

Economic theory has shown that government spending may either benefit or harm economic growth. In the traditional Keynesian macroeconomics, public expenditure on investment can contribute positively to economic growth, through multiplier effects on aggregate demand. On

the other hand, government expenditure on consumption goods and services crowds out private investment, diminishes economic incentive in the short run and reduces capital accumulation in the long run, (Kweka and Morrissey, 2000). With this view, attempt is made to explore some empirical evidence regarding the effects of government expenditures on economic growth giving particular attention to the findings of the literature reviewed.

Ram (1986) used a sample of 115 countries and found that government expenditure component, that is, consumption expenditure has significant positive effect on economic growth, particularly in developing countries but total spending has a negative impact. Similarly, Lin (1994) used a sample of 62 countries from 1960-1985 and found that non-productive expenditure, that is, expenditure on consumption has no effect on economic growth in advanced countries, but positive impact in LDCs. However, some empirical literature found negative impact of government consumption expenditure on economic growth. For examples, Barro (1991), Ghura (1995), Jong-Wha (1995), and Guseh (1997) produced evidence that pointed to a negative relationship between government consumption expenditure and economic growth and therefore, recommended that increasing such non-productive spending is likely to inhibit the growth rate of an economy.

Otani and Delano (1990) studied the determinants of growth in LDCs. They grouped all countries in their sample according to the income levels. Their model incorporated consumption spending, export, population growth, etc. The results showed that consumption expenditure and population growth have negative impacts while export has positive impact on growth.

Baum and Lin (1993) used cross-sectional data to estimate the effects of government's education, defense and welfare expenditures on economic growth in 58 countries. The findings showed that the growth rate of education expenditure has a positive impact; welfare expenditure growth has insignificant negative impact and defense expenditure growth was insignificant for all 58 countries but significant impact for a subset of 47 countries.

Hsieh and Lai, (1994) also examine the relationship between growth rate of per capita real GDP and government spending. The findings showed that the relationship between government spending and economic growth varies significantly across time and countries that have the same growth pattern. Most importantly, the results show that there is no consistent evidence that government spending either increases or decreases per capita output growth. Thus, the results suggest the need to carry out more empirical research to establish the actual link between government expenditure and economic growth. This study was based on data from the G-7 countries. Similarly, Ghali (1997) investigated the relationship between growth and government spending using time series data with particular attention given to causal effects. He likewise found no consistent evidence that government expenditure either negatively or positively affects economic growth. The flow of causality seems to be running from output growth to government spending. An important implication of his study for policy purpose in Saudi Arabia is that, the Saudi Government can reduce its deficit by limiting its expenditure in the economy.

Sinha (1998) used modern time series method to study the relationship between government expenditure and economic growth in Malaysia using Penn World Table annual time series data for the period 1950-1992. First, using co-integration technique, the study found a long run

relationship between economic growth and public expenditure. Second, using Granger causality, the study found no evidence that government expenditure contributes to GDP growth.

Kweka and Morrissey (2000) also investigated the impact of government expenditure on economic growth in Tanzania using time series. They disaggregated total government spending into expenditures on physical investment, consumption spending and human capital investment. According to the findings, expenditure on physical investment has significant negative impact. Consumption expenditure appears to influence economic growth positively, particularly an increase in private consumption. Expenditure on human capital investment was insignificant. They also found that aid significantly increases economic growth given the reform in the mid 1980s in Tanzania. In a similar manner, Sjoberg (2003) also investigated the relationship between government expenditure and economic growth in Sweden using time series data from 1960-2001. He also disaggregated total expenditure into consumption, Investment and transfer. The result met a priori expectations; however, the finding revealed that too much expenditure by Sweden might inhibit economic growth, probably as a result of crowding out of private investment.

A study by Bose et al, (2003) examines the effect of government expenditure on growth using panel data for 30 LDCs. The results indicated that government capital expenditure is positively related to economic growth but current account expenditure is insignificant.

Doessel and Valadkhani (2003) adapt the Ram's two-sector model to analyze the impact of government expenditure on economic growth in Fiji, using time series data for the period,

1964-1999. First, they found that government consumption expenditure exerts a strong beneficial externality on economic growth in the private sector. Second, the results showed that, productivity in the public sector is lower than that in the private sector. The policy implication is that, shifting factors of production from the public sector with low productivity to the private sector with high productivity, the rate of growth will rise.

Le and Suruga (2005) used panel data from 105 developed and developing countries for the period 1970-2001. They, among other variables, examined the impact of Foreign Direct Investment (FDI) on economic growths in those countries. Their results show that FDI is positively related to economic growth, but the impact is stronger at early stage of development than at advanced stage.

Makhema (2006) estimated the impact of public expenditure on economic growth in Lesotho using aggregate government expenditure. The results indicated that, total government spending and population growth are negatively related to the growth rate of the economy of Lesotho.

M'Amanja and Morrissey (2006) included imports as determinant of growth in Kenya. Their results showed that imports are positively related to economic growth. This is due to the fact that imports in Kenya largely provided capital goods for production purposes. Similarly, Ozdeser and Ozyigit (2007) analyzed the role of foreign trade in economic growth in Northern Cyprus for the period 1985-2005 using time series data. The results show that total government expenditure was excessively inefficient in the economy. The results also showed that, there is a significant positive relationship between the volume of trade (both exports and imports) and economic

growth in Northern Cyprus. The policy implication is that maintaining a high level of economic growth in Northern Cyprus requires improved trade policy rather than government expenditure policy.

Lamartina and Zaghini (2008) used a panel co-integration analysis of government expenditures and economic growth in 23 OECD countries. The empirical evidence provides indication of a positive correlation between total public spending and per-capita GDP, which is consistent with Wagner's law. The results further showed a long-run elasticity greater than one, which suggests that an increase in government activities is preferred to private sector economic activity. Additionally, the findings indicated that the relationship between expenditure and growth is usually higher in countries with lower per capita GDP than economies at a more advanced stage of development.

Finally, Alexiou (2009) also provided econometric evidence on the relationship between economic growth and government spending. He applied two different panel data methods to seven transition economies in South Eastern Europe (SEE). The evidence generated indicated that government spending on capital formation, development assistance, private investment and trade-openness, all have positive and significant effect on economic growth. Population growth in contrast, was found to be statistically insignificant. The policy implication is that each concerned government in South Eastern Europe can nurture spending on capital formation, private investment spending, and trade to promote economic growth.

3.6 Conclusion

This chapter reviewed literature on government expenditure and economic growth. The literature review includes both theoretical and empirical evidences. In the theoretical literature, theories of public expenditure growth and models of economic growth are presented. In the empirical literature, findings on the relationship between government spending and economic growth are reviewed.

Firstly, most empirical literature reviewed showed that, total government expenditure appears to have negative impact on economic growth.

Secondly, evidences from empirical literature reviewed indicated that there is no consistent evidence of the effect of public spending on growth in a positive or negative direction. Results differ by country, region, and method of analysis employed and categorization of government expenditure. Further there is no agreement regarding the direction of causality between public expenditure and economic growth, implying a potential endogeneity problem, (Kweka and Morrissey, 2000).

Thirdly, it is also observed that most empirical literature on government expenditure and growth involve cross-sectional analyses and time series studies on individual countries are rare, and applying time series methodology for specific countries can avoid some of the econometric and sampling problems associated with cross-sectional studies. For example, cross-sectional studies assume that coefficients are the same for all countries in the sample, whereas time series analyses address specific country problems of a sample, (Kweka and Morrissey, 2000).

Finally, most literature reviewed indicated that, government consumption expenditure is negatively related to economic growth while investment expenditure has positive impact on economic growth.

CHAPTER FOUR

METHODS AND PROCEDURES

4.1 Introduction

This chapter outlines the methodology used in this study. It presents the theoretical and empirical models, the justification of the model and the choice of variables that are used in this study followed by the sources and type of data. It concludes with the diagnostic analyses to be applied to data of the study.

4.2 The Model

4.2.1 The Theoretical Model or Framework

The Theoretical model of this study follows Baum and Lin (1993) as it employs the neoclassical aggregate production function based on the constant return to scale growth assumption. The theoretical model incorporates labor supply, capital stock and government expenditure as its arguments. Ashauer (1989) also used similar aggregate production function with labor supply, capital and total government expenditure as its independent variables. The theoretical model of this study can be written as:

$$Y = f(L, K) \quad \text{.....} \quad \textbf{(4.1)}$$

Where, Y is real aggregate output, L is labor force, K is capital stock in the economy. The government-augmented aggregate production function is given by

$$Y = f(L, K, G) \quad \text{.....} \quad \textbf{(4.2)}$$

Where, G is government spending which may be disaggregated in the empirical model. Government expenditure is incorporated in the model because it augments and enhances other

factors of production. For instance, government expenditures on infrastructures (roads), education, health etc. may enhance labor supply and capital. Dividing both sides of equation (4.2) by L and setting $\frac{Y}{L} = y; \frac{K}{L} = k \; and \; \frac{G}{L} = g$, the following expression can be obtained for y.

$$y = f\left(1, \frac{K}{L}, \frac{G}{L}\right) = f(k, g) \quad \text{..... (4.3).}$$

Totally differentiating equation (4.3), with respect to time, yields equation (4.4) below:

$$dy/dt = \frac{f_1(LdK - KdL)}{L^2} + \frac{f_2(LdG - GdL)}{L^2} \quad \text{..... (4.4).}$$

Dividing both sides of equation (4.4) by $y = \frac{Y}{L}$ yields equation (4.5) which relates the growth rate of output per worker to the ratio of investment to output and growths of labor and government expenditure:

$$\frac{dy/dt}{y} = f_1(dK/Y) - f_1(K/Y)(dL/L) + f_2(dG/Y) - f_2(G/Y)(dL/L)$$

$$= f_1(dK/Y) + f_2(dG/Y) - [f_1(K/Y) + f_2(G/Y)]dL/L$$

$$= f_1(dK/Y) + f_2(G/Y)(dG/G) - [f_1(K/Y) + f_2(G/Y)]dL/L \quad \text{..... (4.5).}$$

From equation (4.5), setting $(dy/y) = \dot{y}$; $f_1 = \beta_1$; $(dK/Y) = (I/Y)$; $f_2(G/Y) = \beta_2$; $(dG/G) = \dot{G}$; $-[f_1(K/Y) + f_2(G/Y)] = \beta_3$; and $(dL/L) = \dot{L}$, we can rewrite equation (4.5) as

$$\dot{y} = \beta_1(I/Y) + \beta_2\dot{G} + \beta_3\dot{L} \quad \text{..... (4.6)}$$

where $\dot{y}$ is the growth rate of real per capita output, (I/Y) is the ratio of investment to output, $\dot{G}$ is the growth rate of government expenditure which may be disaggregated into government consumption and total investment expenditures, $\dot{L}$ is labor force growth and β_i are the parametric coefficients to be estimated. Note that dy, dL and dG are the derivatives of the respective variables with respect to time. Equation (4.6), which is quite similar to the one used by Baum and Lin (1993), is the equation of choice for estimation in this study. Kormendi and

Mcguire's (1985) specification which includes growth rates of shares of GDP is also similar to equation (4.6).

4.2.2 Empirical Model

Based on the theoretical model in equation (4.6), this study estimates equation (4.7). Though, equation (4.6) lack the intercept, the empirical model includes it to avoid the problem associated with suppressing the intercept. The empirical model is given by:

$$RGDPPCG_t = \beta_o + \beta_1 GFCExG_t + \beta_2 GCFG_t + \beta_3 IMPG_t + \beta_4 PGR_t + \beta_5 APCG_t + \beta_6 NFDIG_t + \beta_7 EXPG_t + \beta_8 HHCExG_t + \beta_9 DRCh + \beta_{10} DWar + \mu_t \quad \ldots\ldots \textbf{(4.7).}$$

Table 4.1 summarizes the variables, their definitions and sources. However, section 4.2.5 gives detailed descriptions and choice of each variable and section 4.3 outlines, in detail, sources and type of data as well as the websites from which the data were obtained.

Table 4.1: Variables, Definitions and Sources of Data

Variable	**Definition**	**Sources of Data**
RGDPPCG	Real GDP Per Capita Growth (Proxy for Economic Growth)	Penn World Table (PWT)
GFCExG	Government Final Consumption Expenditure Growth	UN National Accounts Database
GCFG	Gross Capital Formation Growth (Proxy for Total Domestic Investment Growth)	UN National Accounts Database
IMPG	Import Growth	UN National Accounts Database
EXPG	Export Growth	UN National Accounts Database
HHCExG	Household Consumption Expenditure Growth (Proxy for Private Consumption Expenditure Growth)	UN National Accounts Database
APCG	Aid Per Capita Growth	Earth-Trend database
NFDIG	Net Foreign Direct Investment Growth	Earth-Trend database
PGR	Population Growth Rate (Proxy for Labor Force Growth)	World Development Indicators (WDI)
DRCh	Dummy Variable for Regime Change	-
DWar	Dummy Variable for Political Instability (War)	-

Note, $DRCh\ and\ DWar$ are dummy variables for regime change and war (political instability) respectively, where $DRCh$ equals "1" for 1980-1989, the Doe's era and "0" elsewhere; $DWar$ equals "1" for 1990-2007[2], the era of political instability, and "0" elsewhere, and these dummies are introduced to capture the effect of structural break in the model, if there is any. μ_t is the disturbance term, which is assumed to be IID and β_i are the coefficients to be estimated.

4.2.3 Econometric Techniques

To achieve the objectives of this study, the empirical model is estimated using a simple Ordinary Least Square (OLS) method to analyze the economic growth effects of government consumption and total investment expenditure growths in Liberia. Eviews 3.1 was used for the analysis.

4.2.4 Justification of the model

The neoclassical growth model is widely used because it is straightforward in identifying key determinant of long term growth. However, one of the most important contributions of this model is that it stimulates empirical work and strengthens predictive and explanatory power of regression, (M'Amanja and Morrissey, 2006).

4.2.5 Choice of Variables

Real GDP per capita growth rate (RGDPPCG): is used in this study as a proxy for economic growth since it reflects productivity level within a domestic economy (Makhema, 2006). This fact is also buttressed by (Baum and Lin, 1993) who used per capita real GDP growth as a proxy for economic growth.

[2] The war actually ended 2003 but since some of the effects such as robberies etc lasted up to 2007, the dummy variable (DWar) is introduced for the period 1990-2007.

Government final consumption expenditure Growth (GFCExG): there is a lot of debate in economic literature about the effect of government consumption expenditure on economic growth. Folster and Henrekson (1998), for example, found that government consumption or recurrent expenditure has negative impact on economic growth. On the other hand, Kweka and Morrissey (2000), found positive impact. However, both economic theory and large number of empirical literature have shown that, government consumption expenditure is likely to inhibit economic growth and based on the fact that the Liberian government consumption expenditure accounts for larger proportion of its spending, it is imperative to include this variable in the model to access its impact on the growth rate of the Liberian economy. Thus, the sign of government final consumption expenditure is expected to be negative.

Aid per capita growth (APCG): Following M'Amanja and Morrissey (2006), a factor which closely support investment and hence economic growth is foreign aid. This variable relaxes three constraints to investment: saving, foreign exchange and fiscal constraints. Saving constraint arises (especially in LDCs) if domestic savings are insufficient to meet public investment target. Aid relaxes that constraint. Foreign exchange constraint arises because, investment requires imported capital goods. If foreign exchange from export earnings is insufficient to settle the importation of capital goods for investment, aid in the form of foreign exchange may alleviate that constraint. Fiscal constraint relates to the situation in which government behavior negatively affects private savings and where public spending crowds out private investment. Aid, when used to finance public investment eliminates the need by government to borrow from the central bank to finance its expenditure, thus, easing the rise in interest rate which may otherwise constrain private sector investment. Since aid significantly contributes to investment, it justifies

the basis for its inclusion into the model. Foreign aid per capita growth is therefore expected to affect economic growth in this study positively.

Imports Growth (IMPG): may represent imported technology, capital, and intermediate goods and services which, to some extent, are used for investment purposes, (M'Amanja and Morrissey 2006), in which case, it influences growth positively. But, importations also raise the demand for foreign exchange and a higher demand for foreign currencies leads to the depreciation of the domestic currency. If, the real or productive sector of the domestic economy is dormant, as in the case of Liberia during the latter part of the period under study, [Liberia is net importer as trade balances in war years through 2009 are negatives, (Central Bank Annual Reports, 2003-2009)], economic growth may fall as imports rise. Thus, in this study, import is expected to impact economic growth adversely.

Exports Growth (EXPG): literature on trade and growth tends to focus on exports, (M'Amanja and Morrissey 2006). This is because export earnings enhance the productive capacity of the economy through investment. Therefore, including exports in the model of this study is a necessity and is expected to affect economic growth positively.

Gross Capital Formation Growth (GCFG)/Net Foreign Direct Investment Growth (NFDIG): Gross capital formation growth which is used as the proxy for total domestic investment growth and foreign direct investment growth are included in the model of this study because they directly increase the productive capacity of any ideal economy, holding all other factors constant. They are therefore expected to impact economic growth rate in this study positively. Total

investment (instead of private and government investments) is used because data on each component could not be obtained, due to their unavailability. However, the study by Makhema (2006), in Lesotho, also used gross capital formation as a proxy for total investment in place of private and government investments.

Population growth rate (PGR): in the aggregate production function as in equation (4.1) labor force is one of the major determinants of output and hence economic growth, thus, it is included as one of the determinants of economic growth in this current study. However, in the literature of government expenditure and economic growth, population growth rate has been used as a proxy for labor force growth as in the case of (Makhema, 2006) and since available data on labor force in Liberia is somehow incomplete, population growth rate is used as a proxy for labor force growth and it is expected to improve economic growth in this study.

*Household consumption expenditure growth (HHCExG)**:*** in the literature of government expenditure and economic growth, private consumption expenditure has been found to affect growth positively, as in the study by Kweka and Morrissey (2000). Thus, as a determinant of economic growth, private consumption, used as a proxy for household consumption, is included and it is expected to affect growth in this study positively.

DRCh/DWar: These dummies are introduced to capture the effects (if there are any) of regime change from Tolbert's to the Doe's era and political instability in Liberia respectively. It should be remembered that the period under study is characterized by five distinct eras. The last years of President William V.S. Tubman era (1970-1971), the era of President William R. Tolbert Jr.

(1971-1979), the era of President Samuel K. Doe (1980-1989), the war years of political instability (1990-2003) as well as the beginning of the new political dispensation of President Ellen Johnson-Sirleaf, (2006-2007)[3]. However, to simplify matters for the purpose of the study, three periods will be considered, the eras of presidents Tolbert and Doe as well as the war years. To capture the effects of these three periods, two dummy variables will be introduced for the Doe's era and the war years. The Tolbert's era is the benchmark or reference category to avoid a dummy variable trap or perfect multicollinearity. Since, most of the effects of the civil war such as arm robberies, diseases etc lasted up to 2007; the dummy variable *DWar* will capture the effect of war for the period 1990-2007.

4.3 Data Type and Sources

This study used secondary annual time series data for Liberia covering the period: 1970 – 2007. Data were obtained from the following sources: Penn World Table Annual Time Series Database, Earth-Trend Searchable Database, World Development Indicators (WDI) Online Database and National Accounts Main Aggregates Database of the United Nations Statistics Division. Data on the growth rates of household consumption expenditure, government final consumption expenditure, gross capital formation, Exports and Imports are obtained from the National Accounts Main Aggregate Database, United Nations Statistics Division at http://unstats.un.org/unsd/snaama/selbasicFast.asp. Data on aid per capita and foreign direct investment are obtained from Earth-Trend at http://earthtrend.wri.org. Data on Population growth rate are also obtained from World Development Indicators, WDI at http://ddp-ext.worldbank.org/ext/DDPQQ/member.do?method=getMembers&userid=1&queryId=135.

[3] The period from mid 2003 to the end of 2005 is transitional period which for the purpose of the study are considered part of the instability period.

Finally, data on real GDP per capita growth are obtained from the Penn World Table Annual Time Series Database at http://pwt.econ.upenn.edu. Data from National Accounts Main Aggregates Database and Earth-Trend used 1990 constant prices while data from Penn World Table used 2005 as base year.

4.4 Diagnostic Analyses

The data used in the regression analysis of this study are time series data. Thus, major diagnostic tests associated with time series analysis are conducted. The diagnostic analyses carried out include the ADF test of unit root, Granger's causality test for simultaneity bias, Ramsey's RESET test for specification errors and Chow test of parameter stability. Also, other familiar tests associated with time series analysis such as test for autocorrelation, normality of residuals etc. are conducted. However, the detail mathematical procedures involving Granger causality test, Ramsey's RESET test and Chow test of parameter stability are given in the appendix to avoid disruptions of smooth reading.

CHAPTER FIVE

EMPIRICAL RESULTS

5.1 Introduction

This Chapter presents the empirical estimation and analysis of results of the study. It first presents the summary statistics of the variables used in the model followed by the diagnostic or econometric tests conducted on the characteristics of time series in the study. The chapter next presents the estimation of single equation model by the Ordinary Least Square (OLS) technique and finally, the analysis, discussion and interpretation of empirical results are presented.

5.2 Summary Statistics

It is important to examine the distribution of each time series in a given model. This is achieved through the use of descriptive statistics, particularly the use of the Jacque-Bera statistic. It involves testing the null hypothesis that the time series is normally distributed. If the probability value of the Jacque-Bera statistic is close to zero, that is, the Jacque-Bera statistic itself is high; one can reject the null hypothesis of normality. On the hand, if the probability is reasonably high, say above 10 percent, meaning that the Jacque-Bera statistic itself is very low, then we fail to reject the null hypothesis that the time series in question is normally distributed. Table 5.1 shows the summary or descriptive statistics of the variables in the study.

Table 5.1: Summary or Descriptive Statistics

	APCG	EXPG	GCFG	GFCExG	HHCExG	IMPG	NFDIG	PGR	RGDPPCG
Mean	16.5983	1.5514	2.8108	1.3027	2.783784	4.035135	280.0313	2.51703	-1.658331
Median	7.6035	-2.3000	-4.000	3.1000	0.800000	0.10000	-44.412	2.83000	1.963260
Max	147.80	172.40	101.70	101.50	101.6000	199.700	13192.9	9.09000	88.72808
Min	-59.588	-73.500	-59.40	-64.900	-59.2000	-58.600	-2971.7	-4.0000	-62.36665
Std Dev	45.350	36.532	30.353	27.113	26.87616	41.2403	2244.04	3.02098	22.32126
Skewness	0.8787	2.5248	0.8709	0.7302	1.110380	2.93575	5.27621	-0.1982	1.060597
Kurtosis	3.6708	14.605	4.4679	7.3077	7.053839	15.0015	31.4279	3.28833	9.711475
Jacque-Bera	5.4550	246.92	8.0002	31.896	32.93831	275.205	1417.56	0.37034	76.37935
Probability	0.0653	0.0000	0.0183	0.00000	0.000000	0.00000	0.00000	0.8310	0.000000
Observation	37	37	37	37	37	37	37	37	37

From the summary statistics in table 5.1, population growth (PGR) appears to be normally distributed, the rest are not.

5.3 Granger Causality

Granger causality test is a common method of investigating causal relationship, by estimating an equation in which Y is regressed on k lagged values of Y and k lagged values of additional variable X. We can evaluate the null hypothesis that X does not Granger cause Y (Hood III et al, 2008) as in equations (A.1) and (A.2) in the appendix. If one or more of the lagged values of X are significant, we can reject the null hypothesis. However, the practical aspect of Granger causality test involves trial and error in which the estimations of equations such as (A.1) and (A.2) are carried out several times with different lag length at each time. All estimations are compared and on the basis of the Akaike and Schwarz information criteria, the optimum lag

length is chosen. That is, the lag length of the estimation with the minimum information criteria is chosen as the optimum lag length. In this study, this procedure was followed and the maximum lag length of four was chosen. Table 5.2 summarizes the results of the pair-wise Granger causality test conducted between real per capita GDP growth and the growth of government expenditure.

Table 5.2: Pair-wise Granger Causality Test Results

Null Hypothesis	**F-Statistic**	**Probability**
GCFG does not Granger Cause RGDPPCG	0.60845	0.66045
RGDPPCG does not Granger Cause GCFG	0.46384	0.76155
GFCExG does not Granger Cause RGDPPCG	1.01040	0.42169
RGDPPCG does not Granger Cause GFCExG	0.74637	0.57001
GFCExG does not Granger Cause GCFG	0.27954	0.88830
GCFG does not Granger Cause GFCExG	1.06879	0.39360

The test results in table 5.2 involve gross capital formation growth (GCFG) which is used as a proxy for total domestic investment, Real GDP per capita growth (RGDPPCG) used as a proxy for economic growth and government final consumption expenditure growth (GFCExG). The low F-statistics and high probability values show that none of the test statistics is significant even at 10%, thus we do not reject any of the null hypotheses. This leads to the conclusion that neither real per capita GDP growth nor government expenditure Granger causes each other, thus, leading to no simultaneous bias in the model.

5.4 Test for Structural Break (Chow Test of Parameter Stability)

The procedures for this test are described in detail in the appendix. However, the practical application of the test to time series in this study involves dividing the study period into three as indicated below and estimating equation (4.7) for each period but leaving out the dummy variables. This is because, if this test result shows that there is indeed structural break, then, those dummy variables can be introduced to capture the effects of such structural break. The interest in the below estimations is not the coefficients but to obtain the values for the residuals sum square (RSS), and number of observations (N) for each equation. These values will be used in the F-test for the structural break. For all three estimations the number of parameters estimated (k) is constant. It should be noted that, the choice to divide the study period into three is based on the three major eras of concern as outlined in chapter four section 4.2.5 (particularly where the inclusions of the dummy variables, *DRCh* and *DWar*, are justified).

1970-1979: RGDPPCG = 51.95 + 0.05*APCG + 0.29*EXPG - 0.07*GCFG + 0.61*GFCEXG + 0.34*HHCEXG - 0.28*IMPG + 0.003*NFDIG - 19.7*PGR … **(5.1)**

$RSS_{(5.1)}$ = 1.87E-23; k =9; $N_{(5.1)}$ =10

1980-1989: RGDPPCG = 4.80 + 0.48*APCG - 0.73*EXPG + 0.12*GCFG - 0.23*GFCEXG + 0.44*HHCEXG - 0.71*IMPG - 0.014*NFDIG - 5.9*PGR…… **(5.2)**

$RSS_{(5.2)}$ = 51.61686; k = 9; $N_{(5.2)}$ = 10

1990-2007: RGDPPCG = -1.2 - 0.01*APCG + 0.31*EXPG + 0.04*GCFG + 0.25*GFCEXG + 0.85*HHCEXG - 0.38*IMPG + 0.001*NFDIG - 1.13*PGR…..**(5.3)**

$RSS_{(5.3)}$ = 312.2996; k = 9; $N_{(5.3)}$ = 18

At this point, after the estimations for the three time periods above, equation (4.7) is again estimated for the entire study period, that is, 1970-2007, with the assumption that there is no structural break, implying that the corresponding parameters in equations (5.1), (5.2), (5.3) and (5.4) are the same.

1970-2007: RGDPPCG = -1.6 - 0.02*APCG + 0.32*EXPG + 0.09*GCFG + 0.24*GFCEXG + 0.76*HHCEXG - 0.39*IMPG + 0.001*NFDIG - 0.57*PGR….. **(5.4)**
$RSS_{(5.4)}$ = 679.7099; k = 9; $N_{(5.4)}$ = 38

The subscripts for RSS and N indicate the equation number. For example, the residuals sum square for equation (5.1) is denoted by $RSS_{(5.1)}$ and so on.

To run the F-test, $RSS_{(5.4)}$ is the restricted residuals sum square (RSS_R) because equation (5.4) imposes a restriction that there is no structural break in the entire period of the time series. $RSS_{(5.1)}$, $RSS_{(5.2)}$ and $RSS_{(5.3)}$ are added to obtain the unrestricted residuals sum square (RSS_{UR}). The F-test can be run as follows: $F = \frac{(RSS_R - RSS_{UR})/k}{(RSS_{UR})/[N_{(5.1)} + N_{(5.2)} + N_{(5.3)} - 3k]}$. ……**(5.5)**

Note, in equation (5.5), k = 9 is the numerator degree of freedom and $[N_{(5.1)} + N_{(5.2)} + N_{(5.3)} - 3k]$ = 11 is the denominator degree of freedom. Thus, substituting these values in equation (5.5), the F value of 1.061 is obtained. From the F table (at 9 numerator and 11 denominator degrees of freedom), the critical values at 10%, 5% and 1% respectively are 2.27, 2.90 and 4.63. The conclusion from this result is that, since the computed F value (1.061) is not greater than the critical F value even at 10% we fail to reject the null hypothesis of "no structural break" and conclude that the time series used in this study are freed of structural break and there is no need for those dummy variables. Thus, hereafter all estimations involving equation (4.7) will be done without the dummy variables.

5.5 Unit Root Analysis

In a time series analysis, the use of Ordinary Least Square method to estimate the relationship between non-stationary time series, that is, series containing unit roots may result into a spurious

regression. However, if each of the time series is an I(1), non-stationary, process and the residuals from their estimation is I(0), the regression is non-spurious and the time series are said to be co-integrated. That is, there exists a long run equilibrium relationship between such macroeconomic time series. On the other hand, the estimation of time series which are all stationary in their levels is used to determine short run impacts. However, in this study all the time series variables are growth rates which are supposed to be I(0) or stationary processes. To confirm theory the Augmented Dickey-Fuller (ADF) test is used to test for stationarity in each series to avoid spurious regression. Table 5.3 gives the results of the ADF tests.

Table 5.3: Results of ADF Tests of Unit Root

Variable	**ADF Test Stat**	**Critical Value**	**Ho: there is unit root**	**Order of Integration**
Aid Per Capita Growth	-4.235974	-3.6289*	Reject	I(0)
Export Growth	-4.441970	-3.6289*	Reject	I(0)
Government Consumption Expenditure Growth	-2.704324	-2.6118***	Reject	I(0)
Gross Capital Formation Growth	-3.122751	-2.9472**	Reject	I(0)
Household Consumption Expenditure Growth	-2.394416	-2.6118***	Fail to reject	I(1)
Import Growth	-3.002101	-2.9472**	Reject	I(0)
Net Foreign Direct Investment Growth	-4.131146	-3.6289*	Reject	I(0)
Population Growth	-2.316976	-2.6148***	Fail to reject	I(1)
Real GDP Per Capita Growth	-2.850998	-2.6118***	Reject	I(0)

* 1 percent level; ** 5 percent level; ***10 percent level

The results in table 5.3 fail to confirm the theory that all growth-rate variables are stationary in their levels. And it can be recalled that if a time series variable X_t is integrated of order I(0) and another time series variable Y_t is integrated of order I(1), then, their linear combination $Z_t = (X_t + Y_t)$ is integrated of order I(1), (Gujarati, 2003). Therefore, these time series were

differenced once, after which each became highly stationary at one percent. The Akaike and Schwarz information criteria were used to determine the optimum lag length for each variable in the ADF test. All variables turn out to have the optimum lag length of one, except population growth (PGR) which has the optimum length of three.

5.6 Co-integration Test

Co-integration analysis is carried out to test for the existence of a long run relationship between the dependent and the independent variables. The Johansen Maximum Likelihood estimates are used to test for co-integration between several variables at a time. In this test, if the likelihood estimates are greater than the critical values, then the variables are co-integrated or there is a long run equilibrium relationship between them. On the other hand, if the likelihood estimates are less than the critical values then we rule out co-integration between the variables. Table 5.4 shows the co-integration test results. From the co-integration test results, the likelihood ratio (L.R.) test statistics indicate six co-integrating equations at five percent level of significance.

Table 5.4: Co-integration Test Results

Eigen Value	**Likelihood Ratio**	**5 Percent Critical Value**	**1 Percent Critical Value**	**Hypothesized No. of CEs**
0.950370	347.0436	192.89	205.95	None **
0.858641	241.9331	156.00	168.36	At most 1 **
0.752953	173.4572	124.24	133.57	At most 2 **
0.703781	124.5210	94.15	103.18	At most 3 **
0.588397	81.93810	68.52	76.07	At most 4 **
0.491275	50.86877	47.21	54.46	At most 5 *
0.388734	27.21408	29.68	35.65	At most 6
0.164772	9.986279	15.41	20.04	At most 7
0.099920	3.684490	3.76	6.65	At most 8

**(**) denotes rejection of the null hypothesis at 5 percent (1 percent) significant level*

5.7 Correlation Analysis

To avoid high degree of multi-correlinearity or high correlation between independent variables, a correlation analysis was conducted and table 5.5 summarizes the results of the analysis.

Table 5.5: Correlation Analysis

	APCG	**EXPG**	**GCFG**	**GFCEXG**	**HHCEXG**	**IMPG**	**NFDIG**	**PGR**
RGDPPCG	-0.35054	0.70866	0.63138	0.89153	0.89069	0.69076	-0.25012	0.67087
APCG		-0.27031	0.07380	-0.21567	-0.32799	-0.22838	0.31443	-0.04153
EXPG			0.59830	0.71131	0.57376	0.81331	0.05349	0.42415
GCFG				0.58386	0.61119	0.69998	0.14717	0.58903
GFCEXG					0.53340	0.75136	-0.37966	0.59142
HHCEXG						0.79761	-0.21410	0.53833
IMPG							0.03538	0.57095
NFDIG								-0.03957

In table 5.5, there is a very high positive correlation between export and import growths. This is shown by the correlation coefficient of 0.813 suggesting that one of the variables had to be dropped. However, since the correlation coefficient between export growth and the dependent variable is higher than that between import growth and the dependent variable, export growth was maintained, while import growth was dropped.

5.8 Error Correction Model (ECM)

An ECM identifies a long run equilibrium relationship between macroeconomic variables. It adjusts for disequilibrium between short and long run macroeconomic time series (Gujarati,

2003). To specify the ECM, after dropping import growth, a general to specific model is used and the over-parameterized model comprises the first difference of each variable and its first and second lags. The notation (1st diff.) before each variable name indicates that the variable has been differenced once. Table 5.6 shows the results of the over-parameterized model.

Table 5.6: Results of the Over-parameterized Model

Dependent Variable: FDRGDPPCG

Variable	**Coefficient**	**t-Statistic**	**Prob.**
Constant	1.2153	0.8853	0.3990
1st diff. Real GDP Per Capita Growth, lagged one pd	0.9857	2.0724	0.0681
1st diff. Real GDP Per Capita Growth, lagged two pd	0.5598	1.6477	0.1338
1st diff. Aid Per Capita Growth	-0.1105	-1.5374	0.1586
1st diff. Aid Per Capita Growth, lagged one pd	-0.0401	-0.5148	0.6191
1st diff. Aid Per Capita Growth, lagged two pd	-0.0900	-1.1926	0.2635
1st diff. Export Growth	0.1530	1.8214	0.1019
1st diff. Export Growth, lagged one pd	0.0273	0.2824	0.7840
1st diff. Export Growth, lagged two pd	0.0080	0.1010	0.9217
1st diff. Gross Capital Formation Growth	0.0098	0.0905	0.9299
1st diff. Gross Capital Formation Growth, lagged one pd	0.0864	0.8557	0.4144
1st diff. Gross Capital Formation Growth, lagged two pd	-0.0130	-0.1134	0.9122
1st diff. Govt. Consumption Exp. growth	0.0567	0.2602	0.8006
1st diff. Govt. Consumption Exp. Growth, lagged one pd	-0.6908	-2.0857	0.0666
1st diff. Govt. Consumption Exp. Growth, lagged two pd	-0.4767	-1.6952	0.1243
1st diff. HH Consumption Exp. Growth	0.4871	2.0276	0.0732
1st diff. HH Consumption Exp. Growth, lagged one pd	-0.5036	-1.5359	0.1589
1st diff. HH Consumption Exp. Growth, lagged two pd	-0.3095	-1.3656	0.2052
1st diff. Net Foreign Direct Investment Growth	-0.0007	-0.6133	0.5549
1st diff. Net Foreign Direct Inv. Growth, lagged one pd	-0.0005	-0.3372	0.7437
1st diff. Net Foreign Direct Inv. Growth, lagged two pd	0.0005	0.3194	0.7567
1st diff. Population Growth	-20.717	-2.5044	0.0336
1st diff. Population Growth, lagged one pd	38.8010	2.2896	0.0478
1st diff. Population Growth, lagged two pd	-19.0724	-2.0239	0.0737
Error Correction Term, lagged one pd (ECM_1)	-2.5201	-4.2586	0.0021
R^2:	0.982	**AIC:**	7.381
Adjusted R^2:	0.934	**SIC:**	8.103
DW stat:	1.530	**F-stat(Prob.):**	20.32 (0.000)

1st diff. = first difference
pd = period
Exp= expenditure
Govt. = government
AIC = Akaike Information Criterion
SIC = Schwartz Information Criterion
DW stat= Durbin-Watson statistic
HH = Household
Inv. = Investment
F-stat = F statistic

The results of the over-parameterized model, generated by Eviews 3.1 using OLS, indicate that the data fit the model very well, as the independent variables (together) explain 98 percent of the variation in the dependent variable as indicated by the R-Squared value of 0.982. Further the F-value of 20.32, with the probability of 0.000, shows that all the coefficients combined are highly statistically significant at one percent. However, individually, most of the variables and their lags are statistically insignificant and cannot be interpreted meaningfully.

Therefore, removing the insignificant variables, one at a time, the following parsimonious model turns out to be the best. In the parsimonious model, the independent variables, together, explain 93.5 percent of the variation in the dependent variable, as evident by the R-Squared value of 0.935. The F-Statistic of 48.86 is highly significant at one percent indicating once more that the combined coefficients are statistically different from zero. Table 5.7 summarizes the results of the parsimonious model. However, the complete (unedited) Eviews results of the Parsimonious and over-parameterized models are posted in the Appendix (as Appendices 1 and 2).

Table 5.7: Results of the Parsimonious Model

Dependent Variable: FDRGDPPCG

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
Constant	0.1698	1.3549	0.1253	0.9012
1st diff. Aid Per Capita Growth	-0.0717	0.0303	-2.3703	0.0252
1st diff. Export Growth	0.0882	0.0478	1.8447	0.0761
1st diff. Gross Capital Formation Growth	0.0448	0.0661	0.6778	0.5036
1st diff. Govt. Final Consumption Exp. growth	0.3248	0.1270	2.5583	0.0164
1st diff. Household Consumption Exp. Growth	0.3753	0.0701	5.3556	0.0000
1st diff. Net Foreign Direct Investment Growth	0.0002	0.0008	0.2940	0.7710
1st diff. Population Growth	0.0105	1.1833	0.0089	0.9930
Error Correction Term, lagged one pd (ECM_1)	-1.3145	0.1929	-6.8141	0.0000
R2:	0.935	**AIC:**		7.225
Adjusted R2:	0.916	**SIC:**		7.620
DW stat:	1.894	**F-stat(Prob.):**	48.859	(0.000)

5.9 Other Tests Conducted

When applying OLS technique, it is necessary to carry out several diagnostic tests. Therefore, other diagnostic tests conducted on the characteristics of time series in this study include the followings. *Wald Test*: the null hypothesis is that all the coefficients are equal to zero [Ho: C(1)=C(2)=C(3)...C(8)=0], the result leads to the rejection of null hypothesis, meaning that the model is correctly specified, as indicated by the F-statistic of 42.150 which is significant at one percent. *Ramsey's RESET test*: the null hypothesis is that the model is mis-specified and if the F value is significant at a chosen level, then we can accept null hypothesis. But, if the F value is insignificant, then we reject the null hypothesis of mis-specification, (Gujarati, 2003). The result of this test (F = 0.068 and prob. = 0.935) indicates that the model is correctly specified. *LM Test*: since the Durbin-Watson value in a model with lagged dependent variable(s) can sometimes be misleading, the LM test was applied with two lags under the null hypothesis that, there is no serial correlation in the residuals. The result leads to the acceptance of the null hypothesis, thus indicating that serial correlation is not a major problem in the model estimated, as indicated by the F-statistic of 91.872 which is significant at ten percent. *Normality of Residuals*: this test shows that the set of residuals of the parsimonious model is normally distributed as indicated by the Jacque-Bera statistic of 0.255 with probability value of 0.880. This test also indicates no major problem of heteroscedasticity.

5.10 Analysis, Discussion and Interpretation of Results

The empirical results from the parsimonious model show that, five of the eight independent variables: government final consumption expenditure growth (GFCExG), household consumption expenditure growth (HHCExG), export growth (EXPG), aid per capita growth

(APCG) and the error correction term (ECM_1) are statistically significant. On the other hand, the remaining three: gross capital formation growth (GCFG), net foreign direct investment growth (NFDIG) and population growth (PGR) are insignificant. The results also show that HHCExG and EXPG have expected signs, while GFCExG and APCG have unexpected signs.

The impact of government final consumption expenditure growth (GFCExG) is positive indicating that a unit rise in GFCExG increases economic growth by 0.32. Similar result was found by Ram (1986), Lin (1994) and Kweka and Morrissey (2000). This result challenged both the theoretical prediction of the study and the popular view in economic literature that government consumption expenditure decreases economic growth. However, the probable explanation is that, increases in government expenditures to improve the general security condition in particular and macroeconomic environment as a whole, helped to attract foreign investments and supports into the country. For example, due to the improvement in the general security condition, the country attracted 1.5 billion United States dollars investment package into the iron ore mining industry by Arcelor Mittal Steel in 2005. However, the improvement of the security condition in the country is also the result of the efforts by the multinational United Nations Peace Mission in Liberia, UNMIL. Further, an increase in government salary expenditure has helped to boost households' expenditures on health, education and food items and therefore helped to enhance food security and high productivity in the country considerably.

Gross capital formation growth (GCFG), which is used as a proxy for total domestic investment is statistically insignificant and cannot be interpreted meaningfully. In contrast, however, studies by Bose et al (2003) and Alexiou (2009) found that capital expenditure is statistically significant

and positively related to economic growth in 30 LDCs and in South Eastern Europe (SEE) respectively.

Household consumption expenditure growth (HHCExG), which is used as a proxy for private consumption expenditure growth, is statistically significant at one percent and positively related to economic growth. That is, a unit increase in HHCExG increases economic growth in Liberia by 0.38 and that similar result was also found by Kweka and Morrissey (2000) in Tanzania. HHCExG conforms to the theoretical prediction of this study and the likely explanation is that, household expenditure in Liberia has been highly productive. For example, household expenditure has been instrumental in the fight against malaria which has a negative impact on productivity. Additionally, household expenditure has improved food security in the country. Sanogo (2009) indicated that 91 and 98 percents of households in Liberia and Lesotho, respectively, experienced increased food and health expenditures in 2009. The impact of HHCExG in this study (0.38) is larger compared to that of government consumption expenditure growth (0.32). This has a very important policy implication which will be explored later in the next chapter on conclusions and policy recommendations.

Per capita foreign aid growth (APCG) is statistically significant at five percent level and negatively related to economic growth in this study, implying that an increase in foreign aid growth shrinks economic growth in Liberia by 0.07. This picture may appear unrealistic, given the current economic management programs put into place by the current government with the help of its international development partners, which have attracted more donor supports for the country. However, during the period under study, corruptions and gross economic

mismanagement which misdirected state and economic resources including foreign aid into personal and nonproductive activities were visible. Reno (2008) remarks: “Liberia’s corruption is intractable and illustrates the 'criminalization of the state', where officials divert public resources for private benefits.” Comparing this finding with other studies, for example, Kweka and Morrissey (2000) found that aid improves economic growth in Tanzania in contrast with the negative impact of this study.

Exports growth (EXPG) is statistically significant at ten percent and has positive impact on economic growth in this study. That is, a unit rise in exports growth leads to a 0.09 increase in real per capita GDP growth rate of the Liberian economy. Similar finding was observed by Otani and Delano (1990). The sign of exports growth conforms to the theoretical prediction of the study and the most likely explanation is that the export sector has historically played a crucial role in GDP growth. Over the period 1970-1988, export revenue, on the average, accounted for close to 52 percent of GDP at current prices, (Liberia Economic Review, 1999). However, the coefficient (0.09) appears modest probably because of the decline in the sector due to the disruption in exports by the civil conflict and the closure of the iron ore mines and reduction in rubber production. This disruption of the export sector has made the Liberian economy an import-oriented one, see table 2.1.

Net foreign direct investment growth (NFDIG) is statistically insignificant and cannot have any meaningful interpretation However, other studies including Le and Suruga (2005) found that foreign direct investment (FDI) is positively related to economic growth and indicated that the impact of FDI is stronger at early stage of development than at advanced stage.

Population growth (PGR) is also statistically insignificant and cannot be interpreted and similar result was found by Alexiou (2009). However, population growth is statistically insignificant in Liberia probably because of low human capital development that was further aggravated by the war, as seen in the high illiteracy rate of 59 percent and the very low physician-population ratio of 0.03 per 1000 population, (Poverty Reduction Strategy, Republic of Liberia, 2008). Sen (1995) indicated that the health and education statuses of a country are good summary indicators of human development and should be the targets of development policy.

The error correction term (ecm_1) is highly statistically significant at one percent level and bears the appropriate (negative) sign, implying that there is a convergence towards long run equilibrium between real per capita GDP growth and the independent variables. However, the coefficient which is the speed of adjustment implies that, the convergence is at the rate higher than 100 percent. This implies that there is an over-reaction in the adjustment process towards equilibrium.

CHAPTER SIX

CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter concludes this study by first presenting the conclusions, focusing on the findings and their implications. It also presents the policy recommendations supported by the empirical findings. Next, the limitations of this study are highlighted. Finally, the areas for further research are suggested.

6.2 Conclusions of the Study

This study set out to investigate the problem that government expenditure in Liberia is largely composed of consumption spending which according to macroeconomic theory, reduces growth through its crowding out effect on private investment. However, the findings, from this study, showed that consumption expenditure has a significant positive relationship with economic growth in Liberia. Therefore, improving economic growth in the country requires increasing the level of such expenditure. This finding challenged the popular view in empirical economic literature that government consumption spending reduces growth.

Additionally, household consumption expenditure (as a proxy for private consumption) and export revenue are also positively related to economic growth in Liberia. Thus, the government should also increase its spending into the private sector through adequate subsidies to private institutions and industries. The government should also revamp and provides more subsidies to the export sector (by creating the necessary tax holiday and improving the investment

environment) to enhance the provision of additional products for both the local and international markets. Foreign aid was found to have a negative impact on the growth of the economy. However, using aid for the betterment of all Liberians may reverse this adverse impact.

Furthermore, total domestic investment (consisting of both government and private investment expenditures), foreign direct investment and population growth are insignificant. However, by increasing the levels of investments into infrastructures, human capital development and increasing supports for foreign investments, the government may plausibly cancel out the insignificant effects of these variables.

This study also set out to capture the effects of regime change and war in Liberia though structural break analysis to guide policy makers in the process of decisions making. However, the Chow test of structural break conducted indicated that there is no such structural change in major government activities. The plausible explanation for this is that, though there have been a military coup and a civil war in Liberia but successive governments did not deviate much from past government activities and policies during the period under study. For example, I am told that the sports complex built by the PRC's regime was part of the plan of the former government. However, there was one notable policy shift in the year 2000. This was the shift from fixed to flexible exchange rate system. However, the effect of this shift is not reflected in the structural break analysis because the variable affected, exchange rate, is not part of the model.

6.3 Policy Recommendations

Given the empirical findings of this study, there are numbers of policy implications and recommendations that can be suggested to improve the process of economic growth in Liberia.

Firstly, the government of Liberia can improve economic growth by increasing its expenditure level. However, the impact of private sector expenditure is higher than that of the government sector. Thus, to adequately improve economic growth in Liberia, more resources should be allocated into the private sector, by providing subsidies to private institutions, rather than into the public sector, (Doessel and Valadkhani, 2003). However, the policy recommendation of increasing government expenditure has a caveat. Government expenditure cannot be increased indefinitely to the point where expenditure exceeds revenue, resulting into (large) deficit. Two macroeconomic problems may result. One, if the deficit is financed by borrowing, one of the two possible solutions to finance a deficit, interest rate may likely rise reducing private sector activities which has larger impact. Two, if the deficit is financed by printing and issuing money, all else equal, the money supply is likely to rise resulting into inflation. Because inflation is a situation where more money are used to buy fewer goods and services, government expenditure is likely to increase beyond the previous level resulting into a vicious cycle of deficits. Thus, indefinitely increasing government expenditure may result into macroeconomic instabilities which might harm growth than improve it.

Secondly, the government must improve its investments into infrastructural developments and other developmental activities and must equally improve the investment climate and macroeconomic environment to include the legal system in Liberia to attract more FDIs. These

are more likely to counteract the insignificant effects of total domestic investment and foreign direct investment expenditures in the country.

Thirdly, increasing economic growth in Liberia also requires revamping the real and manufacturing sectors as well as providing export subsidies. This is most likely to provide more new products for domestic consumption and exportation that can enhance economic growth and development. Revamping these sectors is also most likely to create new employment opportunities that can increase growth and development of the economy through high labor productivity. The implication of this policy recommendation is that, the importations of capital and intermediate goods for production are essential to increase growth and development.

Fourth, the present government's policies of zero tolerance on corruption and proper fiscal management are laudable and must be encouraged at all levels in the society. Besides, the government must ensure that donor funds are actually utilized for the greater benefit of the country and not for the top few. More besides, foreign aid depends on the policies and economic condition prevailing in donor's countries. This implies that the inclination towards heavy dependence on foreign aid have grave future consequences. Thus, the government must strategize long-term policies which will be economically self-sustaining than mere dependence on aid.

Finally, the government should work towards the improvement of human capital development through improved education and health to ensure that the bulk of population becomes a useful part of the labor force. This will increase productivity and growth of the nation's economy and

probably counteract the insignificance of population growth in Liberia and make the population more productive. This is because, (Sen, 1995) showed that the health and education of a country are good summary indicators of human development. Thus, health and education developments of the population should be an important target of development policy in Liberia.

6.4 Limitations of the Study

Liberia, like most other developing countries, is faced with a severe data constraint. This is responsible for the use of total investment in place of government and private investments. Also, variables such as human capital expenditure and political instability have been used as determinants of economic growth as in the case of Kweka and Morrissey (2000) and Barro (1991), respectively. They were not applicable in this study due to the data constraint already enumerated.

6.5 Areas for further Research

Given the constraints outlined in section 6.4, there is a need for any subsequent study on government spending and economic growth in Liberia to consider the use of separate data on both government investment expenditure and private investment spending should they become available in the future. There is also a need to include human capital development spending and political instability in future studies of this nature to access their impacts on growth. The inclusion of political instability is particularly necessary to provide insight into policy decision based on a given prevailing political situation.

Secondly, it is indicated in section 6.3 that government expenditure cannot be increased indefinitely. The implication of this statement is that, there is an optimum level of government expenditure beyond (or below) which, the impact on economic growth may be of no benefit. Thus, any subsequent study of government expenditure and economic growth in Liberia may find it applicable and knowledge-contributing to determine the optimum level of government expenditure that will be highly growth-enhancing.

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APPENDIX

Appendix 1 Eviews (Unedited) Results of the Over-parameterized Model

Dependent Variable: FDRGDPPCG
Method: Least Squares
Date: 04/18/10 Time: 18:51
Sample(adjusted): 1974 2007
Included observations: 34 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.215173	1.372604	0.885305	0.3990
FDRGDPPCG_1	0.985651	0.475606	2.072409	0.0681
FDRGDPPCG_2	0.559768	0.339726	1.647705	0.1338
FDAPCG	-0.110454	0.071846	-1.537379	0.1586
FDAPCG_1	-0.040052	0.077809	-0.514751	0.6191
FDAPCG_2	-0.090023	0.075487	-1.192565	0.2635
FDEXPG	0.152978	0.083989	1.821397	0.1019
FDEXPG_1	0.027295	0.096645	0.282428	0.7840
FDEXPG_2	0.008003	0.079201	0.101042	0.9217
FDGCFG	0.009811	0.108456	0.090457	0.9299
FDGCFG_1	0.086448	0.101028	0.855687	0.4144
FDGCFG_2	-0.012980	0.114504	-0.113359	0.9122
FDGFCEXG	0.056675	0.217805	0.260209	0.8006
FDGFCEXG_1	-0.690752	0.331190	-2.085668	0.0666
FDGFCEXG_2	-0.476727	0.281220	-1.695212	0.1243
FDHHCEXG	0.487113	0.240243	2.027587	0.0732
FDHHCEXG_1	-0.503558	0.327854	-1.535923	0.1589
FDHHCEXG_2	-0.309507	0.226651	-1.365564	0.2052
FDNFDIG	-0.000653	0.001064	-0.613282	0.5549
FDNFDIG_1	-0.000508	0.001507	-0.337231	0.7437
FDNFDIG_2	0.000450	0.001408	0.319403	0.7567
FDPGR	-20.71716	8.272229	-2.504423	0.0336
FDPGR_1	38.80128	16.94704	2.289561	0.0478
FDPGR_2	-19.07244	9.423391	-2.023946	0.0737
ECM_1	-2.520142	0.591783	-4.258562	0.0021

R-squared	0.981879	Mean dependent var	0.036575
Adjusted R-squared	0.933556	S.D. dependent var	28.68878
S.E. of regression	7.395016	Akaike info criterion	7.380942
Sum squared resid	492.1764	Schwarz criterion	8.103266
Log likelihood	-93.67601	F-statistic	20.31920
Durbin-Watson stat	1.529892	Prob(F-statistic)	0.000031

Appendix 2 Eviews (Unedited) Results of the Parsimonious Model

Dependent Variable: FDRGDPPCG
Method: Least Squares
Date: 04/18/10 Time: 19:18
Sample(adjusted): 1972 2007
Included observations: 36 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.169766	1.354872	0.125300	0.9012
FDAPCG	-0.071748	0.030270	-2.370254	0.0252
FDEXPG	0.088197	0.047812	1.844685	0.0761
FDGCFG	0.044780	0.066064	0.677831	0.5036
FDGFCEXG	0.324813	0.126964	2.558306	0.0164
FDHHCEXG	0.375296	0.070076	5.355583	0.0000
FDNFDIG	0.000229	0.000780	0.293991	0.7710
FDPGR	0.010533	1.183280	0.008901	0.9930
ECM_1	-1.314473	0.192906	-6.814050	0.0000

R-squared	0.935387	Mean dependent var	0.051996
Adjusted R-squared	0.916242	S.D. dependent var	27.85768
S.E. of regression	8.062261	Akaike info criterion	7.224583
Sum squared resid	1755.001	Schwarz criterion	7.620463
Log likelihood	-121.0425	F-statistic	48.85911
Durbin-Watson stat	1.894052	Prob(F-statistic)	0.000000

Appendix 3 Test for Simultaneity Bias

Causality between public spending and economic growth may not be unidirectional. Government expenditure may affect economic growth, at the same time economic growth may lead to changes in total government expenditure (Chu et al, 1995) and (Makhema, 2006). Hence to avoid such simultaneity bias in the regression analyses, test for simultaneity must be conducted using Granger causality test. In the case of simultaneity, a-2SLS estimation must be carried out to avoid such bias. Granger causality test, involves estimating the following pair of regressions, (Gujarati, 2003).

$Y_t = \sum_{i=1}^{n} \alpha_i X_{t-i} + \sum_{i=1}^{n} \beta_j Y_{t-j} + \mu_{1t}$ ..... **(A.1)**

$X_t = \sum_{i=1}^{n} \lambda_i X_{t-i} + \sum_{j=1}^{n} \delta_j Y_{t-j} + \mu_{2t}$. ..... **(A.2)**

Where the assumption is that the errors μ_{1t} and μ_{2t} are not correlated. Equation (A.1) assumes that the variable Y is related to its lags and the lags of X. The regression tests the null hypothesis that $\sum \alpha_i = 0$. Similarly, equation (A.2) also assumes that X is related to its lagged values and lagged values of Y with the null hypothesis that $\sum \delta_j = 0$. The outcomes of regressions in equations (A.1) and (A.2) may lead to one of the four conclusions.

i. One way causality from X → Y, implying that X causes Y: $\sum \alpha_i \neq 0$ but $\sum \delta_j = 0$.

ii. One way causality from Y → X, implying that Y causes X: $\sum \alpha_i = 0$ but $\sum \delta_j \neq 0$.

iii. Dual causality, implying that $\sum \alpha_i \neq 0$ and $\sum \delta_j \neq 0$ i.e. the coefficients in equations (A.1) and (A.2) are both statistically significant, implying that X causes Y, and at the same time, Y causes X.

iv. No causality, implying that $\sum \alpha_i = 0$ and $\sum \delta_j = 0$, meaning that the set of coefficients of X and Y are both not statistically different from zero.

Appendix 4 Specification Errors Tests

Specification error occurs when an unnecessary variable(s) is included in a model and when a relevant variable(s) is omitted. Specification error also occurs when an incorrect functional form is specified for the correct one, (Gujarati, 2003). An incorrect functional form may occur if, for example, a linear functional form (based on an assumption of constant slope) is specified for a log or double-log functional form which is based on a constant elasticity assumption, (Studenmund, 2001). Specification error in which an irrelevant variable(s) is included in a model is known as over-fitting a model, whereas under-fitting a model refers to the situation where a relevant variable(s) is omitted from a model.

Appendix 4.1 Detecting an Over-fitted Model

One convenient way to find out whether a particular variable X or variables X_i (where $i = 1,2 \ldots k$) included in a model appropriately belong to that model is to test whether the individual slope coefficients are statistically significant using the t test or whether all the slopes (for $X_1 \ldots X_k$) are simultaneously significant at a given level, using the F test. If the slopes are statistically significant or different from zero at a chosen level, then we can conclude that they belong to the model, otherwise they do not.

Appendix 4.2 Detecting an Under-fitted Model and an Incorrect Functional Form

Practically one is almost never sure whether a model adopted for empirical work is the "true" or correct one. However, on the basis of prior empirical works and evidences, a model can be developed that is believed to capture the essence of the study under consideration, (Gujarati, 2003). Thus, the model fitted to analyze this study is predicated on prior studies and the Ramsey's regression specification error test, RESET, is used to test the specification carried out. The general form of the Ramsey's RESET test below was adopted from (Gujarati, 2003). Given that a model chosen is hypothetically given by:

$$Y_i = \lambda_1 + \lambda_2 X_i + \mu_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(A.3)}$$

The Ramsey's RESET test involves the following steps:

i. From equation (A.3), obtain $\hat{Y}_i$.

ii. Generate $\hat{Y}_i^2 and\ \hat{Y}_i^3$.

iii. Regress Y_i on X_i from equation (A.3) as well as $\hat{Y}_i^2 and\ \hat{Y}_i^3$ generated. That is estimate

$$Y_i = \lambda_1 + \lambda_2 X_i + \lambda_3 \hat{Y}_i^2 + \lambda_4 \hat{Y}_i^3 + \mu_i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \textbf{(A.4)}$$

iv. Let the R^2 obtained from equation (A.3) be R^2_{old} and the one obtained from equation (A.4) be R^2_{new}, then we can run the F test as follows:

$$F = \frac{(R^2_{new} - R^2_{old})/No\ of\ new\ regressors}{(1 - R^2_{new})/(n - No\ of\ parameters\ in\ equ.\ 10)} \quad \textbf{(A.5)}$$

Where n is the number of observations. Now, from equation (A.5), if the computed *F* is greater than the tabulated *F* at a particular level of significance, then we fail to reject (accept) the null hypothesis that the model is mis-specified, in which case the researcher can rethink the model specification: that is the functional form and any relevant variable(s) to be included into the model. However, the procedures above may be cumbersome and unnecessary. This is because most software packages can give the value of the F-statistic just at few clicks. Thus, using a software program, if the computed F-statistic is significant we can accept (or fail to reject) the null hypothesis of mis-specification. On the other hand if computed F-statistic is insignificant we can reject the null hypothesis of mis-specification and conclude that model is correctly specified.

Appendix 5 Testing for Structural Break or Parameter Stability in a Model

In most time series regression models, it is likely that there is structural break in the relationship between the regressand and the regressors. Structural break depicts a situation where parameters values of the model do not remain constant throughout the entire period of the time series. Sometimes the structural break may be due to policy change such as from fixed to flexible exchange rate, changes in minimum wage rate, political instability etc. To test for structural break, the following example is adopted from (Gujarati, 2003). Suppose we want to run a simple saving equation that relates savings (Y) to disposable income (X) for the period 1970–1995 for an economy. Suppose also that the economy suffered a recession in 1982. We can test for structural break using the following regressions.

1970-1981: $Y_t = \alpha_1 + \alpha_2 X_t + \mu_{1t} \quad (n_1 = 12)$ …..……..... **(A.6)**

1982-1995: $Y_t = \beta_1 + \beta_2 X_t + \mu_{2t} \quad (n_2 = 14)$…..…… **(A.7)**

1970-1995: $Y_t = \lambda_1 + \lambda_2 X_t + \mu_{3t} \quad (n = n_1 + n_2 = 26)$…….. **(A.8)**

Where the μ_s and n_s are the error terms and numbers of observations respectively. Equation (A.8) assumes that there is no structural break between the two time periods and therefore estimate the relationship between savings (Y) and disposable income (X) for the entire time period consisting of 26 observations. That is, equation (A.8) assumes that the intercept and slope are the same over the entire time period, thus there is no structural change, implying that $\alpha_1 = \beta_1 = \lambda_1$ and $\alpha_2 = \beta_2 = \lambda_2$. On the other hand, equations (A.6) and (A.7) assume that the regressions in the two time periods are different. That is, $\alpha_1 \neq \beta_1 \neq \lambda_1$ and $\alpha_2 \neq \beta_2 \neq \lambda_2$; implying that there is structural break.

The question is how do we know that the parameters in one time period are statistically different from the parameters in the other time period? The answer to this question is: through the use of Chow Test of parameter stability which follows the steps below (Gujarati, 2003).

i. Estimate equation (A.8) and obtain $RSS_{(A.8)}$ with degree of freedom, $(n_1 + n_2 - k)$, where k is the number of parameters to be estimated. $RSS_{(A.8)}$ is the restricted residual sum square (RSS_R) because it is obtained by imposing the restriction that $\alpha_1 = \beta_1$ and $\alpha_2 = \beta_2$.

ii. Estimate equations (A.6) and (A.7) and obtain $RSS_{(A.6)}$ and $RSS_{(A.7)}$ with degrees of freedom $(n_1 - k)$ and $(n_2 - k)$ respectively.

iii. Add $RSS_{(A.6)}$ and $RSS_{(A.7)}$. Since the two sets of samples used to estimate equations (A.6) and (A.7) are thought to be independent, the sum of $RSS_{(A.6)}$ and $RSS_{(A.7)}$ is considered as the unrestricted residual sum square (RSS_{UR}).

iv. Using the *F* test: $\boldsymbol{F = \frac{(RSS_R - RSS_{UR})/k}{(RSS_{UR})/(n_1+n_2-2k)}}$ ..... **(A.9)**

If the computed F value is greater than the tabulated F value, under the null hypothesis that there is no structural break, then we reject the null hypothesis and conclude that there is parameters instability. That is there is structural break, in which case we will introduce dummy variable(s) to capture the effect of such structural break. However it should be noted that Chow test is carried out under the assumption of constant variance for the two time periods, otherwise it not applicable.

Appendix 6: Data used in the Regression Analysis

Appendix 6.1 contains growth rate data used in the regression analysis of the study. The computations of the growth rate data are only possible from 1971 because there is no data point for 1969 to facilitate computation for 1970. However, appendix 6.2 presents the main data set from which the growth rates in appendix 6.1 are computed. Note that, all data points in appendix 6.1 are growth rates and therefore presented in percents, while, all data points in appendix 6.2 are presented in million United Dollars except real GDP per capita which is presented in thousands United States dollars.

Appendix 6.1: Growth Rates Data Used in the Regression Analysis (in percent)

Year	Household Consump. Exp. Growth	Govt. Consump. Exp. Growth	Gross Capital Formation growth	Export Growth	Import Growth	Popn Growth	Foreign Aid Growth	Net FDI Growth	Real GDP Per Capital Growth
1971	6	7.1	18.5	-3.5	0.1	2.69	-3.979	-159.545	2.390
1972	4	-5.1	-14.5	9.1	0.3	2.60	-1.568	-160.882	1.963
1973	2.3	-3.8	-14.9	5.3	-5.7	2.59	-22.639	261.353	3.019
1974	1.4	8.3	47.3	-3.4	-0.3	2.68	37.206	-22.861	2.393
1975	-6.3	1	49.1	-24	2	2.83	33.655	212.652	-13.901
1976	18.1	6.1	-0.4	8.1	17.9	2.93	28.388	-53.880	2.707
1977	14.5	10.6	-4	-10.8	-0.8	2.98	19.738	104.928	3.127
1978	-0.6	5.1	-12.9	17.1	2	3.07	38.602	-15.132	1.477
1979	-6.9	6.3	25.6	-1.3	19.4	3.22	67.332	-71.527	-14.297
1980	-15.3	-4.7	-4.2	0.4	-30	3.35	16.847	74.515	9.574
1981	-4.4	-4.1	-25.5	-8.3	-9.6	3.51	7.604	300.556	-10.974
1982	-4.1	9.4	18.3	-12.9	-19.1	3.56	-3.471	-87.917	3.551
1983	4.7	-22.8	-17.5	-2.3	4.2	3.29	4.652	41.092	-11.355
1984	-4.4	-7.2	-10.4	6.4	-20.7	2.65	8.341	-26.273	3.412
1985	0.6	-12.7	-30.6	-3.4	-15.4	1.79	-31.873	-144.751	-5.618
1986	-5.1	3.1	-13.1	-5.1	30.3	1.01	6.118	1.852	-18.079
1987	6	0.8	-1.4	5.1	-23.8	0.36	-19.421	-333.333	14.216
1988	2.7	-5.3	-15.5	1.9	-15.7	-0.37	-17.340	653.766	1.778
1989	-10.7	3.9	-5.4	11.1	-14.4	-1.19	-5.567	126.051	-0.855
1990	-59.2	-64.9	-59.4	-73.5	-58.6	-1.99	91.337	-65.671	-62.367
1991	0.8	-26.9	-27	-63.3	-47.9	-3.09	40.597	-96.27	-4.444
1992	-44.7	-23.9	-23.6	51.2	6.6	-4.00	-22.862	-229.762	-35.535
1993	-33.2	-33.1	-33.3	-29.9	-29.9	-3.73	3.291	391.743	-35.346
1994	-21.8	-21.8	-21.8	-21.8	-21.8	-1.66	-48.65	-132.463	-21.151
1995	-4.3	-4.3	-4.2	-4.3	-4.3	1.66	87.557	-73.563	-4.309
1996	12.1	12.1	12.1	-23	-31.1	5.42	31.760	-2971.74	6.872
1997	101.6	101.5	101.7	172.4	199.7	8.15	-59.588	-261.847	88.728
1998	29.7	29.7	29.7	29.7	29.7	9.09	-12.753	-10.992	16.224
1999	44.1	21.7	17.9	-2.9	39.9	8.21	21.177	34.682	15.168
2000	29.6	23.1	3.5	8.7	22	6.45	-32.106	-91.885	18.153
2001	13.6	9.3	-31.8	-10	15.5	4.60	-45.011	-60.096	0.441
2002	4.4	-1.2	-0.7	-11.2	-8.2	3.30	32.063	-66.265	1.516
2003	-27.5	-57.4	35.9	11.9	10.4	2.62	103.074	13192.86	-31.586
2004	-2.2	25.7	44.3	18.2	16.8	2.73	96.509	-44.412	2.842
2005	0.8	12.7	31.2	7	6.8	3.34	6.225	-6.235	2.045
2006	53.5	11.6	31.1	-18.6	72.8	4.02	11.100	-142.113	2.599
2007	3.2	38.3	9.5	27.3	10.2	4.40	147.797	294.524	4.262

Appendix 6.2: Main Data Set from which the growth rates are computed (in millions of US$, except real GDP per capita which is presented in thousands of US$)

Year	Government consumption Expenditure	Gross Capital Formation	Exports	Household Consumption Expenditure	Real GDP Per Capita	Foreign Aid	Net Foreign Direct Investment
1970	200.5337	220.3375	763.4198	861.4052	1.8906	9.3000	57.1000
1971	214.6843	261.0019	736.5100	912.8017	1.9358	8.9300	-34.0000
1972	203.7682	223.2215	803.7845	948.9848	1.9738	8.7900	20.7000
1973	196.0864	190.0555	846.4892	970.3657	2.0334	6.8000	74.8000
1974	212.3537	279.8934	817.4215	984.0731	2.0821	9.3300	57.7000
1975	214.5520	417.3347	621.5809	922.3900	1.7926	12.4700	180.4000
1976	227.7416	415.5451	671.7889	1089.7339	1.8412	16.0100	83.2000
1977	251.9227	399.0808	599.2662	1247.3683	1.8988	19.1700	170.5000
1978	264.6727	347.5403	702.0311	1239.3724	1.9268	26.5700	144.7000
1979	281.3796	436.6623	692.9291	1153.7015	1.6513	44.4600	41.2000
1980	268.1899	418.4084	695.8652	976.6483	1.8094	51.9500	71.9000
1981	257.1985	311.7483	638.3169	933.8128	1.6108	55.9000	288.0000
1982	281.3631	368.7159	556.0334	895.8659	1.6680	53.9600	34.8000
1983	217.2242	304.3519	543.1655	937.8528	1.4786	56.4700	49.1000
1984	201.5429	272.7207	577.8734	896.1544	1.5291	61.1800	36.2000
1985	175.9644	189.1577	558.3945	901.7815	1.4432	41.6800	-16.2000
1986	181.4914	164.2934	530.0616	856.1875	1.1823	44.2300	-16.5000
1987	182.9053	161.9329	556.9778	907.4087	1.3503	35.6400	38.5000
1988	173.2652	136.9112	567.4846	932.0814	1.3744	29.4600	290.2000
1989	179.9490	129.5148	630.5253	832.2361	1.3626	27.8200	656.0000
1990	63.2297	52.6346	166.8426	339.8475	0.5128	53.2300	225.2000
1991	46.2369	38.3970	61.2460	342.5157	0.4900	74.8400	8.4000
1992	35.2064	29.3260	92.6215	189.3224	0.3159	57.7300	-10.9000
1993	23.5646	19.5692	64.9209	126.4886	0.2042	59.6300	-53.6000
1994	18.4375	15.3094	50.7926	98.9617	0.1610	30.6200	17.4000
1995	17.6509	14.6617	48.6247	94.7371	0.1541	57.4300	4.6000
1996	19.7927	16.4293	37.4542	106.2170	0.1647	75.6700	-132.1000
1997	39.8906	33.1450	102.0228	214.1841	0.3108	30.5800	213.8000
1998	51.7246	42.9779	132.2892	277.7245	0.3612	26.6800	190.3000
1999	62.9493	50.6744	128.4189	400.3092	0.4160	32.3300	256.3000
2000	77.4949	52.4240	139.6014	518.8628	0.4915	21.9500	20.8000
2001	84.7331	35.7392	125.5984	589.6234	0.4937	12.0700	8.3000
2002	83.6758	35.4911	111.5355	615.4822	0.5012	15.9400	2.8000
2003	35.6738	48.2194	124.8180	446.5072	0.3429	32.3700	372.2000
2004	44.8590	69.6015	147.5067	436.5491	0.3526	63.6100	206.9000

2005	50.5434	91.3014	157.8093	440.0441	0.3598	67.5700	194.0000
2006	56.3924	119.7005	128.5313	675.3462	0.3692	75.0700	-81.7000
2007	77.9786	131.0904	163.5880	696.7356	0.3849	186.0000	159.0000