

**EFFECTS OF FOREIGN AID PREDICTABILITY ON
INVESTMENT AND ECONOMIC GROWTH IN
KENYA**

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DECLARATION

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DEDICATION

To my late parents Mzee Wilson Obiero and Mama Leunida Ajiambo Obiero

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TABLE OF CONTENTS

Declaration	i
Dedication	ii
Acknowledgements	iii
Table of Contents	iv
List of Tables	vii
List of Figures	viii
Operational Definition of Terms	x
Abbreviations and Acronyms	xii
Abstract	xiv
CHAPTER ONE: INTRODUCTION.....	1
1.1 Background to the Study	1
1.1.1 Foreign Aid-growth Debate.....	1
1.1.2 Foreign Aid Flows to Kenya.....	4
1.1.3 Predictable Aid Flows.....	7
1.1.4 Implications of Aid Unpredictability.....	11
1.1.5 Kenya’s Joint Assistance Strategy.....	12
1.2 Kenya’s Macroeconomic Performance.....	13
1.2.1 Economic Growth.....	13
1.2.2 Investment in Kenya	16
1.2.3 Macroeconomic Policy Reforms	19
1.3 Statement of the Problem.....	22
1.4 Research Questions.....	23
1.5 Objectives of the Study.....	24
1.6 Significance of the Study.....	24
1.7 Scope and Delimitations of the Study	25
1.8 Organisation of the Study	25
CHAPTER TWO: LITERATURE REVIEW	26
2.1 Introduction.....	26

2.2	Theoretical Literature	26
2.2.1	The Theory of Public Goods Provision	27
2.2.2	The Gap Theory	28
2.2.3	The Solow-Swan Model and the Poverty Traps	34
2.2.4	Endogenous Growth Models	39
2.2.5	Investment Theories.....	43
2.3	Empirical Literature.....	45
2.3.1	Foreign Aid, Investment and Growth Literature	45
2.3.2	Foreign Aid Unpredictability Literature	70
2.3.3	Overview of the Literature.....	75
CHAPTER THREE: METHODOLOGY		78
3.1	Introduction.....	78
3.2	Research Design	78
3.3	Theoretical Framework.....	79
3.4	Model Specification.....	88
3.4.1	The Effect of Aid on Investment and Growth	88
3.4.2	The Effect of Macroeconomic Policy Environment on the Aid- Growth Nexus	91
3.4.3	The Effect of Aid Predictability on Investment and Economic Growth	96
3.5	Estimation Procedure.....	99
3.6	Working Hypotheses	102
3.7	Definition and Measurement of Variables.....	103
3.8	Data Type and Sources	104
3.9	Data Collection, Cleaning and Refinement	104
3.10	Time Series Properties.....	104
3.11	Diagnostic tests	111
3.12	Hypothesis Testing	113
CHAPTER FOUR: EMPIRICAL FINDINGS		114
4.1	Introduction.....	114

4.2	Descriptive Statistics and Correlation Results.....	114
4.3	Time Series Property Results.....	116
4.3.1	Stationarity Analysis	116
4.3.2	Cointegration Analysis Results.....	117
4.4	Diagnostic Tests Results.....	118
4.5	Hypothesis Testing Results.....	120
4.6	The Long-run and Short-run Dynamics.....	122
CHAPTER FIVE: SUMMARY, CONCLUSIONS AND POLICY		
IMPLICATIONS		141
5.1	Introduction.....	141
5.2	Summary.....	141
5.3	Conclusion	144
5.4	Policy Implications	144
5.5	Areas for Further Research.....	148
REFERENCES		150
APPENDIX I: Evolution and Pattern of Foreign Aid to Kenya (1966-2011)		174
APPENDIX II: Data Used in the Study.....		176
APPENDIX III: Descriptive Statistics and Correlation		179
APPENDIX IV: Plots of Variables in Levels and First Difference.....		181
APPENDIX V: Results of Stationarity Tests		185
APPENDIX VI: The <i>F</i> -Statistic of Cointegration		186
APPENDIX VII: Results of Diagnostic Tests		187
APPENDIX VIII: Graphs of Diagnostic Tests.....		188

LIST OF TABLES

Table 4.1: Hypothesis Testing	121
Table 4.2: Estimated Long-Run Coefficients of the Growth Model	123
Table 4.3: Error Correction Representation for the Growth Model	124
Table 4.4: Estimated Long-Run Coefficients of the Investment Model.....	126
Table 4.5: Error Correction Representation for the Investment Model.....	127
Table A1: Evolution and Pattern of Foreign Aid to Kenya (1966-2011).....	174
Table A2: Raw Data	176
Table A3: Descriptive Statistics	179
Table A4: Correlation Matrix	180
Table A5: Unit-Root Estimation (ADF Test).....	185
Table A6: The F -Statistic of Cointegration Relationship (Growth Equation)	186
Table A7: The F -Statistic of Cointegration Relationship (Investment Equation)	186
Table A8: Results of Diagnostic Tests for the Growth Model	187
Table A9: Results of Diagnostic Tests for the Investment Model.....	187

LIST OF FIGURES

Figure 1.1: Average ODA flows to Kenya from multilateral and bilateral donors.....	5
Figure 1.2: Composition of total ODA flows by major donors to Kenya (1963-2011).....	6
Figure 1.3: Foreign aid commitments and disbursements (1966-2011).....	10
Figure 1.4: Trends in real GDP growth rates (1963-2011).....	14
Figure 1.5: Gross fixed capital formation and domestic investment in Kenya (1965-2011)	16
Figure 1.6: Kenya's external balance (1966-2011).....	18
Figure 2.1: The savings and foreign exchange gaps.....	32
Figure 2.2: Poverty traps in a Solow-Swan model with subsistence consumption.....	37
Figure 2.3: Transmission framework of aid-growth nexus	53
Figure 3.1: Utility-maximizing conditions	82
Figure 3.2: The Foreign aid expansion path when foreign aid is predictable...	83
Figure 3.3: The Engel Curve when foreign aid is predictable	84
Figure 3.4: The Foreign aid expansion path when foreign aid is unpredictable	84
Figure 3.5: The Engel Curve when foreign aid is unpredictable	85
Figure 3.6: Relationship between foreign aid, investment and economic growth	87
Figure 3.7: Policy Index 1963 -2010	95
Figure A1: Plots of Variables in Levels and First Difference	181
Figure A2: Histogram of Residuals and the Normal Density (economic growth model)	188
Figure A3: Histogram of Residuals and the Normal Density (Investment model)	188
Figure A4: Autocorrelation Function of Residuals (Economic growth model)	189
Figure A5: Autocorrelation Function of Residuals (Investment model)	189

Figure A6: Standardized Spectral Density of Residuals (Economic growth model)	190
Figure A7: Standardized Spectral Density of Residuals (Investment model)	190
Figure A8: Cumulative Sum of Recursive Residuals (Growth equation)	191
Figure A9: Cumulative Sum of Squares of Recursive Residuals (Growth equation)	191
Figure A10: Cumulative Sum of Recursive Residuals (Investment equation)	192
Figure A11: Cumulative Sum of Squares of Recursive Residuals (Investment equation)	192

OPERATIONAL DEFINITION OF TERMS

Absorptive capacity is defined as the marginal return to aid, is a dynamic concept that depends on the timing and sequencing of public spending.

Conditionalities are the use of conditions attached to a loan, debt relief, bilateral aid or membership of international organizations, typically by the international financial institutions, regional organizations or donor countries.

Economic growth refers to an increase in a country's output of goods and services, measured by changes in national or per capita income and products.

External debt refers to the portion of a country's debt that was borrowed from foreign lenders including commercial banks, governments or international financial institutions.

Foreign aid refers to resource transfers from the official sector in the form of grants and loans at concessional financial terms to developing countries. In addition to financial flows, technical co-operation is included in aid.

Foreign aid volatility refers to the amount of uncertainty or risk regarding the degree and size of changes in foreign aid disbursement. Higher volatility means that foreign aid flows can change dramatically over a short period in either direction.

Fungibility refers to a good or asset's inter-changeability with other individual goods/assets of the same type. Assets possessing this property

simplify the exchange/trade process, as inter-changeability assumes that everyone values all goods of that class as the same.

Gross capital formation consists of outlays on additions to the fixed assets of the economy plus net changes in the level of inventories.

Gross Domestic Product is the total value of all goods and services produced over a period of time (usually one year) excluding net factor income from abroad.

Investment is the spending on capital goods by firms and government, which will allow increased production of consumer goods and services in future time periods. It can also be defined as an addition to the capital stock. Investments are of two types namely, public investments and private investment.

Official Development Assistance is foreign aid provided by donor governments to low - and middle-income countries.

Predictable Aid refers to a situation where partner countries can be confident about the amount and timing of aid disbursements.

Private Investment is an injection of capital into a business from a private investor.

Public Investment encompasses investment in human capital, law and order, research and development, and social and economic infrastructure made by central government, local government and public corporations. It also entails the payment for acquisition of land, buildings and other non-financial assets to be used for more than one year in the production process.

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
ADF	Augmented Dickey-Fuller
AfDB	African Development Bank
AIC	Akaike Information Criterion
ARCH	Autoregressive Conditional Heteroscedasticity
ARDL	Autoregressive Distributed Lag
CUSUM	Cumulative Sum
CUSUMSQ	Cumulative Sum Squares
DAC	Development Assistance Committee
DF	Dickey-Fuller
EC	European Commission
ECM	Error Correction Model
ERS	Economic Recovery Strategy for Wealth and Employment Creation
FE	Fixed Effects
GDP	Gross Domestic Product
GNP	Gross National Product
HAC	Harmonization, Alignment and Coordination
IADB	Inter-American Development Bank
IMF	International Monetary Fund
ICOR	Incremental Capital-Output Ratio
ICRG	International Country Risk Guide
IV	Instrumental Variables
KJAS	Kenya's Joint Assistance Strategy
LDCs	Less Developed Countries
LM	Lagrange Multiplier
MRS	Marginal Rate of Substitution
MRT	Marginal Rate of Transformation
N3SLS	Non-Linear Three Stage Least Squares
NARC	National Alliance of the Rainbow Coalition

ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
PFM	Public Finance Management
PIP	Public Investment Programme
RE	Random Effects
SAPs	Structural Adjustment Programmes
SBC	Schwarz Bayesian Criterion
SIC	Schwarz Bayesian Information Criterion
TSLS	Two Stage Least Squares
UK	United Kingdom
USA	United States of America
VAR	Vector Autoregressive

ABSTRACT

Foreign aid forms one of the largest components of foreign capital flows to low-income countries. Since attaining political independence in 1963, Kenya has been dependent on foreign aid for capital and social investments. The Paris declaration of 2005 commits donors to provide reliable, indicative commitments of aid over a multi-year framework and also disburse aid in a timely and predictive manner in line with the agreed schedules. Studies have also argued that stable macroeconomic policy environment is a requisite for aid effectiveness. However, foreign aid flows in Kenya have been unpredictable and the macroeconomic policy environment unstable. The general objective of this study, therefore, was to examine the effects of foreign aid predictability on investment and economic growth in Kenya. Specifically, the study sought to examine the effect of foreign aid on investment and economic growth; examine the effect of macroeconomic policy environment on foreign aid, investment and economic growth; analyse the effect of aid unpredictability on investment and economic growth; and suggest policy implications. The study drew from the Samuelson model and used time series data for the period 1966-2010. The data was collected from published sources. It employed the autoregressive distributed lag estimation technique. Results of the bound tests indicated that there was a long-run relationship between the variables. The study found that foreign aid had a positive effect on Kenya's economic growth and public investment. The lagged effects of foreign debt positively affected economic growth and public investment after one year and negatively thereafter. The empirical findings show that private investment positively affected economic growth and public investment. It was found that there was a complementary relationship between private investment and public investment. Kenya's macroeconomic policy environment was found to be unstable over the study period thus negatively affected economic growth and public investment. This was despite the macroeconomic policy reforms that the Government of Kenya had undertaken and the push for such reforms by the development partners. Foreign aid flows to Kenya were found to be unpredictable and negatively affecting economic growth and public investment despite Kenya and her development partners having committed to work towards predictable foreign aid. In light of the foregoing, this study recommended among other things, the need to review Kenya's Joint Assistance Strategy, ensuring sustained economic growth of over 10 per cent while keeping inflation low. Additionally, there is need to encourage private investment in the country and that development partners have a role to play in this respect as part of their commitments in Busan in 2011.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

1.1.1 Foreign Aid-growth Debate

Foreign aid forms one of the largest components of foreign capital flows to low-income countries but not to most middle-income countries where private capital flows are more important (Radelet, 2006). The question as to how foreign aid affects the economic growth of developing countries has drawn the attention of many scholars over time. The results of their studies have been varied. Papanek (1972) and Fayissa and El-Kaissy (1999) found a positive relation between aid and growth. The findings of Singh (1985) and Snyder (1993) were in support of the positive relationship but conditional to the exclusion of state intervention and taking country size into consideration. Burnside and Dollar (1997), and World Bank (1998) emphasized that good-policy environment was essential for this positive relationship to occur. Specifically, the World Bank (1998) study noted that developing countries with sound policies and high-quality public institutions had grown faster than those without them at 2.7 per cent per capita GDP and 0.5 per cent per capita GDP respectively. In this regard, one per cent of GDP in assistance under normal circumstance translated to a sustained increase in growth of 0.5 per cent per capita. Some countries with sound policies received only small amount of aid, yet they still achieved 2.2 per cent per capita growth. The groups that were

characterized with good management and received more aid grew much faster at 3.7 per cent per capita GDP.

Other studies have found a negative relationship between foreign aid and growth. Knack (2000), for example, observed that high levels of aid had the potential to erode institutional quality, increase rent-seeking and corruption, thus negatively affecting growth. Easterly, Levine and Roodman (2003) re-examined works by Burnside and Dollar (1997) using a larger sample size and found that the results were not as robust as before. Gong and Heng-fu (2001) found a negative relation between aid and growth. Pedersen (1996) noted the inconclusiveness of the impact, as Morrissey (2001) argued that aid worked well conditional on other variables in the growth regression.

This has been the controversy around the aid-growth nexus. But the conventional macroeconomic rationale for foreign aid is to supplement domestic savings, foreign exchange and government revenue, thereby contributing to higher growth. However, the seemingly simple relationship is complicated by among others, fiscal status, debt problem and absorption capacity limits.

For fiscal status, studies (Hjertholm *et al.*, 2000; Hagen and Hatlebakk, 2005; Ouattara, 2006) that have sought to examine the effects of aid on government fiscal behaviour have been concerned with the fungibility of aid as regards government spending patterns, while others (such as Njeru, 2003) have

examined the fiscal response models in an attempt to analyse the effect of aid on various components of government revenue and expenditure. In this respect, the fact that aid is fungible. This implies that aid can be used to fund activities that the recipient government intended to finance in its absence. This has made researchers to examine the extent to which the freed up government resources have been used elsewhere to finance for example, consumption, debt servicing or tax reductions. This has to some extent been linked with possibilities for creating opportunities for corruption as the freed up resources are not directed to their intended objectives.

For the foreign debt problem, the debate has been around two dimensions. Firstly, debt payments have been acknowledged as a further drain on foreign exchange and government revenue. Secondly, debt adversely affects public expenditure (reducing opportunities for crowding in private investments) and debt overhang has been associated with disincentives such as tax disincentives and macroeconomic instability.

Turning to absorption capacity limits, the argument is usually that returns to aid are limited by constraints to expanding service delivery and accelerating growth. Current concerns about aid absorption partly reflect the recognition that aid has often been previously ineffective and poorly managed but they also reflect the concern that aid may pose a challenge when it is large relative to the economy it is intended to assist, even if it is well-managed (Bevan, 2005).

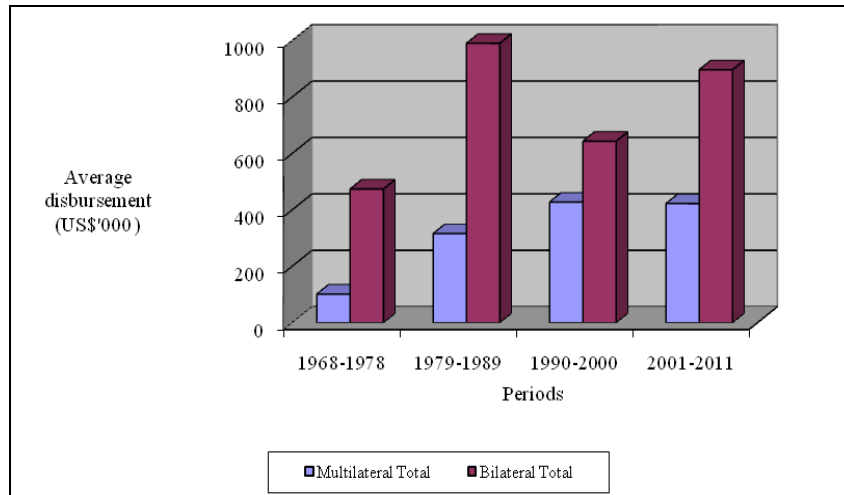
By and large, the relationship between aid and economic growth remains inconclusive, and is worth being studied further within the context of a specific developing country. Most studies have zeroed in on the above three issues (fiscal status, foreign debt and absorption capacity) and with little on the issue of aid unpredictability and its effects on the aid-growth nexus. This is an issue of interest in this study.

1.1.2 Foreign Aid Flows to Kenya

Historically, most aid has been given as bilateral assistance directly from one country to another. Donors also provide aid indirectly as multilateral assistance, whereby resources are pooled together from many donors. Notable multilateral institutions include the International Monetary Fund (IMF) and the World Bank. There are also regional development banks such as the Asian Development Bank (ADB), African Development Bank (AfDB) and Inter-American Development Bank (IADB). Various United Nations agencies such as the United Nations Development Programme also fall in this category.

According to Mwega (2004), 78 per cent of Kenya's aid has been from the bilateral donors, and that the share of multilateral aid increased moderately in the 1980s and early 90s, primarily due to the disbursement of the World Bank adjustment lending under the Structural Adjustment Programme (SAPs). However, the bilateral aid share rose again since then, with the decline in new adjustment lending after 1991. A summary of the Official Development

Assistance (ODA) flows to Kenya over the period 1968-2011 is shown in Figure 1.1.



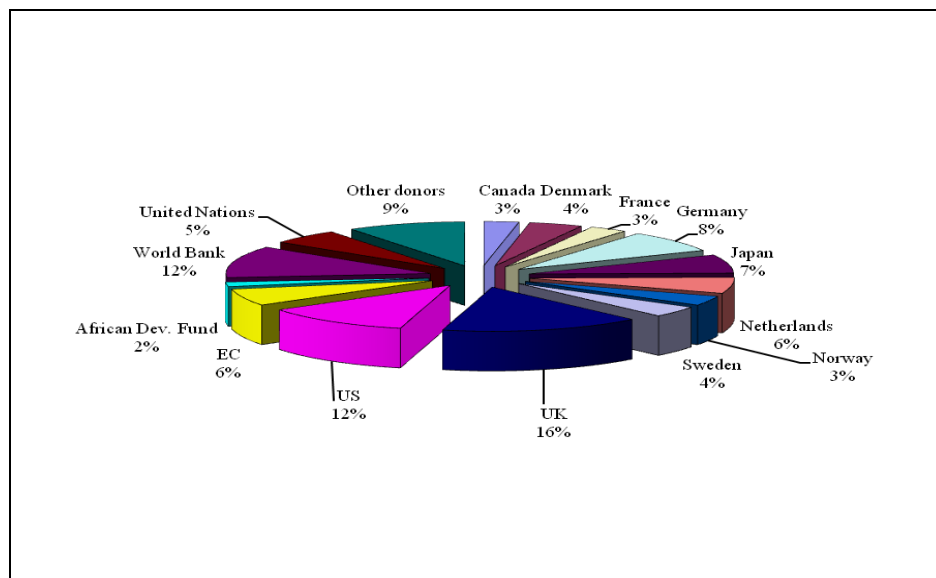
Source: Based on data from OECD/DAC, March, 2013

Figure 1.1: Average ODA flows to Kenya from multilateral and bilateral donors

Figure 1.1 shows that average flows from multilateral donors were high in 1990-2000 compared to the other periods. The period 2001-2011 recorded some growth in ODA flows from the multilateral donors that is comparable to that of the previous period. This could be attributed to the increased donor interest in Kenya arising from the regime change in 2002. On the bilateral flows, it is evident that there was a steady increase in the period 1979-89, a period that recorded the highest foreign aid flows to Kenya. This was partly due to the flows arising from the need to cushion the economy from the effects of the effects of the SAPs and the need to ensure sustenance of the reforms that the country was undertaking during this period. This period also witnessed much of the bilateral support being channelled outside of the Government to the Civil Society Organizations following a not so good relationship between

the government and the development partners during certain periods. After a dip in the period 1990 -2000, there was a noticeable increase in bilateral flows for the period 2001 -2011, possibly due to the regime change and Kenya's commitment to reform.

The composition of major donors to Kenya over the period 1963-2011 is shown in Figure 1.2.



Source: Based on data from OECD/DAC February, 2013

Figure 1.2: Composition of total ODA flows by major donors to Kenya (1963-2011)

Figure 1.2 shows that the major bilateral donors to Kenya include the United Kingdom, United States of America and Germany. Others are Japan, Netherlands, Denmark, Norway and Sweden. Increased foreign aid flows have been seen from China from the early 2000. The major multilateral donors include the World Bank, the United Nations Organisations, the European Commission (EC), the IMF and African Development Bank.

1.1.3 Predictable Aid Flows

The timely flow of aid matter a lot in this process as countries that are dependent on aid become vulnerable when funds are committed and scheduled, but not disbursed on time, or when there is insufficient information about donors' intentions to disburse. In this respect, the Paris Declaration of 2005 commits donors to "provide reliable indicative commitments of aid over a multi-year framework, and disburse aid in a timely and predictable fashion according to agreed schedules" (Organisation for Economic Cooperation and Development [OECD], 2005, No. 26: 4).

According to Celasun and Walliser (2008), whereas aid predictability has been highlighted as a key issue for aid effectiveness (see also OECD, 2005; World Bank, 2007; and IMF, 2007), little systematic information is available on the magnitude of the predictability problem and thus its potential impact on aid recipients. Zimmerman (2005) argued that donors had not been able to make multi-year financial commitments that would enable the recipients to rely on during their planning and budgeting process. They have continued to apply complicated and inconsistent conditionalities, and have in a secretive and slow way been determining how to allocate the resources. Thus, donors have continued to use different disbursement mechanisms and monitoring procedures instead of coordinating their activities (Saasa, 2005; Gómez, 2005). Indeed, creative initiatives such as the global funds run by mixed groups of public, business and non-profit organizations, have but continued to add to the confusion (Sagasti, Bezanson and Prada, 2005).

Aid is said to be unpredictable when there is disparity between commitments and disbursements. The government may plan using the amounts committed, but sometimes donors disburse less than they committed to give. Therefore, at the point of planning, the government is not in a position to plan well using the commitments, since it cannot predict how much of the commitments will actually be disbursed. The Government of Kenya has continued to factor foreign aid in her national budget, but on commitment basis (Republic of Kenya, 2011). This is despite the fact that commitments are poor predictors of disbursements as observed by Bulir and Hamann (2001).

Aid unpredictability arises due to two main reasons which are both external and internal to the recipient countries. Firstly, donor aid commitments, budget approval and disbursements are often made by multiple actors or agencies. For example, commitments by the Minister for Development Cooperation of a country to provide aid to a given country will need parliamentary approval and disbursement by the Ministry of Finance. This commitment might end up not being the same given the approval process and the fact that other priorities might arise during this process. Secondly, the conditions imposed by donors also contribute to the lack of aid predictability. The conditionalities attached are sometimes process-related (for example when a donor insists on recipient countries using consultants from their country in executing projects they finance) or policy or performance based conditions (for example, timely submission of unqualified audit reports). While the imposition of

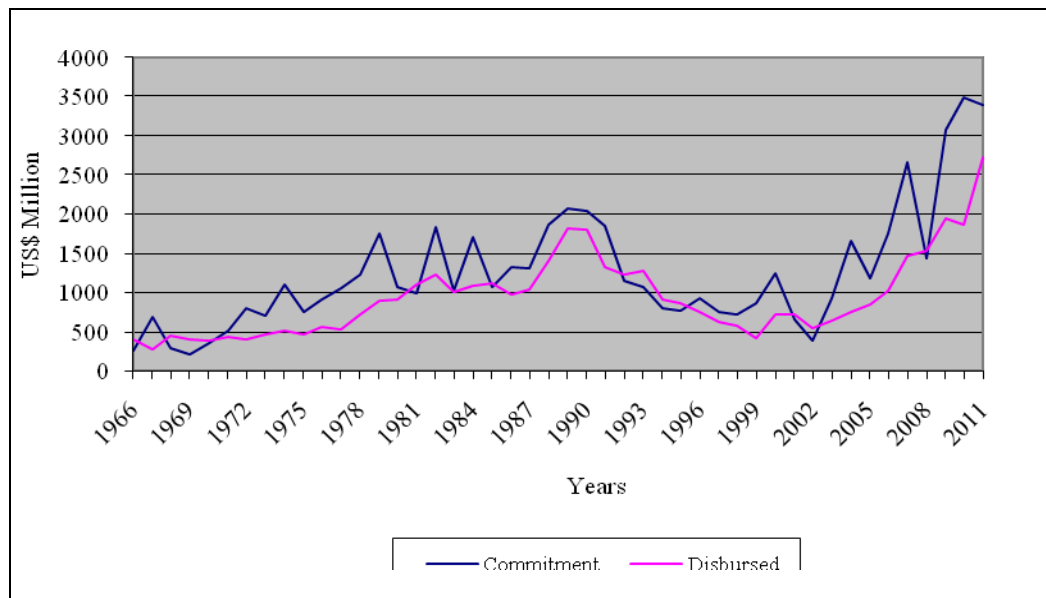
conditionalities is understandable, they are costly. Of significance, therefore, is whether the benefits outweigh the costs.

OECD (2006; 2008) found that there are cases of both under-disbursement (funds not being disbursed on schedule) and of over-disbursement (the disbursement of unscheduled amounts), with little if any progress towards greater in-year predictability. The reasons given by donors for delays include “administrative problems on the donor side” (43 per cent of donor responses) and “the government failure to meet fiduciary conditions” (down to 7 per cent in the 2007 survey from 24 per cent in the 2005 survey) (OECD, 2009: 55). The evaluation noted that partner and donor reports generally provide little evidence of progress towards greater predictability. Even among donors that generally perform strongly on Paris Declaration criteria, some acknowledge that in this area they do not do well.

Since the 1980s, Kenya has experienced relatively unpredictable flows of international aid (see also M’Amanja and Morrissey, 2005; Mwegu, 2009; Oduor and Khainga, 2009). According to OECD-DAC statistics, while Kenya experienced a dramatic build-up in nominal aid flows in the 1980s, the 1990s witnessed a reduction in donor support (Mwegu, 2009). Nominal aid flows increased from US\$ 55.6 million in 1963 to a peak of US\$ 1.2 billion in 1990, before declining to a low of US\$ 309.9 million in 1999, with some recovery thereafter in response to a new government in December 2002 (see Appendix I Table A1 for details).

Kenya has experienced major standoffs with the donor community, which has sometimes led to aid freezes (Wawire, 2006). As a result, foreign aid disbursements were short-lived due to the continued uneasiness amongst the donors with Kenya's implementation of aid conditionalities. For example, the World Bank in July 1982 did not release the second tranche of US\$50 million on the basis that Kenya was lax in undertaking policy reforms (Njeru, 2003). The resumption of funding in 1984 was partly attributable to the humanitarian gesture of providing large volumes of food aid in response to the devastating drought that year. Further freezes were experienced in 1992 and 1997.

The extent of aid unpredictability in Kenya is demonstrated in Figure 1.3.



Source: Based on data from OECD/DAC March, 2013

Figure 1.3: Foreign aid commitments and disbursements (1966-2011)

Figure 1.3 shows that commitments have been higher than disbursements over the years. The only periods when disbursements were higher than commitments were 1968-70, 1981, 1985, 1992-95, and 2001-2002. The situation obtaining between 1968 and 1970, up to 1981 could be due to the effects of the oil shocks that necessitated the need for foreign aid to cushion the Kenyan economy. Between 1992 and 1995 coincided with the funding of Structural Adjustment Programmes (SAPs) by International Monetary Fund (IMF) and World Bank. The situation seen between 2001 and 2002 coincided with the optimism in terms of possible change of government in 2002 coupled with low commitments on the part of Kenya's development partners.

The foregoing situation implies that throughout the study period, donors have not been able to disburse all the resources committed. There have been years when disbursements have exceeded commitments. This too is not good for the country as this becomes a windfall gain that was not expected in the first place. Therefore, the extent of aid unpredictability when examining the figure above is demonstrated by the continued widening of the gap between commitments and disbursements.

1.1.4 Implications of Aid Unpredictability

A number of implications arise when aid is unpredictable. One consequence is that it makes fiscal planning and implementation of a country's development agenda difficult, given the short term nature of the commitments when compared to the government's long term planning. Secondly, it makes

ownership of development programmes difficult as their continuity is pegged on the availability of aid resources which is uncertain. Thirdly, it increases the likelihood of fiscal and monetary instability (Bulir and Lane, 2002). In this case, the government is forced to reschedule some of her activities in light of the aid unpredictability. The key culprit in this case has been reduction in development expenditure allocation, yet this is supposed to be a key driver to the growth of the economy. Additionally, the government has had to increasingly borrow from the domestic market in order to meet the budget shortfall. This has been at the cost of crowding out private investment and increased interest rates. Fourthly, aid unpredictability when associated with aid pro-cyclicality increases output volatility and thus reduces economic growth (Ramey and Ramey, 1995; Lensink and Morrissey, 2000). The foregoing implications makes one wonder how unpredictable aid flows has affected investments and economic growth in Kenya.

1.1.5 Kenya's Joint Assistance Strategy

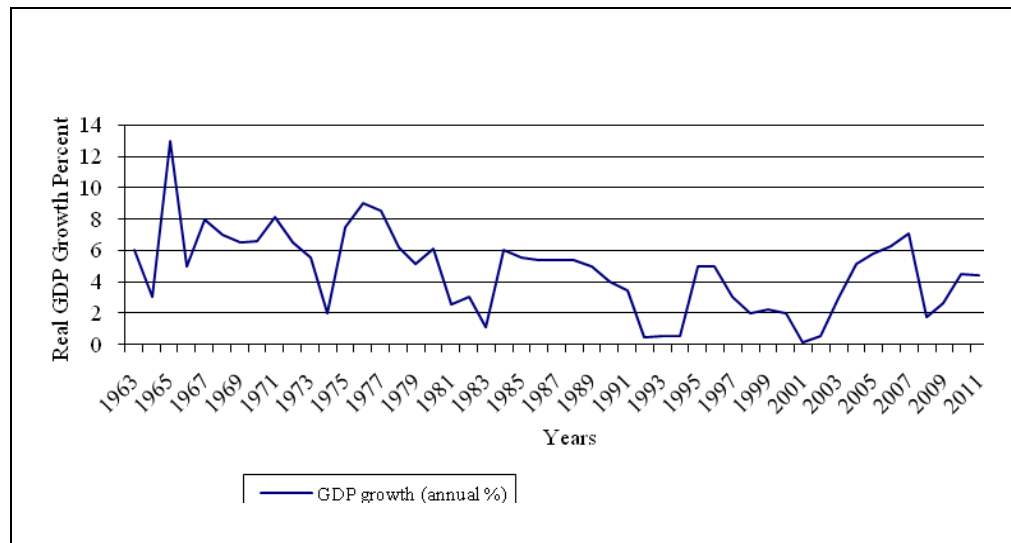
Arising from the foregoing, Kenya and a number of her development partners in 2007 launched Kenya's Joint Assistance Strategy (KJAS) (2007-2012). The strategy represented the mutual commitment of the government and donors to develop a new and more effective way of working together. It was deemed to be a major step forward in the partnership between the government and her development partners, and it was expected to intensify collaboration to significantly improve the prospects for sustained growth and poverty reduction. Through the KJAS, the partners were committed to the principles of aid

effectiveness as demonstrated in the Rome declaration in 2003 and Paris declaration in 2005. At the request of the government, development partners established in 2004 the Harmonization, Alignment and Coordination (HAC) group to improve the effectiveness of development assistance across sectors and agencies. Arising from this strategy, one would expect to have a drastic reduction in disparities between commitments and disbursements, but things have not changed, if anything, the gap has continued to widen further.

1.2 Kenya's Macroeconomic Performance

1.2.1 Economic Growth

Kenyan post-independence economic history can be divided into three periods. The first period, from 1963 to the beginning of the 1980s, was characterized by strong economic performance and huge gains in social outcomes. A second period, from the 1980s to 2002, was typified by slow or negative growth, mounting macroeconomic imbalances and significant losses in social welfare, notably rising poverty and falling life expectancy. Failure to reform and the increased role of politics over policy were at the heart of this structural break (Legovini, 2002). The third period, from 2003 to 2011, was marked by the resurgence in economic growth following the 2002 elections and regime change thereof. Economic growth performance is shown in Figure 1.4.



Source: Computation based on Data from African Development Indicators, World Bank

Figure 1.4: Trends in real GDP growth rates (1963-2011)

Between 1963 and 1970, the economy grew at an average real growth rate of 5 per cent, and from 1970 to 1980, it grew at 8 per cent. In contrast, the following two decades were characterized by a stagnating economy with average growth rates of 4 and 2 per cent in the periods 1990/80 and 2000/90, respectively. According to Republic of Kenya (2006), real GDP growth averaged 3.0 per cent from 1990 to 2005.

In 2006, Kenya's GDP was about US\$17.39 billion. The country's real GDP growth picked up to 2.3 per cent in early 2004 and to nearly 6 per cent in 2005 and 2006, compared with a paltry 1.4 per cent recorded in 2003 and throughout President Moi's last term (1997–2002). Real GDP was expected to continue to improve, mainly as a result of expansions in key sectors of the economy such as tourism, telecommunications, transport, construction and anticipated

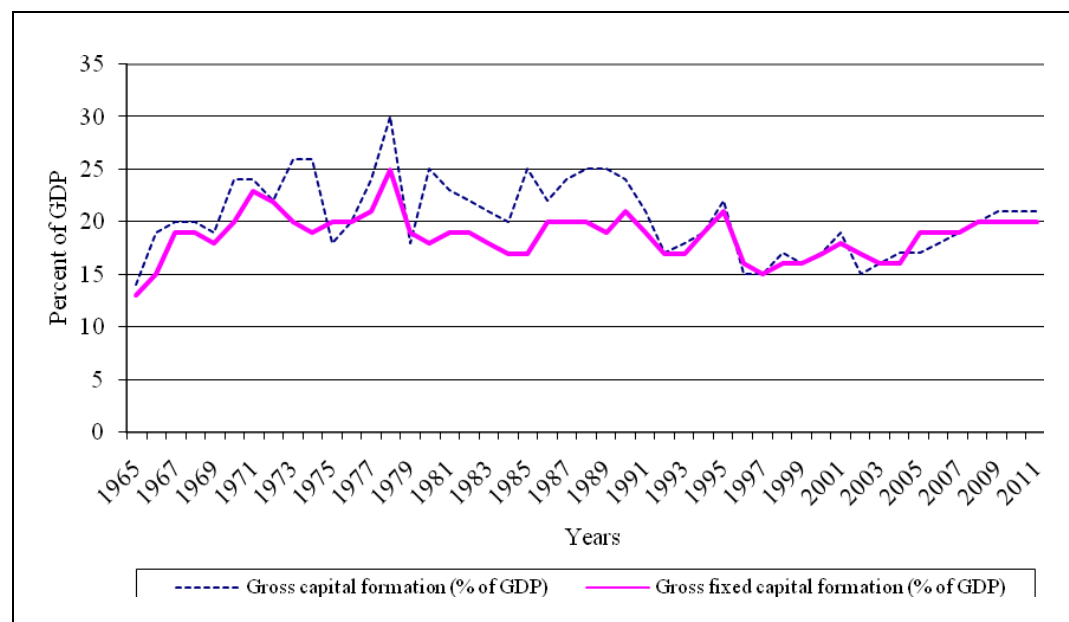
recovery in agriculture. Real GDP growth rates averaged 4.4 per cent over the period 2006 and 2011. The Kenya Central Bank forecast for 2007 was between 5 and 6 per cent GDP growth, but the out turn was 7.1 per cent. Economic growth in the country slumped to 1.7 per cent in 2008 from 7.1 per cent in the year 2007. The subdued growth reflected adverse after-effects of the post-election crisis and high international crude oil prices, which eventually stifled the transport sector and increased the cost of fuel and energy resources utilized in several other sectors. Similarly, the global financial crisis that emerged in the last quarter of 2008 further decreased production levels and export demand. In addition, according to the Central Bank of Kenya (2009), production in the agricultural sector fell due to inadequate rainfall in most parts of the country.

Invariably, increased aid should lead to increased growth, but from the above discussion, even if aid was increasing, this may not lead to increased economic growth as aid is unpredictable. As has been mentioned earlier, aid flows to Kenya has increased sharply in the last few years. However, economic growth has remained dismally low. Could aid unpredictability explain this poor performance in economic growth? This resonates well with the inherent belief that aid is supposed to promote growth, and therefore, any unpredictability has a possibility to affect growth negatively. It is for this reason that this study found the debate on aid unpredictability in Kenya an issue worth examining as most studies (M'Amanja and Morrissey, 2005; Mwegu, 2009; Oduor and Khainga, 2009) had just but mentioned it without specifically factoring it in their models. The main concern for this study, therefore, is the extent to which

output growth is retarded as a result of the unpredictability in aid flows to Kenya.

1.2.2 Investment in Kenya

The role of investment whether private or public in economic development of a country cannot be gain said. Public investment is crucial in setting the basic framework for the private sector to thrive. Since independence, most African countries, including Kenya, have been almost totally dependent on aid for capital investments such as roads, power, water supply and telecommunications (Cooksey, 2004). The growth of gross domestic investment in Kenya over the period 1965 to 2011 is shown in Figure 1.5.



Source: Based on data from African Development Indicators, World Bank, March 2013

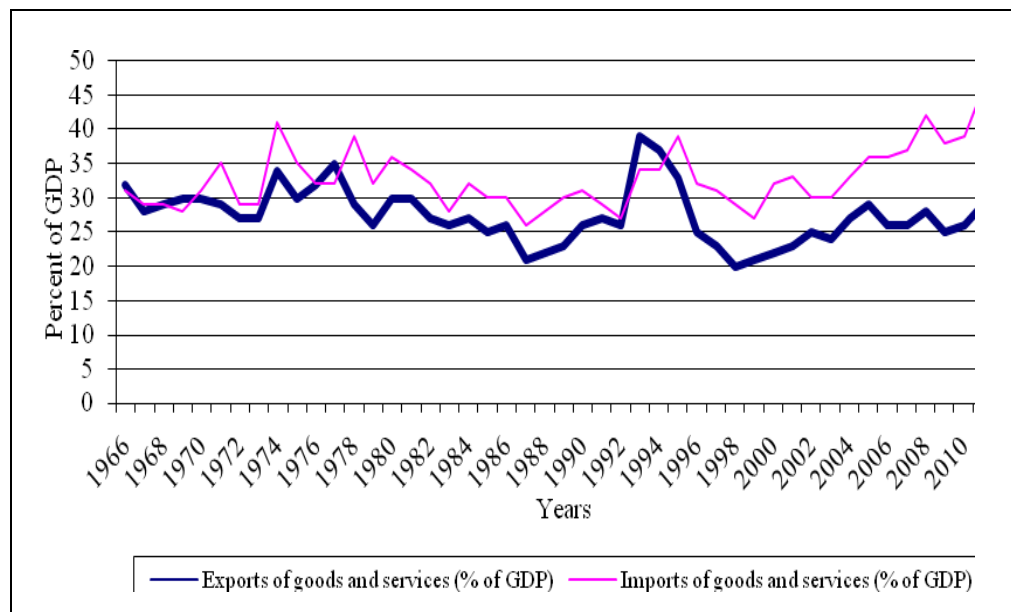
Figure 1.5: Gross fixed capital formation and domestic investment in Kenya (1965-2011)

The figure shows that there was a steady growth in domestic investment (represented by the gross capital formation) in the 1970s reaching a peak in 1979. A further expansion was witnessed in the 1980s with a somewhat decline or stagnation in the 1990s. There has been a steady increase in domestic investment in the period after 2001 but has not reached the levels witnessed in the 1970s. Historically, the 1970s and 1980s witnessed a steady expansion of a number of projects in the development portfolios of ministries, agencies and parastatals. These projects were financed through external loans and grants as well as domestic tax revenues. During the same period, the government's budget deficits as a percentage of GDP grew increasingly larger. By the late 1980s, the World Bank and the IMF argued that the Government had to reduce its overall level of development expenditure while restructuring the nature of that expenditure towards investments that more directly contributed to economic growth. As a result, the Government had to limit budget deficits to five per cent of GDP and formulate a Public Investment Programme (PIP) identifying all development projects and guiding the budget allocation decisions that were essential to improve the quality of the development investments (Cohen, 1995).

The heavy public investments in the economy were deemed essential in laying the necessary grounds for private sector investment. However, the continued heavy presence of government meant that there was a drastic need for reforms under the SAP. The reduction in the government stake in these parastatals, some of which were a drain to the exchequer, meant that the government had to

reprioritise her investment priorities. With the coming in of the National Alliance of the Rainbow Coalition (NARC) government in 2003, investment in infrastructure took a major focus and has continued to date. Private sector is thus seen as an engine for growth, and heavy investments through the private sector have been encouraged, a number of challenges notwithstanding.

In the 1966-1980 periods, sustained commodity exports provided foreign exchange earnings, which favoured investment and capital imports. Figure 1.6 presents Kenya's external balance over the period 1966-2011.



Source: Computation based on data from African Development Indicators, World Bank, March 2013

Figure 1.6: Kenya's external balance (1966-2011)

Overall, there were pronounced swings in the trend of imports between the periods 1973/4, 1983/84 and 1993/94. These periods coincided with the oil crisis and imposition of stringent controls of early 1970s, the advent of

structural adjustment programmes in early 1980s as well as trade and financial sector liberalisation of early and mid-1990s (M'Amanja and Morrissey, 2005). All these swings had some effects on the investments in the economy.

1.2.3 Macroeconomic Policy Reforms

According to Burnside and Dollar (1997), and World Bank (1998), a good policy environment is a prerequisite for aid effectiveness. It is in this regard that the World Bank and other donors have pushed for policy reforms in developing countries, Kenya included. For example, the basic objectives of the Structural Adjustment Programmes were to restore developing countries to macroeconomic stability and to revive economic growth through increased resource mobilization and more efficient use of resources (O'Brien and Ryan, 2001). Throughout the reform period, the policy framework emphasized macroeconomic stabilization through monetary, fiscal and exchange rate management. In addition, the policy agenda encompassed interest rate deregulation, domestic price decontrols, cereals market liberalization. Other features of the reform period were export incentive schemes, reform of financial management and regulatory reforms.

The need for reforming the public finance system was emphasized in the Economic Recovery Strategy for Wealth and Employment Creation (the ERS) for 2003-2007. This was to enable the economy to achieve, among others, fiscal sustainability and balance in the public economy, restructuring and reallocations for growth and poverty alleviation. This, according to Republic of

Kenya (2003), was to result into improved performance of the public sector coupled with efficiency and effectiveness resulting into improved service delivery.

As a result of this, a number of relevant and important reforms have since been initiated. Some of these reforms have been related to an improved budget process and documents and have included automation of payroll and financial management systems. Reforms have also been visible in the legal regimes governing the financial management, ethics and procurement. The introduction of improved audit techniques and the clearing of audit backlogs have been essential components of this process. Institutional reforms have also been undertaken to promote good governance and fight corruption.

These reforms have been premised on the fact that an efficient Public Finance Management (PFM) system is a key factor to the efficient use of a nation's scarce public resources and the realization of public sector objectives such as poverty reduction and support towards national growth and prosperity. It is also an important requirement for donors who are interested in providing general budget support and using national PFM systems. The impact of these reforms on the government's financial management is of essence.

In June 2008, the Government of Kenya unveiled Vision 2030 with a focus on transforming national development. The Vision 2030 superseded the Economic Recovery Strategy for Wealth and Employment Creation, which came to an

end in December 2007. Republic of Kenya (2008) notes that the aim of Vision 2030 is to turn Kenya into an economic powerhouse by increasing income per head fivefold to \$3,000 by achieving and sustaining a 10 per cent GDP growth per annum, and leading into the transformation of the country into an efficient modern democracy.

According to Republic of Kenya (2008), Kenya Vision 2030 covers the period 2008 to 2030 and is based on three pillars, viz: the Economic, Social and Political Pillars. The aim of the economic pillar is to provide prosperity through an economic development programme focusing on achieving an average GDP growth rate of 10 per cent per annum over the next 25 years. The social pillar, on the other hand, seeks to build a just and cohesive society with social equity within a clean and secure environment. The aim of the political pillar is to realise a democratic political system founded on issue based politics that respects the rule of law and protects the rights and freedoms of every Kenyan. Inherent in the pillars is an overarching vision of a globally competitive and prosperous nation with a high quality of life.

The Vision 2030 is to be implemented in successive five year Medium-Term plans. The first plan covers the period 2008-2012. To implement these plans will require significant resources, some of which will have to come externally in the form of foreign aid flows, which have remained unpredictable.

1.3 Statement of the Problem

Since independence in 1963, Kenya has been dependent on foreign aid for capital investments such as roads, power, water supply, and telecommunications. On the other hand, and according to Burnside and Dollar (1997) and World Bank (1998), a good policy environment is a prerequisite for a positive effect of aid on economic growth. Towards this end, Kenya has undertaken a number of macroeconomic policy reforms largely at the behest of the donor community. Whereas the effects of these reforms have largely been judged to be positive, it is unclear whether they have helped in enhancing the effects of foreign aid on investment and economic growth.

However, foreign aid remains unpredictable and fragmented, and donors have not been able to make multi-year financial commitments that would enable the recipients to rely on during their planning and budgeting process (Zimmermann, 2005). Kenya's situation has not been any different, given that the country has experienced relatively unpredictable flows of international aid since 1980s (Mwega, 2009; Oduor and Khainga, 2009). In this respect, the gap between foreign aid commitments and disbursements has continued to widen. This is despite the fact that making foreign aid predictable has been one of the tenets of the Rome declaration in 2003, Paris declaration in 2005, Accra Agenda for Action in 2008, and Busan Partnership for Development Effectiveness in 2011. Thus, the Government has continued to factor foreign aid in her budget estimates on commitment basis (Republic of Kenya, 2011), yet commitments are poor predictors of disbursements.

The foregoing leads one to question why foreign aid flows have continued to be unpredictable despite the fact that donors and recipient governments have committed to abide by the Paris and Accra principles of aid effectiveness. It is unclear how the continued unpredictability has affected investment and economic growth in Kenya, and thus, how the country would realise her development goals when foreign aid that forms a major source of development financing remains unpredictable. It is also unclear whether the macroeconomic policy reforms have had any effect in improving the aid-growth nexus.

This study was, therefore, informed by the fact that most studies (M'Amanja and Morrissey, 2005; Mwegu, 2009; Oduor and Khainga, 2009), while recognising the unpredictability of aid in Kenya, had failed to factor it in their models. Lensink and Morrissey (2000) argued that the effect of aid on growth was insignificant unless some measure of aid uncertainty was included in the regression, and that uncertainty about aid is detrimental to growth.

1.4 Research Questions

This study sought to respond to the following research questions:

- (i) What is the effect of foreign aid on investment and economic growth in Kenya?
- (ii) What is the effect of macroeconomic policy environment on the foreign aid, investment and economic growth?
- (iii) What is the effect of aid unpredictability on investment and economic growth?

- (iv) What are the policy implications to address the problem?

1.5 Objectives of the Study

The general objective of this study was to examine the effects of foreign aid predictability on investment and economic growth in Kenya. The specific objectives were to:

- (i) Examine the effect of foreign aid on investment and economic growth in Kenya;
- (ii) Examine the effect of macroeconomic policy environment on foreign aid, investment and economic growth;
- (iii) Analyse the effect of aid unpredictability on investment and economic growth; and
- (iv) Draw policy implications arising from the study findings.

1.6 Significance of the Study

The significance of this study is to inform policy debate on aid-growth nexus and add to the literature on the subject of aid effectiveness in Kenya. To the Government of Kenya, the study findings and policy implications thereof are of significance in as far as enhancing economic growth and improving the country's relations with the private sector and development partners. This study also points to areas that Kenya's development partners should improve on in line with their international commitments on aid effectiveness. The study also is significant to the private sector in so far as its increased role in Kenya's economic development. For researchers with interest on aid effectiveness, this

study examines aid predictability, an issue that development partners have committed to but seem not to have adhered to over a considerable period of time. It underscores the need to incorporate the issue of aid predictability or unpredictability in empirical studies on aid effectiveness.

1.7 Scope and Delimitations of the Study

The study was delimited to the period 1966-2010 since data was available for most of this period. The study used aggregated data and therefore was delimited in the extent to which the impact had been felt at micro-level. There are a number of issues regarding the aid debate that were related to this study. These are absorption capacity, aid volatility and external debt. However, this study only related to these issues where necessary.

1.8 Organisation of the Study

This study is organized as follows. Chapter one is an introduction that provides relevant information about Kenya's foreign aid flows and the macro economy. Chapter two presents the literature review and focuses on the theoretical and empirical literature. Chapter three focuses on the methodology. The theoretical framework for the study, the model specification and estimation method are also presented. Chapter four presents the study findings, while summary, conclusions and policy implications are presented in chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter presents the literature review for the study. The chapter is divided into two sections. Section 2.2 covers the theoretical literature while section 2.3 presents the empirical literature. Section 2.2 is divided into five sub-sections. Sub-section 2.2.1 presents the Theory of Public Goods Provision; sub-section 2.2.2 presents the Gap Theory, while the Solow-Swan Model and the Poverty Traps are presented in sub-section 2.2.3. Sub-section 2.2.4 presents the endogenous Growth Models and sub-section 2.2.5 presents the investment theories. Section 2.3 is divided into two sub-sections. Sub-section 2.3.1 presents the Foreign Aid, Investment and Growth Literature and sub-section 2.3.2 presents the Foreign Aid Unpredictability Literature. The literature reviewed was essential in informing the variables that were selected later on in the methodology section.

2.2 Theoretical Literature

In this section, a review of several theories that link foreign aid, investment and economic growth is done. The following is a brief discussion on each one of them.

2.2.1 The Theory of Public Goods Provision

In a perfect competitive market, pareto–efficiency is assumed to exist in the sense that given the set of factor prices, a reallocation of factor inputs does not increase total output and given the initial distribution of income, it is not possible, by reallocating final output between individuals, to make one person better off without making another worse-off. Competitive markets contribute greatly to the material well-being of the citizens, but they are not without their flaws. A higher level of material welfare can be obtained if the government operates in close consultation with the market system, by taking care of its inadequacies and moderating its harsher tendencies. In this respect, the functions of the government are two-fold and well-defined.

The government’s potential role follows from the observation that actual economies do not satisfy the requirements of pareto-efficiency conditions. A public good is often defined to be a good that is both nonrivalrous and nonexcludable in consumption. The nonrivalrous property holds when use of a unit of the good by one consumer does not preclude or diminish the benefit from another consumer using the same unit of the good. Thus, there is jointness in consumption of the good as one unit of the good produced generates multiple units of consumption. Non-rivalrous implies that the opportunity cost of the marginal user is zero.

Thus, the role of the government is to provide public goods. The characterization of the efficient provision of public goods was first published in

Samuelson (1954) and was followed by a diagrammatic explanation in Samuelson (1955). Samuelson's rule states that Pareto-efficient provision of the public good occurs when the marginal rate of transformation between the public good and each private good is equal to the sum, over all households, of the marginal rates of substitution. In this case, therefore,

$$\sum_{h=1}^H MRS_{Gx}^h = MRT_{Gx}, \quad (2.1)$$

where H is the number of households (with $h= 1, \dots, H$), G is public good, x is private good, MRS is the marginal rate of substitution and MRT, the marginal rate of transformation.

The government in a bid to provide the public goods has to finance this process either through taxation or through foreign aid. As previously stated, foreign aid in most developing countries is unpredictable and thus the essence of this theory in providing the link between public goods provision and foreign aid. This will be examined in detail under the theoretical framework.

2.2.2 The Gap Theory

The origins of the two-gap model was associated with McKinnon (1964) and Chenery and Strout (1966). Although no longer popular in the academic literature (Easterly (1999) calls it a 'dead model'), it is still widely used by policy-makers.

The basic two-gap model has two components of which the first concerns the link between investment and growth, and determines the supply side. In the Harrod-Domar tradition, gap models assume a linear relationship between output (Y) and capital (K), such that

$$Y = \frac{K}{v} \quad (2.2)$$

where v represents the capital-output ratio or the incremental capital-output ratio (ICOR). This implies that output growth will be a function of the investment rate (I),

$$\frac{\dot{Y}}{Y} = \frac{\dot{K}}{vY} = \frac{I}{vY} - \delta, \quad (2.3)$$

where a dot over a variable denotes the change over time (that is $\dot{Y} = \partial Y / \partial t$ is the change in output between now and the next period) and δ the depreciation rate. Note that current output is predetermined by past investments.

As a planning framework, equation (2.3) allows policy makers to determine the minimum level of investment (I^*) required to achieve the desired rate of output growth (g^*):

$$\frac{I^*}{Y} = v(g^* + \delta) \quad (2.4)$$

The second component of the two-gap model deals with the determination of investment. From basic national income accounting it is known that

$$Sp - I = (G - T) + (X - M), \quad (2.5)$$

with Sp = private savings, G = government (current and capital) expenditure, T = taxes, X = exports and M = imports. This could be rewritten as

$$I = \underbrace{s_p + (T - G)}_{\text{domestic savings}} + \underbrace{(M - X)}_{\text{foreign savings}} = S + F \quad (2.6)$$

In equation (2.6), private savings and the budget surplus have been aggregated into domestic savings (S). The last term is referred to as foreign savings (F), since the trade deficit on goods and services has to equal the sum of net current transfers (including foreign aid), net capital inflows (capital account plus financial account) and net factor payments. F in this case is taken as foreign aid.

In the two-gap literature, it is assumed that all the terms on the right-hand side of equation (2.6) are determined exogenously. The feasible levels of investment are thus given by

$$I^{SG} \leq S + F \quad (2.7)$$

In case the resulting investment level falls below the desired level I^* , then the economy would be facing a savings gap.

To derive the foreign-exchange gap, the model assumes further that imports consist of capital imports (M_k) and other imports (M_o):

$$M = M_o + M_k \quad (2.8)$$

It is assumed that a fixed share m of all capital goods will have to be imported from abroad,

$$I = \frac{1}{m} M_k = \frac{1}{m} (M - M_o) \quad (2.9)$$

Substituting $M = X + F$ into this equation gives

$$I = \frac{1}{m} [(X - M_o) + F]. \quad (2.10)$$

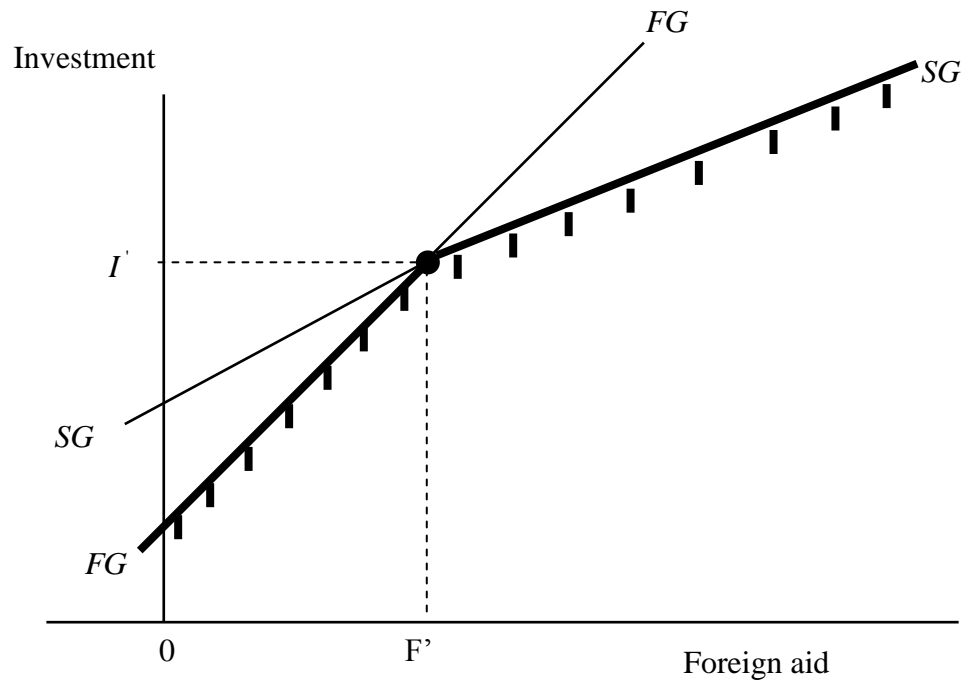
Again, the two-gap model assumes that the variables on the right-hand side are either exogenous or predetermined. Thus, the investment constraint arising from this foreign-exchange restriction is given by

$$I^{FG} \leq \frac{1}{m} [(X - M_o) + F] \quad (2.11)$$

There is a foreign exchange gap (or ‘trade gap’), if this investment level is below I^* , that is, below the level required to achieve the desired level of output growth g^* .

Depending on the various exogenous and predetermined variables, either the savings constraint (2.7) or the foreign-exchange constraint (2.11) could be binding for a country. Note that neither implies that the economy is in disequilibrium. In this case, therefore, there is a difference between the ex-ante (desired) and the ex-post (actual) investment rate.

The two binding constraints on investment are thus plotted as a function of foreign aid (F) in Figure 2.1.



Source: Harms and Lutz (2004) p. 7

Figure 2.1: The savings and foreign exchange gaps

The savings constraint is represented by the SG-curve while the foreign-exchange constraint is represented by the FG curve. Investment (I) is bounded by either of the two curves such that the feasible region is depicted by the bold shading. It may be observed that to the left of F' , investment is limited by the foreign exchange constraint (FG), and to the right of F' , it is limited by the domestic savings constraint (SG). From equation (2.3), it follows that these limits on investment translate directly to the feasible growth rates that could be obtained in an economy characterised by these features.

An increase in foreign aid moves the economy to the right. This raises the feasible level of investment. Thus, regardless of whichever of the two gaps is

applicable, more aid has the potential to increase the feasible growth rate of the economy. The magnitude of the rise will depend on which of the two constraints is binding (Harms and Lutz, 2004). An economy that is facing a savings gap will have a smaller effect.

Several criticisms have been put across on the Gap models. Firstly, is the link between investment and growth, specifically its assumption of a constant capital-output ratio. However, more recent growth models have put the role of physical capital investment as modest, and have given more emphasis on the role of education, research and development as determinants of growth. Secondly, the model has been criticised on its assumption regarding the relationship between foreign aid and investment. From the point of view of private and public agents in the recipient country, an inflow of aid constitutes additional income. The share to be saved depends on how transitory the additional income is. According to Harms and Lutz (2004), the longer the aid inflow is expected to last, the more of it will be allocated to current consumption.

Thirdly, it is possible that the government can alter its general expenditure pattern as a result of the aid inflow. Thus, the fungibility of aid makes it unlikely that all aid resources are devoted to investment. In addition, resources may get wasted directly by corrupt government officials and indirectly via rent-seeking activities (Kanbur, 2000).

Bacha (1990) and Taylor (1990) identified a third gap – the fiscal gap. The gap arose due to lack of capacity of governments of developing countries to raise revenue necessary for a desired level of investment. In this respect, they argued that foreign aid flows to governments could potentially relax the fiscal gap conditional to it being used for investment purposes. A study by Njeru (2003) sought to examine the impact of foreign aid on public expenditure in Kenya. This could be seen as a way of examining the validity of the fiscal gap in Kenya and the role of foreign aid in filling the fiscal deficit.

Despite the above criticisms of the gap theory, this study finds it important in as far as laying a sound framework for understanding the foreign aid, investment and growth relationship.

2.2.3 The Solow-Swan Model and the Poverty Traps

The Harrod-Domar growth model discussed in the previous section considers foreign aid as a means to raise investment and thus improve the country's growth rates closer to a desired level. In this regard, as indicated by Harms and Lutz (2004), investment and growth return to their initial levels if the inflow of aid dries up, that is, the long-run growth effects of aid are only realised if the volume of aid disbursements is raised persistently.

The foregoing explanation changes under a different theoretical framework in which growth is hampered by the presence of poverty traps. A poverty trap could have different sources, which could be traced back to among other

factors, population dynamics, and the existence of complementarities, agents' savings behaviour, or properties of the production function. The causal factors notwithstanding, it is apparent that the existence of multiple steady states and the possibility that countries that start out with a low per capita income have a possibility to find themselves in a vicious circle with poverty and low-growth reinforcing each other. In this respect, a temporary injection of foreign capital could help the economy to take off and to permanently reach a higher level of per-capita income.

A Solow growth model allows for the possibility of substitution between capital and labour. It implies that the economy approaches a steady state in which the economy's savings are balanced by the need for investment to maintain a constant capital-labour ratio, in light of the increases in labour force growth and productivity. Thus, the steady state growth rate in this model is equal to the rate of population growth plus the rate of technical change. Thus, a flow of aid does not affect the economy's growth rate once it reaches the steady state, but it does imply that this growth rate is reached at a higher level of GDP (which in itself is a desirable outcome), and further implies a higher growth rate during the transition.

The model assumes that agents have access to constant returns to scale technology ($F(K, L)$) with physical capital K and labour L as inputs. It is also assumed that there are no private international capital flows, so that domestic investment I has to be financed out of domestic savings S :

$$Y = F(K, L), \quad (2.12)$$

$$\dot{K} = I - \delta K, \quad (2.13)$$

$$I = S, \quad (2.14)$$

where δ denotes the exogenous rate of depreciation. For simplicity it is assumed that there is no exogenous technological progress.

Deviating from the Solow model by assuming that there are basic subsistence consumption needs to be satisfied by the agents, and that savings are zero whenever per capita income does not exceed this level of subsistence consumption, the savings function is then described as follows:

$$s = \begin{cases} s[Y - \tilde{C}L] & \text{if } Y > \tilde{C}L \\ 0 & \text{if } Y \leq \tilde{C}L \end{cases}, \quad (2.15)$$

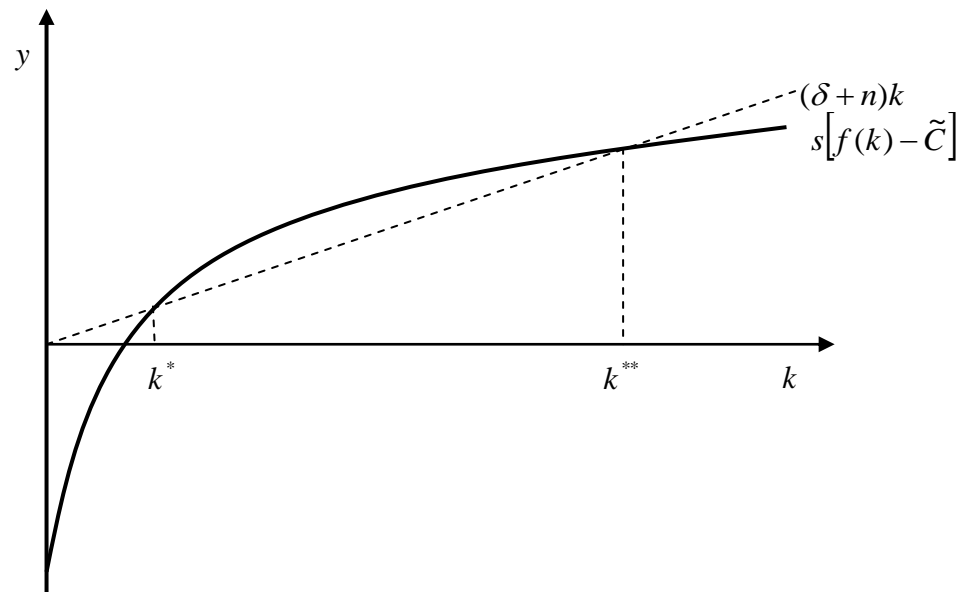
where $0 < s < 1$ and \tilde{C} is the per capita subsistence consumption needs.

Combining equations (2.12 through (2.15) results into the following modified Solow equation:

$$\dot{k} = s[f(k) - \tilde{C}] - (\delta + n)k, \quad (2.16)$$

where k is the capital stock in per-capita terms and n is the exogenous population growth rate.

Figure 2.2 presents the poverty traps in a Solow-Swan model with subsistence consumption.



Source: Harms and Lutz (2004) p.10

Figure 2.2: Poverty traps in a Solow-Swan model with subsistence consumption

The evolution of the capital stock (in per capita terms) \dot{k} is depicted as the distance between the bold line and the dashed line. In this case, two steady states are evident from the system: one stable, Solow-type steady state k^{**} , to which the per-capita capital stock converges from below and above; and a second, unstable steady state k^* , which determines the boundary of the poverty trap. If a country's initial capital stock (per capita) is lower than k^* , the dynamic forces of the model will drive it to an even lower level.

From the above analysis, it is evident that if agents have a very low income, subsistence consumption needs prevent them from investing in the maintenance of the capital stock. As a result, depreciation reduces the capital

stock even further, reinforcing the process of poverty and decay in future periods.

From this background, there is an obvious role for aid: since a one-time increase of the capital stock can propel a country out of the poverty trap, and therefore permanent inflows of aid not required in lifting developing countries to higher levels of income and growth. Instead, a one-time injection could do the trick. According to Nelson (1956), flow of funds from abroad results into increased income and capital and this could help to free an economy from the low-level equilibrium trap.

However, the above seemingly easy relationship has a number of limitations. Firstly, is the model's suggestion that poverty is due to unfavourable initial conditions. While this may be part of the truth, reliance on the argument risks downplaying the role of current institutions and policies. Secondly, while aid seemed to be the only way to alleviate a shortage of capital in the 1960s, this notion has been surpassed by the massive private foreign investment in developing countries. Recent developments in the private capital markets in developing countries, including Kenya could be a pointer to the need to re-evaluate the basis of this poverty-trap theory. This study therefore doesn't find this theory to form a good theoretical framework due to the criticisms raised above.

2.2.4 Endogenous Growth Models

Endogenous growth models seek to explain growth on the basis of increasing returns to scale (linked to human capital accumulation) and positive externalities associated with learning-by-doing. They therefore leave open the possibility that the equilibrium growth rate is path-dependent and thus leave it open for empirical work on various factors that influence growth.

According to Agénor (2004), there are basically two main mechanisms through which the creation of knowledge is captured in endogenous growth models. These are as a by-product of economic activity, or as a production activity in its own right.

Arrow (1962) postulated that learning by doing was a key source of technological progress. Under such a situation, experience, as measured in various ways, such as, cumulative past investment or output, plays a key role in raising labour productivity over time. Arrow's learning by doing approach is simply presented by assuming that the level of productivity, A , is related to the absolute size of the capital stock and to an autonomous factor, B , such that

$$A = BK^\theta, \quad (2.17)$$

where θ is a positive coefficient.

When equation (2.17) is differentiated with respect to time, thus:

$$\frac{\dot{A}}{A} = \theta \left(\frac{\dot{K}}{K} \right) + \gamma, \quad 0 < \theta < 1, \quad (2.18)$$

where $\gamma (\equiv \dot{B}/B)$ is the exogenous rate of labour-augmenting technical change, and θ is the learning by doing coefficient, which is dependent on government spending on for example education.

Considering that the production technology is Cobb-Douglas, its intensive form could be written as

$$y = k^\alpha, \quad (2.19)$$

where $k = K/AL$ is the capital effective labour ratio.

The capital accumulation and labour force growth rate are given by

$$\dot{K} = sY - \delta K, \quad \dot{L}/L = n. \quad (2.20)$$

where n is the growth in population.

From equations (2.19) and (2.20), the growth rate of capital stock is given by

$$\frac{\dot{K}}{K} = s\left(\frac{Y}{AL}\right)\left(\frac{AL}{K}\right) - \delta = \frac{sk^\alpha}{k} - \delta, \quad (2.21)$$

Using equation (2.18), the growth rate of labour in efficiency units is given by

$$\frac{\dot{A}}{A} + \frac{\dot{L}}{L} = \theta\left(\frac{\dot{K}}{K}\right) + \gamma + n. \quad (2.22)$$

Differentiating the expression $k = K/AL$ with respect to time yields

$$\frac{\dot{k}}{k} = \frac{\dot{K}}{K} - \left(\frac{\dot{A}}{A} + \frac{\dot{L}}{L}\right), \quad (2.23)$$

Using equation (2.21) and (2.22) yields

$$\dot{k} = s(1 - \theta)k^\alpha - [\gamma + n + \delta(1 - \theta)k], \quad (2.24)$$

which is a nonlinear, first-order differential equation in k . Thus, the equilibrium capital-effective labour ratio is given by

$$\tilde{k} = \left\{ \frac{s(1-\theta)}{n + \gamma + \delta(1-\theta)} \right\}^{1/(1-\alpha)}, \quad (2.25)$$

From equation (2.25), it could be deduced that an increase in the learning coefficient θ , by raising the level of effective labour, reduces the steady-state value of the capital-effective labour ratio.

Setting $\dot{k} = 0$ in equation (2.23), the steady-state growth rate of the capital stock is given by, using equation (2.22),

$$\tilde{g}_K \equiv \left. \frac{\dot{K}}{K} \right|_{k=\tilde{k}} = \theta \tilde{g}_K + \gamma + n, \quad (2.26)$$

such that

$$\tilde{g}_K = \frac{\gamma + n}{1 - \theta}. \quad (2.27)$$

The steady-state growth rate of output, ALk^α , is therefore equal to

$$\tilde{g}_Y = \theta \tilde{g}_K + \gamma + n = \frac{\gamma + n}{1 - \theta}, \quad (2.28)$$

such that income per worker, Y/L , grows on the balanced growth path at the rate

$$\tilde{g}_{Y/L} = \tilde{g}_Y - n = \frac{\gamma + n}{1 - \theta}. \quad (2.29)$$

From the above analysis, it could be deduced that the influence of aid on growth under this model is through the extent to which it is used to add to human capital. In this regard, the role of aid in health and education spending

in development is crucial here. A related literature has focused on the role of institutions in influencing total factor productivity. This is an important aspect that will be borrowed from this theory as part of the theoretical framework and the model thereof.

However, despite Arrow's formulation being able to explain the differences in growth rates in per capita incomes to differences in the ability to learn from experience, it still gives no role to saving and investment rates.

According to Barro and Sala-i-Martin (1992), the level of the technology $A(t)$ can be different in different states or countries. Assuming that the initial distribution of differences in technology is as given by history, the knowledge about it diffuses slowly from high technology to low technology regions. This would mean that across the states, there is underlying variation in $A(t)$ that causes variation in both k (capital effective labour ratio) and y (output). As a result, differences in output per worker do not necessarily signal large differences in the marginal product of capital. Because the flow of knowledge from the technology leader makes the technology grow faster in the follower country, the results is that income per capita grows faster in the follower as diffusion closes (what has been called a technology gap). The speed of convergence will be determined primarily by the rate of diffusion of knowledge, so the convergence dynamics tell nothing about the exponents on capital and labour.

An extension of Arrow's learning-by-doing model was developed by Villanueva (1994) in order to address the inadequacies of the model. The introduction of learning through experience in Villanueva's model results into: (i) the equilibrium growth rates becoming endogenous and may be influenced by government policies; (ii) the speed of adjustment to the equilibrium growth path becoming faster than in the Solow-Swan model, and enhanced learning reduces adjustment time; and (iii) the equilibrium rate of output growth exceeds the sum of exogenous rates of technical change and population growth.

2.2.5 Investment Theories

Turning into investment theories, it is worth noting that a number of theories relating to investment and growth have been advanced. Although these theories are relevant, they have not been very successful for developing countries' analyses, when they are assessed independently. This has therefore led to the emergence of hybrid models which attempt to take the structural composition of developing economies into account.

Keynes (1937) recognized the existence of private investment decisions in the economy, which depended on the marginal efficiency of capital that reflected the opportunity cost of capital. Thus, a fall in interest rate will decrease the cost of investment when compared to the return, such that planned capital investment projects may become profitable on the margin. The theory emphasizes the role of interest rates in investment decision making. It however, ignores other major factors that determine investment behaviour. The role of

private investment as stated in this theory becomes important in this proposed study.

In the accelerator theory, the level of investment depends on the level of output (Harrod, 1936, 1948; Hansen, 1949; Hicks, 1950). This implies that the rate of investment depends on economic growth rate. The model assumes that the demand for machinery and factories is derived from the demand for goods. Thus, if the demand for the goods that capital equipment produces is to increase and the existing capacity cannot meet this expected increase in demand, then a new investment in plant and machinery will be required to increase production. However, due to the restrictive nature of the assumptions under this model, the proposed study will not use it.

The neoclassical model as formulated by Jorgenson (1967) and Hall and Jorgenson (1971) seek to address the restrictive assumptions of the accelerator theory. Under this model, the desired capital stock depends on the user cost of capital and the level of output. Further, the user cost of capital depends on a number of factors key among them are the real interest rate, the price of capital goods and the depreciation rate. In this case, the difference between the current and desired capital stock is deemed to arise due to lags in decision making and delivery, thus giving rise to an investment equation. Thus, increases in user cost of capital will automatically lead to lower rate of investment. This model is built on a number of assumptions including, perfect competition and exogenously determined output; and static expectations about future prices,

output and interest rates. It may however be noted that some of the assumptions may be too restrictive, particularly the assumption of static expectations regarding economic agents.

2.3 Empirical Literature

This section reviews empirical literature on the subject. It examines literature on the relationship between foreign aid, investment and economic growth before examining briefly those on aid predictability. This is done on the understanding that the first section of the literature sets the basic framework of the aid-growth nexus and includes the policy environment link. The second section of the literature delves further into the issue of aid predictability and its relationship with the aid-growth nexus.

2.3.1 Foreign Aid, Investment and Growth Literature

The origins of foreign aid could be traced to the Marshall Plan that was developed by America following the end of the Second World War in 1945. The intention of the USA funded Marshall Plan was to bring development to Europe following the effects of the World War. The Plan was widely successful, with many European countries undergoing a period of rapid industrialisation during the late 1940s and early 1950s, which brought America close to a number of European countries with an aim to contain the growth of Russian Communism. There was, however, very little research at this time on the effects of foreign aid on economic development. Early studies on economic growth started in the 1950s with development theories postulating that foreign

aid would provide the necessary capital to propel development. Studies by Nurkse (1953) and Lewis (1954) sought to examine the role of capital formation and labour as critical ingredients in economic growth. These two studies, therefore, form an important starting point in the aid-growth nexus debate.

This study appreciates the massive number of studies that have been conducted on this subject and therefore cannot review all. Studies by White (1992), Hansen and Tarp (2000), Hermes and Lensink (2001), Morrissey (2001), McGillivray (2003) and McGillivray *et al.* (2005) have solely sought to examine the advances in the literature over the period, with McGillivray *et al.* (2005) examining the 50 years of the aid-growth controversy. Whereas McGillivray *et al.* (2005) have categorized the period into two, 1950 to 1998, and 1998 to the present (in this case 2004), this study finds the classification by Hansen and Tarp (2000) of great interest and adopts it in the review. The reason for adopting this approach is its emphasis on the theoretical underpinnings in the selection of the models used by the various studies. The Hansen and Tarp study categorizes the literature into three: Aid, savings and growth (first-generation studies); Aid, investment and growth (second-generation studies); and Aid, policy and growth (third-generation studies).

(a) Aid, Savings and Growth: First-Generation Studies

During the early 1960s, empirical studies were based on the 'gap models'. The two-gap models came to be associated with Chenery and Bruno (1962) and Chenery and Strout (1966).

As earlier explained, the Harrod–Domar growth model was the first and the most well-known of the gap models. The key assumption in the model was that growth was constrained by the availability and productivity of capital in spite of the oversupply of labour. Capital availability was determined by the level of savings, which was to be increased if the government was to realise a targeted growth rate. Given the low savings in developing countries, foreign aid could relieve the savings constraint, thus increasing investment and leading to a higher rate of growth.

A foreign exchange gap emerged, given that developing countries were unable to have enough export earnings necessary to import capital goods for investment. Chenery and Bruno (1962) and Chenery and Strout (1966) thus developed a 'dual gap' model. Their explanation of the foreign exchange gap was also supported by McKinnon (1964), who asserted a classical view that the role of foreign aid or investment was to supplement domestic saving in the recipient country. The study appreciated the fact that many goods necessary for industrial development could not be produced domestically, especially after emerging from a war, noting the important role of foreign aid in this respect. Thus, foreign aid accounted for a very small portion of domestic savings. The

study further emphasized the role of export expansion and import substitution coupled with foreign aid as being necessary to relieve the industrialization bottleneck. However, export expansion to a large extent was dependent on the country's level of development. The exports of primary goods from the developing countries were tied to a number of trade barriers imposed by the developed countries.

Aid might have different effects in different developing countries. A study by Chenery and Carter (1973) using data from 50 countries over the period 1960-1970 and following the two-gap model of Chenery and Strout (1966), showed that the effects of official development assistance (ODA) on the development performance of countries under study were different among certain groups of countries. The study found that foreign assistance accelerated economic growth in five of the countries, namely Kenya, Korea, Iran, Taiwan and Thailand, and retarded growth in six countries, namely, Colombia, Ceylon, Chile, India, Ghana and Tunisia). In comparison to a no-aid pattern of growth, post-aid growth rates could be higher or lower depending upon three factors: (i) initial poverty of a country; (ii) additional rise of government consumption as percentage of aid received; and (iii) the term of aid. *Ceteris paribus*, a given amount of aid tended to increase post-aid growth if domestic savings ratio was higher, the percentage of aid fungible into government consumption was lower, and the term of aid was longer. The critical assumptions were that government replaced portions of its savings with aid and then allocated the freed money to other programmes, which could not be cut back once started.

Earlier studies on the aid-growth nexus focused on the two gaps, that is, the relationship between foreign aid and savings, with later studies examining the impact of foreign aid on investment and economic growth. Studies by Rosenstein-Rodan (1961) and Chenery and Strout (1966) put a different twist. Instead of investigating the relationship between foreign aid and savings, they estimated the amount of foreign aid that would be necessary in order to achieve a targeted rate of growth.

According to these early studies, the underlying assumption was that a dollar of foreign aid would increase savings and investment by the same magnitude, and this would further lead to economic growth. They noted that a positive relationship between aid and savings would imply a favourable impact on economic growth (McGillivray *et al.*, 2005). The empirical model used in most of these studies was of the following form:

$$\left(\frac{S}{Y}\right)_i = \delta_0 + \delta_1 \left(\frac{A}{Y}\right)_i + \mu_i \quad (2.30)$$

where S was the domestic savings in the recipient country i ; Y was the Gross National Product (GNP); A was a measure of foreign aid; δ_0 was a constant, δ_1 was the slope of the regression; and μ_i is the error term.

Most of these studies were conducted on a sample of developing countries (that is, they were cross-country studies) and used Ordinary Least Squares (OLS). However, it was not possible to identify the particular impact of aid from these

studies. These studies suffered from omitted variable bias and fail to differentiate between aid flows and other foreign capital inflows.

Papanek (1972) and Newlyn (1973) provided an alternative explanation for the finding of a negative association between foreign capital flows and savings. They noted that domestic savings were used as the dependent variable, and were calculated as national income less consumption. The implication of this is that if any part of foreign aid was used for consumption, the impact on domestic savings would be negative, *ceteris paribus*. Given that donors were not averse to funding some components of consumption, the issue of importance was whether total savings (domestic savings plus foreign aid) would fall. Unless, the coefficient on the aid variable was significantly less than minus one, it could be concluded that although foreign aid displaced domestic savings, total savings increased.

Papanek (1973) study used a cross-country analysis with data composed of 34 countries in the 1950s and 51 countries in the 1960s, with foreign aid, domestic savings, foreign investment and other flows as explanatory variables. The study found that foreign aid had a substantially greater effect on growth than the other variables. The study asserted that aid could fill both the savings and foreign exchange gap, and was supposed to be designed in order to foster growth and was biased towards countries with a balance-of-payment constraint. The study also found a strong negative correlation between foreign aid and domestic savings, which co-contributed to the growth performance.

A study by Singh (1985) found that foreign aid had a strong positive impact on economic growth in less developed countries (LDCs) for both periods 1960-1970 and 1970-1980, when state intervention was not taken into account. When the state intervention variable was included in the regression, the effect of foreign aid got statistically weak over time. Moreover, foreign aid negatively affected the domestic savings rate, while country's size, per capita income and exports positively affected it.

Snyder (1993) analysed the relationship between foreign aid inflow and the growth rate of gross domestic product in 69 developing countries over three periods (the 1960s, the 1970s and 1980-1987), while incorporating country size (measured by gross domestic product) in the model. This study was based on the model developed initially by Papanek (1972, 1973) and extended by Mosley (1980) and Mosley, Hudson and Horrell (1987). The study argued that when country size was not included, the effects of aid on economic growth were small and insignificant, but when country size was taken into account, the coefficient of aid became positive and significant. The study emphasized that previous econometric analysis had not made allowance for the fact that larger countries grew faster but received less aid. The study also claimed that donors favoured small countries for a number of reasons. First, donors who were seeking support from recipient countries found it better to provide aid to many small countries than to focus on just few large countries. Thus, given the same amount of aid, the proportion of aid over GDP was bigger in small countries compared to that of larger countries, and as a result, gave them more credits.

Second, there was pressure on multilateral donors to deliver aid to all member countries. In this respect, small countries tended to receive more aid than they expected due to their feasible project size. Third, small countries tended to have historical colonial relations with donor countries, which were somewhat influential to donors' aid giving decisions. The last reason was that trade normally had larger fraction of GDP in small countries than in big ones, and therefore, these countries could be gaining more weight in donors' assessment.

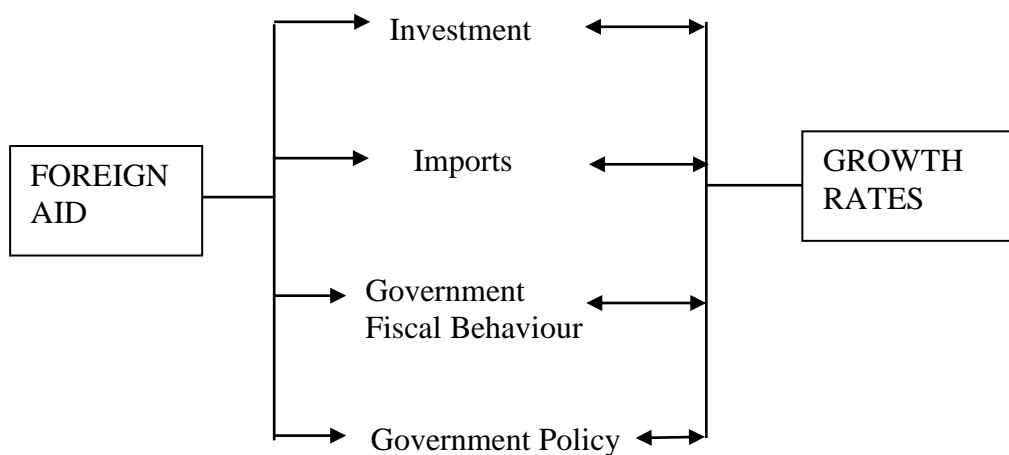
(b) Aid, Investment and Growth: Second-Generation Studies

Using a sample of 25 aid-receiving Sub-Saharan African countries, Gomanee, Girma and Morrissey (2005) sought to examine the channels through which aid impacts growth. The study noted in the first instance the failure of studies to pay attention to the importance of transmission mechanisms in determining the influence of aid inflows on growth rates. This was despite the existence of extensive empirical literature in this area. The aim of the study was not to attempt to resolve disputes in the literature, but rather to focus on a particular issue – the treatment of investment in the specification of the growth equation. The study, while recognizing the works of Burnside and Dollar (2000) and Hansen and Tarp (2000), differed with them in the way in which they treated the aid and investment variables. The study noted that aid was intended to affect growth via its effect on investment. However, not all aid was intended for investment, and not all investment was financed by aid. The study observed that if one adopted the approach of omitting investment, the regression was mis-specified and the estimated coefficient on aid was biased. On the other

hand, if one included aid and investment, there was double counting (as some aid was used for investment), and the coefficient was again biased (clearly downwards in this case). For this reason, the study proposed the technique of generated regressors to address this problem.

The study's analytical framework was the Harrod-Domar growth model, where savings are needed to fund the investment required to attain a target growth rate, conditional on the productivity of capital. The study underscored the insufficiency of resources necessary for investment and importation of capital in most poor countries.

Figure 2.3 gives the transmission framework that was developed in the study to explain the aid-growth nexus.



Source: Gomanee, Girma and Morrissey (2005)

Figure 2.3: Transmission framework of aid-growth nexus

The study examined this relationship over the period 1970 and 1997 using pooled panel and found a positive relationship between aid and economic growth. The study identified investment as the channel through which aid affected economic growth, noting that a percentage increase in the aid/GNP ratio contributed one-quarter of one percentage point to the growth rate. Therefore, according to the study, Africa's poor growth record was attributable to other factors and not on aid ineffectiveness. The variables used were growth of real per capita GDP, the percentage of population aged 15 or above who had completed primary education, and investment as a share of GDP which were included as indicators of (additions to) human and physical capital. Two measures of aid, both expressed as a percentage of GNP and taken from OECD (1999) were used. These were the total of grant aid and total aid. Squared aid terms were included to account for diminishing returns in line with most studies. A number of indicators of political and economic policy features of the countries and three policy variables – rate of inflation, government consumption as a share of GDP and imports as a percentage of GDP as an indicator of openness- were included.

However, the study like most studies on aid-growth nexus was limited in a number of ways. Its theoretical foundation – based on Harrod-Domar model – leaves it amenable to the deficiencies of the model. Further, it was dependent on cross country data. It may be recalled that one of the defects of panel growth regressions was that one was observing a relationship across countries, hence there was potential heterogeneity. Whereas the study tried to control for many

of the variables that would thus eliminate heterogeneity, the possibility of country-specific effects due to omitted variables cannot be ignored.

Karras (2006), in a cross-country study using 71 countries, investigated the correlation between foreign aid and growth in per capita GDP for the period 1960 to 1997. The study found a positive effect of foreign aid on economic growth. This effect was permanent and statistically significant. In this respect, a permanent increase in foreign aid by \$20 per person resulted in a permanent increase in the growth rate of real GDP per capita by 0.16 per cent. One of the drawbacks of this study was the fact that it did not take into consideration the effect of macroeconomic policies on the aid-growth nexus.

Herzer and Morrissey (2011) examined the long-run aid effectiveness using data from 59 developing countries over the period 1971-2003. The principal argument of the study was that the effect of aid on GDP depended on a trade-off that is country-specific: aid had a direct positive effect through financing investment but could have an indirect negative effect on aggregate productivity. The study used a two-step methodology, with the first step involving a heterogeneous panel and individual country cointegration techniques, and the second involving a general-to-specific variable selection approach. The study found in the first instance that aid effectiveness coefficients were, on average, negative (in about a third of cases the effect was positive) but smaller than the positive effect of investment (that may be aid financed). In the second case, the study found that aid effectiveness could be

explained mainly by cross-country differences in law and order, religious tensions and government size in the way they impact on productivity.

Uneze (2011) study drew on the vast literature on aid allocation by examining whether foreign aid had any impact on private investment in West Africa when other determinants of private investment were taken into account. Specifically, the study investigated whether multilateral aid and bilateral aid affected private investment differently. The study used both the random effects (RE) estimator and the fixed effects (FE) estimator. The study further examined the impact of aid uncertainty on private investment. The results showed that multilateral aid affected private investment positively, but not bilateral aid. The study found that uncertainty, measured as the coefficient of variation, had a negative impact on private investment and therefore reduced the impact of aid on domestic private investment. The study used an unbalanced panel data set of 14 West African countries covering the period 1975 to 2004.

(c) Aid, Policy and Growth: Third-Generation Studies

Burnside and Dollar's (1997) study was a turning point in the aid-growth debate. The study used a modified neoclassical growth model as the analytical framework and noted the positive impact of foreign aid on a poor country due to imperfect international capital markets. This was because foreign aid acts as an income transfer, which may or may not produce growth. The study noted that the effect depended on how aid was used, that is, whether it was invested (thus an increase in domestic output) or consumed. The extent to which aid was

effective was dependent on it being invested and its productivity as capital was affected by various policy distortions that could lower the return to capital.

The study used a new database on foreign aid developed by the World Bank and incorporated both policy and institutional distortions. A panel of 56 countries and six four-year time periods (1970-1973 to 1990-1993) was used. Both OLS and 2SLS estimation techniques were used. The objective of the study was to find out what factors affect growth and aid flows.

The study used the following model that followed Levine and Renelt (1992):

$$g_{it} = \beta_{g0} + y_{it}\beta_{gy} + a_{it}\beta_{ga} + p'_{it}\beta_{gp} + a_{it}p'_{it}\beta_{gap} + x'_{it}\beta_{gx} + \varepsilon_{it}^g \quad (2.31)$$

where g_{it} was the growth rate of real per capita; y_{it} was the level of real per capita GDP in country i at the beginning of period t ; a_{it} was the level of aid as a fraction of GDP received by country i in period t ; p_{it} was a $P \times 1$ vector of policy variables in country i at time t ; p'_{it} was a policy index; x_{it} was a $K \times 1$ vector of exogenous variables; ε_{it}^g was some mean zero scalar of the error terms, $\beta_{g0}, \beta_{gy}, \beta_{ga}$ were scalars, β_{gp} and β_{gap} were $P \times 1$ vectors and β_{gx} was a $K \times 1$ vector. The interactive term $a_{it}p'_{it}\beta_{gap}$ captured the effects of policy and aid in line with the neoclassical model.

The study recognised the endogeneity of aid and policy and their dependent not just on the independent variables, but also on each other. Two equations that

were estimated by the study to reflect the growth equation and the policy equation are as follows:

$$a_{it} = \beta_{ao} + y_{it}\beta_{ay} + p'_{it}\beta_{ap} + x'_{it}\beta_{ax} + \varepsilon_{it}^a \quad (2.32)$$

$$p'_{it} = \beta_{po} + y_{it}\beta_{py} + a_{it}\beta_{pa} + x'_{it}\beta_{px} + \varepsilon_{it}^{p'} \quad (2.33)$$

where ε_{it}^a was mean zero scalar of the error terms; $\varepsilon_{it}^{p'}$ was a zero mean $P \times 1$ vector of the error terms; β_{ao} and β_{ay} were scalars, β_{ap} was a $P \times 1$ vector; β_{ax} is a $K \times 1$ vector; β_{po} , β_{py} and β_{pa} were $1 \times P$ vectors, and β_{px} was a $K \times P$ matrix.

Since there was an interactive effect amongst the growth and policy variables, it was difficult to estimate the coefficients accurately, thus a scalar policy index, $\tilde{p}_{it} = \alpha_0 + p'_{it}\alpha_1$ was constructed as a linear combination of a set of policy variables. The policy index was used to construct a single interaction term in the growth equation. The study used both OLS and Two Stage Least Squares to estimate the regression.

In this growth convergence model, growth depended on the logarithm of real per capita GDP at the beginning of the period. The study incorporated the ratio of aid over GDP and an index measurement for macroeconomic policies in the right hand side of the equation. The study explained that aid could affect output only through the extent that it is used for investment rather than consumption. It was argued that aid itself had small and insignificant impact, but aid

interacting with good policy had a significant positive impact on growth. In fact, policy seemed more important for aid effectiveness in lower income countries. Moreover, the study showed that aid followed diminishing returns to scale. Another finding was that there was no tendency for total aid or bilateral aid to favour good policy, while multilateral aid was allocated in favour of good policy. However, the weaknesses of the study can be seen from the fact that no granger causality tests were done to establish the direction of causality between variables and since there was no theoretical underpinning, the use of a Vector Autoregressive approach (VAR) would have been recommended.

Knack (2000), in a cross-country analysis, indicated that higher aid levels eroded the quality of governance indexes, that is, the rule of law, corruption, and bureaucracy. The study argued that aid dependence could potentially undermine institutional quality. This would be feasible through a number of ways such as encouraging corruption and rent seeking on one hand and fomenting conflict over control of aid funds on the other hand. It was also argued that the siphoning off of scarce talent from the bureaucracy and the resultant alleviation of pressures to reform inefficient policies and public institutions could be the other factors. Large aid inflows did not necessarily result in general welfare gains, and high expectation of aid could increase rent-seeking and reduce the expected public goods quality. Moreover, there was no evidence that donors took corruption into account seriously while providing aid. In the study, quality of governance was measured by subjective indices from the International Country Risk Guide (ICRG). An 18-point scale created

by summing the following three six-point scales: the rule of law, corruption in government and bureaucratic quality was used in deriving the relevant scale. Some of the other variables used in the study included ODA as a percentage of GNP and as a percentage of government expenditures, in addition to population change. The study used both OLS and Two Stage Least Squares. However, it may be observed that ICRG data was only available from 1986 and therefore would not be suitable for studies that covered periods prior to 1986. Additionally, the study's focus on governance was to some extent limiting in the sense that the flow of aid to developing countries was dependent on a number of variables that had not been captured in the study. The limitations of using cross country data particularly regarding the failure to capture unique country events also makes it not applicable to a country specific study.

Incorporating export price shocks into Burnside and Dollar (1997) analysis, Collier and Dehn (2001) showed a significant and negative relation between negative shocks and economic growth. The adverse effects of negative shocks on growth under such circumstances could be mitigated by offsetting increases in aid. Therefore, the study proposed that targeting aid towards negative shock experiencing countries could be more effective than towards good-policy countries. The study found 179 positive shocks and 99 negative shocks episodes when using a 2.5 per cent cut off in their sample size of 113 countries. They therefore concluded that the change in aid interacted with positive shocks was insignificant. The interaction of negative shock with the change of aid was found to be significant at the 1 per cent level of significance. Additionally,

incorporating shocks into Alesina-Dollar's (2000) regression, they showed that donors had so far not taken shocks into account in aid allocation. Finally, they claimed that the aid effectiveness could be increased significantly if both policy and adverse export price shocks were considered upon determining aid allocation.

Bearce and Tirone (2008) explored the relationship between economic growth and foreign aid conditioned on the level of democracy in the potential recipient country. The study estimated the following growth equation for a sample of aid-eligible country/years 1964-2003 ($N \approx 4000$).

$$\begin{aligned} Growth_{it} = & \beta_0 + \beta_1 * Aid_{it-4} + \beta_2 * Democracy_{it} + \beta_3 * (Aid * Democracy) \\ & + \beta_X * Controls_{it} \end{aligned} \quad (2.34)$$

Arguing that aid primarily improved growth by incentivizing economic reform, the study explained why foreign aid should be less effective in more democratic recipient countries. This proposition was then tested on a sample of aid-eligible country/years and the statistical results showed that while foreign aid was positively correlated with economic growth, this positive relationship weakened in more democratic recipient countries. The statistical results also showed that foreign aid was correlated with capitalist economic reform, but only in more autocratic countries. The study concluded that the conditional relationships were robust using a variety of democracy indicators. These included the Freedom House scores, the polity measure and Vanhanen's index of democracy. The weakness of the study can be seen in its failure to examine

the transmission channels through which aid affects growth. It examined democracy as if it was the sole issue in aid (even though it is one of the factors) and totally ignored other important variables.

Mallik (2008) sought to examine the effectiveness of foreign aid on economic growth in six poorest and highly aid dependent African countries, namely the Togo, Malawi, Mali, Central African Republic, Sierra Leone and Niger over the period 1965-2005. The study's underlying econometric model was:

$$f(\ln RGDPPC_t, \ln AIDY_t, \ln IY_t, \ln OPEN_t) = 0 \quad (2.35)$$

where, $\ln RGDPPC_t$ = Natural log of real gross domestic product per capita time t (in United States Dollars (USD)); $\ln AIDY_t$ = Nominal Aid (official development aid) as a percentage of nominal gross domestic product at time t; $\ln IY_t$ = Natural log of investment as a percentage of gross domestic product (GDP) at time t; $\ln OPEN_t$ = Natural log of openness (exports plus imports as a percentage of gross domestic product at time t).

Using co-integration analysis, the study found that a long-run relationship existed between per-capita real GDP, investment as a percentage of GDP, aid as a percentage of GDP and degree of openness. The long-run effect of aid on growth was found to be negative for most of these countries. However, the study does not examine the underlying reasons for negative aid-growth relationships leaving it open for one to conjecture that a number of factors may underlie these findings. It does not also examine the issue of aid predictability and volatility, the twin problems in countries that are highly dependent on

foreign aid and some of which receive significant aid in form of humanitarian assistance.

Using panel data series for foreign aid while accounting for continental and regional differences as well as the differences in income levels, Ekanayake and Chatrta (2009) analysed the effects of foreign aid on the economic growth of developing countries. They found that foreign aid had a mixed impact on economic growth of developing countries. In the first instance, when the model was estimated for different time periods, foreign aid variable had a negative sign in three out of four cases, indicating that foreign aid appeared to have an adverse effect on economic growth in developing countries. In addition, this coefficient was not statistically significant in any of the four cases. In the second instance, when the model was estimated for different regions, foreign aid variable had a negative sign in three out of four cases, indicating that foreign aid appeared to have an adverse effect on economic growth in developing countries. However, this variable was positive for the African region, indicating that foreign aid had a positive effect on economic growth in African countries. This was not surprising given that Africa was the largest recipient of foreign aid than any other region. Finally, when the model was estimated for different income levels, it was found that foreign aid variable had a positive sign in three out of four cases, thus indicating that foreign aid appeared to have a positive effect on economic growth in developing countries. However no time series properties tests were conducted despite using time series data, a situation that puts to doubt the robustness of the study findings.

In a panel regression model covering twenty Sub-Saharan African countries and estimated using OLS and TSLS over a period of 1970 to 2001, Salisu and Ogwumike (2010) found that a sound macroeconomic environment was mandatory for the effective contribution of aid to sustainable growth. The study also found that macroeconomic policy environment was an important determinant of growth. Overall, the study concluded that aid effectiveness in SSA countries had been curtailed by the frequent socio-political crisis, bad governance, policy inconsistencies and macroeconomic instability. The study was based on the neoclassical growth model. The standard growth regression expressed the growth rate of per capita real GDP as a function of the initial level of income, the level of aid as a fraction of GDP, measures of macroeconomic environment (policy index) and some exogenous variables - measure of institutional quality that capture security of property rights and efficiency of the government bureaucracy – among others. The study used an update of Burnside and Dollar (1997) data. However, the study omitted certain variables such as openness and the transmission channel of aid. Its focus only on policy variables did not help in giving a clear understanding of the relationship between aid, growth and policy.

(d) Country Specific Studies on Aid-Growth Nexus

Empirical studies reviewed so far have been cross country in nature. However, cross-country studies only highlight what appears to be important in general or on average. In this respect then, analytical country studies play an important role of bringing to fore an understanding of the process and identifying factors

that are most important in individual countries (Rodrik, 2003). It is in light of this that an examination of country specific studies is of essence. A review of literature that looks at this relationship at country level is also provided.

Using an Autoregressive Distributed Lag (ARDL) model, Gounder (2001) found that aid had a positive and significant effect on growth in Fiji. A neoclassical production function was applied to estimate the aid-growth nexus. Since the data employed were time series for the period 1968 to 1996, the ARDL approach to cointegration was utilized to estimate the models. Various components of total foreign aid, such as loan aid, grant aid, technical cooperation, multilateral and bilateral aid flows were also utilized to estimate a disaggregated short-run and long-run relationship between foreign aid and economic growth. The results showed that total aid flows and its various forms, that is, bilateral aid, grant aid and technical cooperation grant aid, had a significant impact on economic growth in Fiji. Regarding domestic resources, it is only exports and private investments in two equations that showed positive contribution to growth.

Nyoni (1998) examined the impact of foreign aid inflows to Tanzania on macroeconomic variables such as export performance, the real exchange rate, investment, government expenditure and growth over the period 1967 to 1993. The main hypothesis of the study was that aid inflows caused real appreciation. To test this hypothesis, the study used cointegration techniques and an error-correction model to estimate the long-run equilibrium and the short-run real

exchange rate, respectively. The results obtained from the estimated model suggested that foreign aid inflows, devaluation of the local currency and openness of the economy led to depreciation of the real exchange rate, while government expenditure tended to appreciate the real exchange rate. The study recommended that the correct policy response to the influx of foreign aid was to direct the aid to domestic productive investment in order to induce a positive supply response. The study further recommended that the government should also reduce its expenditure and enhance economic liberalization. The main weaknesses with this study has to do with the duration covered and the omission of some important variables – such as policy variables (inflation, money supply) in the estimated regression equation. Further, the study covered 1967-1983, a period of only 16 observations, which also puts into question the robustness of the econometric results.

Mavrotas (2003) used an aid disaggregation approach to examine the impact of different types of aid on the fiscal sector of the aid-recipient country. The study used time-series data on different types of aid (food aid, programme aid, project aid and technical assistance) for Uganda, to estimate a model of fiscal response in the presence of aid, which combined aid disaggregation and endogenous aid. Due to the well-known data problems and limitations related to the pre-1980 period in Uganda, the time period covered in the study was from 1980 to 1999. Data on the foreign aid variables used in the study were obtained from the OECD-DAC. Other variables considered included the public investment (I_g), government consumption (G), and tax and non-tax revenue

(T). The non-linear Three Stage Least Squares (N3SLS) estimation technique was employed for the estimation of the structural equations. The empirical findings clearly suggested the importance of the disaggregation approach for delving deeper into aid effectiveness issues, since different aid categories had different effects on key fiscal variables. This impact could not be revealed if a single figure for aid was employed. Specifically, food aid and project aid appeared to cause a reduction in public investment. Programme aid and technical assistance were found to be positively related to public investment. Government consumption also had a similar effect. The impact on government tax and non-tax revenues were negligible, while strong displacement of government borrowing was also found. However, the study, while using time series data, did not undergo time series tests. The short duration of study would have been addressed in a better way through the use of Autoregressive distributed lag (ARDL) method as it works better for small samples.

M'Amanja and Morrissey (2005) examined the effect of foreign aid on investment and economic growth in Kenya over the period 1964-2002. The aim of the study was to identify aspects of the determinants of growth in Kenya, in particular if aid played a role. This was owing to the fact that the empirical specifications used in cross-country work did not translate easily into country studies: many of the variables were not available annually or tended to change very slowly over time, and it was not feasible to include all potential determinants. The study was anchored on endogenous growth theory. The authors used a multivariate approach on time series data for Kenya to

investigate the growth effects of foreign aid, investment and imports. They used the following variables: real per capita income, private investment, government investment, foreign aid, and imports of goods and services. A Vector Autoregression (VAR) model was used for estimation.

The results indicated the existence of two long-run relations representing the reduced form growth equation and the behavioural function of private investment. The study found that the shares of private and public investment and imports in GDP had strong beneficial effects on per capita income in Kenya. The study, however, found out that aid in the form of net external loans had a significant negative impact on long-run growth. Private investment had a negative effect on public investment and imports but positive effect on foreign aid.

The weakness of the study, however, was the use of imports as a proxy for openness to trade. It would have been important to consider openness as a summation of both imports and exports given the role of exports in raising foreign exchange and also being so amenable to external shocks. Additionally, while the study took care of the macroeconomic shocks that have affected the Kenyan economy over the study period, it did not capture the relevant policy variables that were key to the aid-growth relationship. The study's failure to factor in aid predictability in the model presents an important knowledge gap which would be addressed through the proposed study. Further, it might be

noted that the use of VAR limited the number of variables to include in the equation.

Boakye's (2008) study sought to examine the long and short-run relationships between foreign aid and economic growth in Ghana for the period 1970 to 2005. Using Autoregressive Distributed Lag (ARDL) model, the study found that the impact of foreign aid on economic growth in Ghana was significantly negative, which was attributable mainly to the fungibility of aid. The study and its data analysis were modelled on an aggregate production function framework. The aggregate production function assumed that along with conventional inputs of labour and capital used in the neoclassical production function, unconventional inputs like foreign aid and trade openness could be included in the model to capture their contribution to economic growth. Specifically, the variables used in the study included: Official development assistance as a percentage of gross domestic product (*GDP*); total net private capital flows as a percentage of *GDP*; trade liberalization (Trade as a percentage of *GDP*); financial development (money supply (*M2*) as a percentage of *GDP*); inflation (proxy for general macroeconomic instability); and dummy to proxy for constitutional regime. The study, however, did not examine the role of investment (both private and public), and considered net private capital flows instead. As a country that had extensive investments from private and public, this omission could be seen as weakness for the study in addition to the number of observations (35) since the study period was 1970-2005.

2.3.2 Foreign Aid Unpredictability Literature

Lensink and Morrissey (2000) examined the link between aid instability (as measured by uncertainty) and economic growth in developing countries. The equations were estimated for each country over the sample period (1970-1995) using data from World Bank (1998). They applied the analysis to the entire group of developing countries (N = 75), as well as to the sub-group of African developing countries (N = 36). The study estimated a standard cross-country growth regression, including the level of aid and found aid to be insignificant. Aid remained insignificant despite the inclusion of measures of instability. They found that such uncertainty influenced the relationship between aid and investment and the government's response to aid, and therefore, affected how aid impacted on growth. Thus, when uncertainty was accounted for, there was a significant positive effect on growth. Stability tests showed that the significance of aid was largely due to its effect on the volume of investment. The use of cross section data however, makes it difficult to draw inferences from this study on a specific country basis. This is despite the fact that country equations were estimated.

Bulir and Hamann's (2001) study sought to provide empirical evidence on the volatility and uncertainty of aid flows, and the main policy implications. The study used cross country data for 72 countries for which aid data were available for the period 1975-1997. It was argued that time-series data showed that commitments by donors exceeded disbursements systematically, and that aid could not be predicted reliably on the basis of donors' commitments alone.

However, despite their poor track record as a predictor of disbursements, commitments had continued to be used in budgetary exercises in aid recipient countries, mainly as a result of pressure from donor countries and/or agencies. The study, therefore, noted that there was need to properly account for aid volatility when it comes to planning against the possibility of delays and/or shortfalls in aid disbursements vis-à-vis commitments. The study found that uncertainty about aid disbursements was large and that the information content of commitments made by donors was either very small or statistically insignificant. However, the study did not go into examining the effects of this unpredictability on investment and growth.

Vargas (2005) study was premised on the fact that aid commitments tended to be used in budgetary exercises in recipient countries mainly as a result of pressure from donors. The author noted that even if a recipient country knew commitments made by donor countries were poor predictions of aid receipts, there was still a cost to the poor predictive power of commitments in that a recipient country was forced to act on the predictions commitments make. The study found that, on average for sub-Saharan Africa, the difference between commitments and disbursements was as much as +/- 20 per cent of commitments. It also found that on average, disbursements were less than commitments by 4.9 per cent over the period 1975–2002. On the whole, the study found that out of a sample of 112 ODA recipients, commitments for 53 countries did not predict disbursements. For 52 countries, commitments had predictive power for disbursements at the 5 per cent level of significance. In

the case of Trinidad and Tobago, the study found that the coefficient on commitments was negative and significant. However, this study did not conduct detailed econometric analysis on the effects of the aid unpredictability on economic growth.

Desai and Kharas (2010) examined the issue of aid volatility noting that whereas more is known about the negative impact on growth through several channels, less was known about the sources of that volatility. Using an autoregressive conditional heteroscedasticity model, the authors generated conditional variances for total aid flows to all aid-recipient countries between 1960 and 2008. The study found that some degree of volatility was caused by events in recipient countries, mainly natural disasters, civil wars and adverse regime change—all of which increased the unpredictability of aid flows. The findings were consistent when they removed aid flows for food aid, humanitarian assistance, technical assistance, emergency relief, and debt relief. The results demonstrated the need for donor action in mitigating aid uncertainty. The study, however, seemed to use volatility and unpredictability within the same breath.

Martins (2010) confirmed the continued increase in aid volatility and unpredictability of disbursements, with serious economic consequences on recipient countries. Using cross-sectional data over the period 1990 to 2008 for a number of developing countries, the study found that predictability of resource inflows was crucial; with particular reference to ODA inflows which

form a significant source of foreign resources flows to developing countries (see also Pallage and Robe, 2001; Bulir and Hamann, 2008; Celasun and Walliser, 2008). The study noted that increasing unpredictability of aid led to delays in project implementation and increased domestic financing with serious implications to the sustainability of public debt. The study, however, did not use any econometric models and therefore puts to question the empirical evidence and conclusions derived. It is also quite difficult to lump together all the resource flows to developing countries knowing well that the motivations for the flows vary and therefore the reasons for volatility will also vary. The use of cross-country data in a study of this nature also camouflages the various unique dynamics that would be country specific for each of the resources flows.

Diarra (2011) examined the extent to which aid disbursement delays could be used as an indicator of the aid unpredictability and absorptive capacity in recipient countries. The study argued that disbursement delays matter for aid effectiveness. The study used the so-called 'pipeline approach', which contends that in the short-run, disbursement constraints could lead to huge delays and weak rates of aid disbursement relative to commitments. The study used a framework of programmable aid to run some econometric estimation through a dynamic model, an Autoregressive Distributed Lag (ARDL) for a panel of 48 African countries during the period of 1975–2008. The study found that disbursement constraints were mainly at the short-run level. Thus, the selectivity and the degree of aid fragmentation were the main donor's specific

factors. It was also found that disbursement rates and rhythms were influenced by the economic performance and governance quality of the recipient countries and the share of grants in aid modalities. Bilateral donors were found to underperform in comparison with multilateral donors in terms of the rhythm of aid disbursement. Whereas the pipeline approach provides a good framework for understanding issues to do with absorption capacity, the study failed to examine other key macroeconomic variables and how these are affected by the unpredictability.

Kangoye (2011) examined the effects of aid on governance, noting that aid unpredictability had the possibility to increase corruption in recipient countries as it provided incentives to political leaders to engage in rent seeking activities. Using cross-sectional data from 67 developing countries over the period 1984-2004 and Ordinary Least Squares (OLS) and Two-Stage Least Square (IV) estimations, the study found that higher aid unpredictability was associated with increased corruption as measured by a synthetic index. In line with other studies, this study found that aid dependency was associated with less corruption. This resonates well with the situation in Kenya where corruption is a cancer and therefore its effects on the aid dynamics needs to be considered. The study argued that the basic political economy rationale was that aid flows uncertainty reduced the temporal horizon of the aid rent capture. The study, therefore, did not examine the macroeconomic effects of the unpredictability, but political economy approach by linking aid flow uncertainty to rent-seeking

behaviours in recipient countries. This is its weakness as aid unpredictability cannot just be linked to corruption alone as its effects are much wider.

2.3.3 Overview of the Literature

From the foregoing analysis, there are diverse studies on the aid-growth nexus. These have been categorised into three, namely first-generation studies that examined the aid, savings and growth relationship; the second-generation studies that examined the aid, investment and growth relationship, and the third-generation studies that looked at the aid, policy and growth relationship. A selection of studies within each of these categories was reviewed.

The studies on the impact of aid on growth have used various models. For instance, the Harrod-Domar model, by linking growth to aggregate investment, provided the core of the underlying economic paradigm for analysing the impact of aid and aid effectiveness at the macroeconomic level. Its extensions into the new growth models provided the analytical basis for a few recent empirical cross-country studies. The investment variable and productivity are assumed to depend on policy and institutional variables within the prism of the new growth theory approach (Robinson and Tarp, 2000). Harms and Lutz (2004) gave particular attention to the role of institutions and policies in determining aid effectiveness. As a general conclusion, they suggested an adoption of a more disaggregate perspective with respect both to different types of aid and to various aspects of governance. Gomanee *et al.* (2005) in their examination of the channels through which aid impacts growth provided a

justification for the inclusion of the investment variables in the aid-growth equation. The Burnside and Dollar (1997) study marked a turning point in the aid-growth debate due to its emphasis on stable macroeconomic policy environment.

Most of the studies have been cross-country in nature. The value of cross-country studies is that they allow one to try and identify factors that help to explain cross-country variations in growth performance. However, this has not been without any problems. According to Herzer and Morrissey (2011), the reliance on cross-country panel growth regressions suffers from many limitations: failure to account for cross-country heterogeneity in aid effects; using growth as the dependent variable but levels as independent variables; and the endogeneity problem of weak instruments. The situation is compounded by the fact that some variables that have been found significant in some studies have turned out to be insignificant in others (Levine and Renelt, 1992; Sala-i-Martin *et al.*, 2003). The limitation of the cross-country approach is that it is not usually informative for a particular country. Its assumption of parametric invariance across countries renders it difficult to interpret results for a single country and therefore difficult to derive country-specific policy implications (Harrison, 1996; Durlauf, 2002; Hoeffler, 2002). It is in light of this observation that a country-specific study is deemed relevant.

It could be concluded that country-specific studies on the aid-growth nexus have also not been without any problems. The challenge has been due to the

shorter duration of study, omission of variables and the estimation techniques used. The studies reviewed so far have shown divergence in terms of the findings, with some showing a negative relationship between foreign aid and growth, while others found a positive relationship. These studies have assumed that the aid flows have been predictable, a situation which is not the case. Studies that have been specific on unpredictability of aid flows have also been reviewed. This study, therefore, sought to fill the knowledge gap that exists in the aid-growth nexus in Kenya through the examination of the aid predictability effects on investment and growth. The reviews indicated that a number of studies had used autoregressive distributed lag (ARDL), an approach that was relevant to the study. The next chapter presents the methodology used in the study.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter presents the methodology of the study. Section 3.2 presents the research design, section 3.3 presents the theoretical framework and section 3.4 presents the model specification. Section 3.5 presents the estimation procedure, section 3.6 presents the working hypotheses, section 3.7 presents the definition and measurement of variables, and section 3.8 presents the data type and sources. Section 3.9 presents the data collection, cleaning and refinement while time series properties are presented in section 3.10. Finally, the diagnostic tests conducted on the models are presented in section 3.11.

3.2 Research Design

This study aimed at examining the effects of aid predictability on investment and economic growth in Kenya. The study applied quantitative approaches to answer the research questions. The study was a non-experimental research in which a range of variables were measured. The design adopted was that called correlational studies, since correlation was used in the analysis. The study used data covering the period 1966-2010 for the following variables: economic growth, public investment, private investment, foreign aid (commitments and disbursements), predictability indicator, and a composite policy variable as a proxy for macroeconomic policy environment (inflation, final government

consumption and degree of openness). The data was collected from secondary sources, including the OECD/DAC and government documents. A data collection instrument was developed. The collected data was analysed using Eviews and Microfit 5 econometric softwares. An autoregressive distributed lag (ARDL) method was used in estimating the equations after undergoing time series property tests on the data.

3.3 Theoretical Framework

Two theoretical frameworks that guided this study are explained to capture both the provision of public goods aspect and the link between foreign aid, investment and growth as explained in the endogenous growth theory.

The first theoretical framework for this study borrows from Samuelson's fundamental general equilibrium analysis of public sector activities and its variations (Samuelson, 1954, 1955; Bolnick, 1978; Musgrave, 1986; Varian, 1992; Barnett, 1993; Wawire, 2011). The proposed model is cognisance of the need to consider the demand side for government financing of public goods provision and whether these goods are financed through taxes or foreign aid (Herzer and Morrissey, 2011). It emphasizes the optimal allocation of resources between the public and private goods.

Following Wawire (2011), it is assumed that there is a pure private good (X_p) and a pure public good (X_g). The private sector has initial powers for all resources, a situation that cannot lead to efficient allocation of resources

without the transfer to the public sector for producing X_g through increased marginal opportunity cost. Thus, the marginal cost includes resources used directly to levy taxes plus loss of X_p through dampened incentives and reduced efficiency in the private sector resulting from the tax policies (Branson, 1989; Agénor and Montiel, 1996; Froyen, 2002; Dornbusch, Fischer and Startz, 2003).

It is assumed that the government fully finances its activities through taxes and foreign aid, and that there exists a set of individualistic preferences, $\bar{U}(X_g, X_p)$ embodying continuously diminishing marginal rates of substitution between the public and private goods (Bolnick, 1978; Stiglitz, 1988; Barnett, 1993). The resultant preference function is assumed to be a characteristic of Scitovsky's social indifference curves (Scitovsky, 1941; Samuelson, 1976; Layard and Walters, 1978; Mishan, 1981; Wawire, 2006) or Bergson-Samuelson social welfare function (Bergson, 1938; Samuelson, 1977; Varian, 1997). This situation could be used to explain the variations in the flows of aid and its attendant implications in the provision of public goods and taxation.

The demand function for the public good is derived through consideration of a model of utility-maximizing behaviour together with some underlying constraints. Assume a rational individual behaviour whose preference will be a bundle (z) made up of both public and private goods from a set of affordable alternatives (Z) that satisfy the individual's budget constraint. Assume a fixed income Y and $p = (p_g, p_p)$ is the vector of prices for a public good (p_g) and a

private good (p_p). The set of affordable bundles and the budget of the individual could be given by: $B = \{z \in Z : PZ \leq Y\}$

The utility maximization problem is therefore written as:

$$\text{Max } U(z)$$

$$\text{Subject to: } PZ \leq Y \text{ and } z \in Z.$$

According to Varian (1992), a utility-maximizing bundle z^* must satisfy the budget constraint with equality under the local non-satiation assumption. The above equation is therefore rewritten in indirect utility form as:

$$V(P, Y) = \text{Max } U(z)$$

$$\text{Subject to } PZ = Y$$

Thus, the value of z that solves this problem is the individual's demand bundle, which expresses how much of each good the individual would buy at a given level of prices and income. The individual's demand function is expressed as that function that relates P and Y to the demanded bundle, conditional on other covariates (see Wawire, 2006).

The individual's bundle that maximizes utility is at a point where the budget line is tangent to the indifference curve (Stiglitz, 1988). Therefore, a rational individual would choose to allocate the income between public and private goods in such a way that the marginal rate of substitution of the public good for private good ($MRS_{g,p}$) equals the ratio of their prices, that is,

$$MRS_{g,p} = \frac{p_g}{p_p} \quad (\text{Mansfield, 1986; Silberberg, 1991; Pindyck and Rubinfeld, 1996}).$$

However, it may be observed that the unpredictability of aid would lead to under-provision of public goods. Figure 3.1 illustrates the indifference curve for an individual.

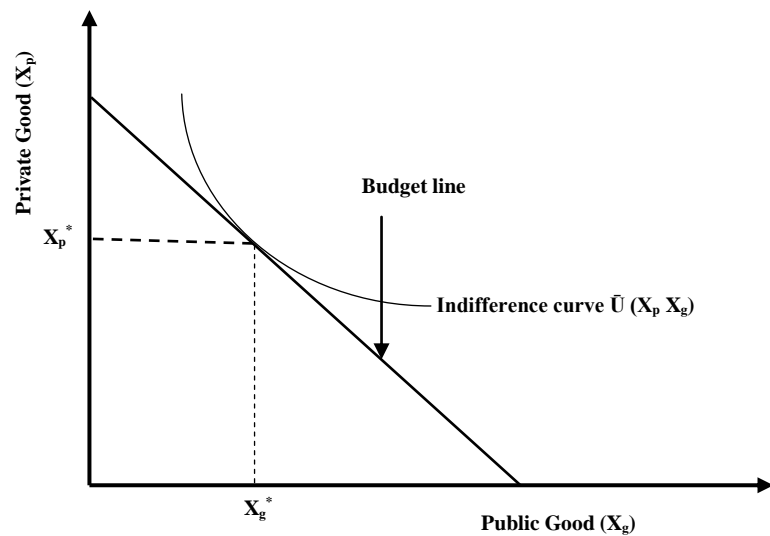


Figure 3.1: Utility-maximizing conditions

The optimal quantities of both goods are given as X_g^* and X_p^* . The slope of the budget line depends on the prices of the public good and the private good. It may be noted too that the consumption/provision of the public good also depends on the flow of foreign aid. Thus, for a given income level, there will be an optimal choice for each of the goods. Thus, for the public good (X_g), the optimal choice at each set of prices and income will be the demand function.

Considering changes in foreign aid, the vertical intercept of the budget line will change and also the slope given that foreign aid is used towards provision of

the public good. An increase in foreign aid that is predictable, holding other factors constant, will result into an outward shift of the budget line and provision of more public goods. The resulting locus of utility-maximizing bundles is known as the foreign aid expansion path a situation that is similar to the income expansion path (Silberberg, 1991; Varian, 1992; Varian, 1997). This relationship is illustrated in Figures 3.2 and 3.3.

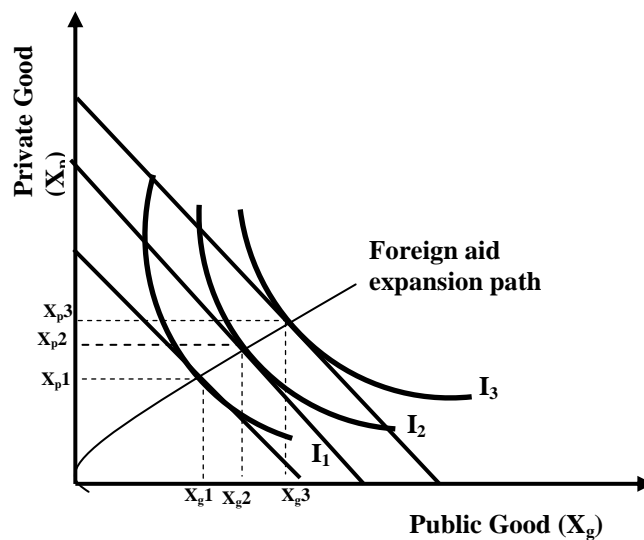


Figure 3.2: The Foreign aid expansion path when foreign aid is predictable

In the case of a bending foreign aid expansion path like the one in Figure 3.2, the resulting Engel curve bends away from foreign aid implying that as foreign aid increases and is predictable, more of the public good is consumed. The relationship between foreign aid and the demand for the public good is shown graphically in Figure 3.3.

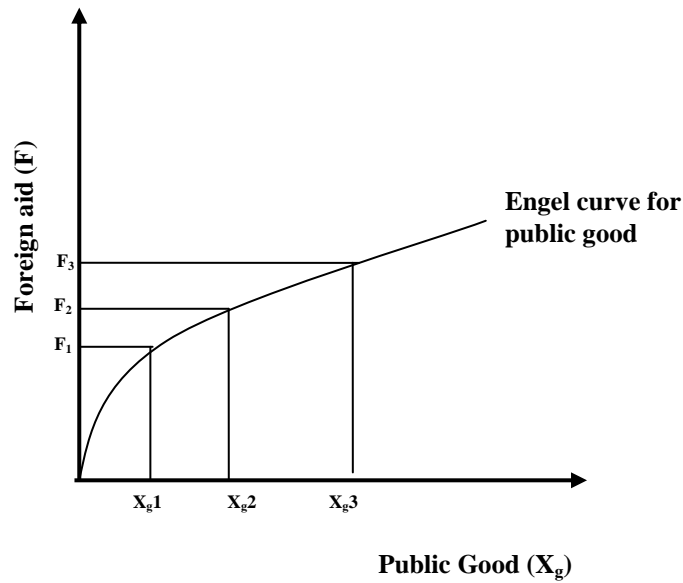


Figure 3.3: The Engel Curve when foreign aid is predictable

Figure 3.4 and 3.5 show the situation when foreign aid is unpredictable.

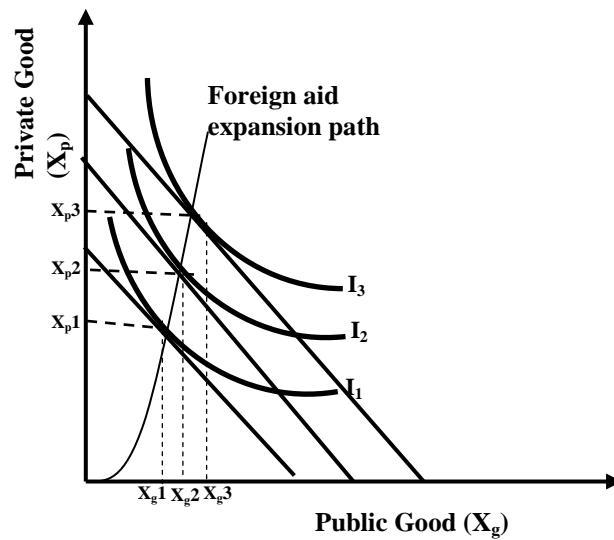


Figure 3.4: The Foreign aid expansion path when foreign aid is unpredictable

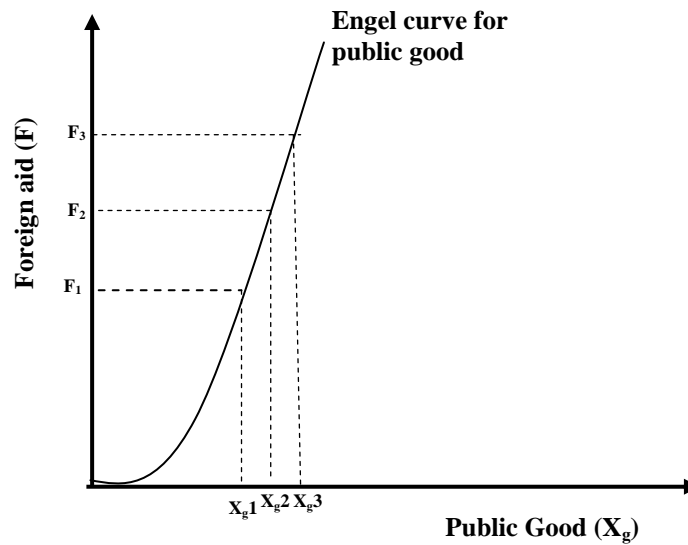


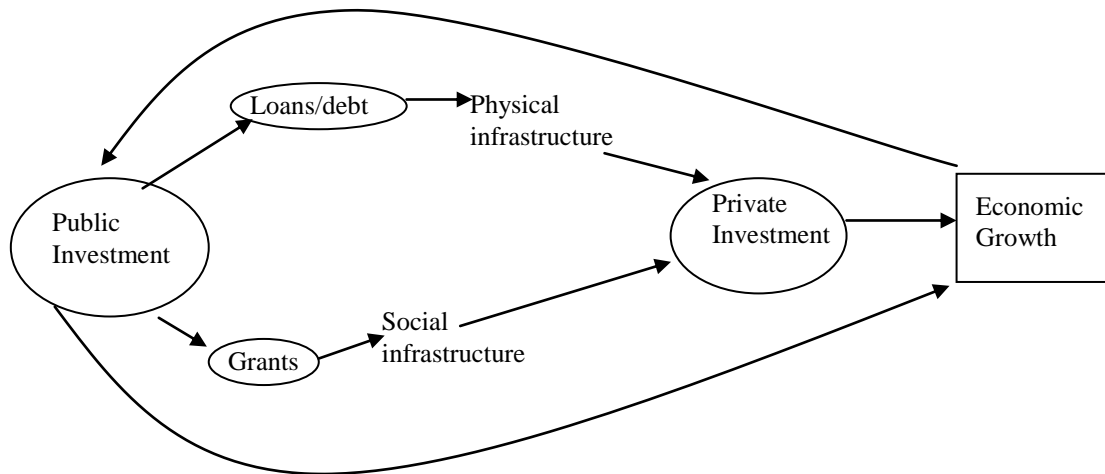
Figure 3.5: The Engel Curve when foreign aid is unpredictable

Unpredictable foreign aid will imply under-provision of public goods and the citizens will tend to demand more of the private good than the public good. The resulting Engel curve bends towards the unpredictable foreign aid, implying that proportionately less of the public good is demanded.

The assumption in the foregoing analysis is that foreign aid will be used towards public investment, which will positively affect economic growth of the country. Thus, for the government to provide the public good, it must invest her resources, which in this case, is assumed to come from foreign aid and taxation. The effects of these investments on the consumption/provision of private good will depend on whether the private good is a complement or not. The foregoing analysis thus examines the relationship between foreign aid, investment and economic growth from a consumer choice behaviour.

The second theoretical framework examines the link between foreign aid, investment and economic growth from a consumption/capital accumulation perspective. For investment and growth, Kormendi, Levy and Meguire (1988) argue that foreign aid effects can be categorized as capital augmentation, resource mobilization and rent seeking. Given that the proposed study is concerned with the effects on investment, it is important to consider first the capital augmentation effect.

Theoretically, if aid is fungible, then it would be treated as a pure income transfer that can be devoted either to current consumption or to the accumulation of physical and human capital. From the perspective of the Permanent Income or Life Cycle Hypotheses, if aid is permanent, then it will to a greater extent be consumed, with little impact on economic growth. However, if aid is effectively tied to net public or private capital accumulation, the result would be, holding other factors constant, a positive association between the level of aid (relative to domestic product) and the growth rate of real domestic output, as long as the projects undertaken yield a positive return. This explains the link between foreign aid, investment and economic growth as shown in Figure 3.6. Thus, the proviso that projects yield a positive return will play an important role in understanding the role of aid in the empirical results.



Source: Sola (2008)

Figure 3.6: Relationship between foreign aid, investment and economic growth

However, the increase in a recipient country's productive inputs brought about by aid may not be confined to a country's stock of physical capital. In the first instance, to the extent that aid increases the demand for domestic output, the supply of relevant domestic factors of production may also increase. Secondly, the recipient government could use aid to reduce the taxes due to their distortionary effects, thereby reducing the disincentives for supplying inputs or to provide inputs complementary to private production. Lastly, if aid were used to raise the average diet or to supply medical services, hence reducing the morbidity and mortality of the population, labour inputs would increase. Therefore, by mobilizing resources, the level of aid can have a positive effect on the level of output.

3.4 Model Specification

The role of the government is to provide public goods according to the theoretical framework explained above. In so doing, the government has to invest the available resources, which are either from taxes or foreign aid. This is done in order to realise economic growth. The following section, therefore, examines the model for the study.

3.4.1 The Effect of Aid on Investment and Growth

The first objective of the study was to examine the effect of foreign aid on investment and economic growth. White (1998) noted that the aid-growth regression has been mis-specified on three counts: (i) omitted variable biases, (ii) single equation estimations of simultaneous relationships, and (iii) parameter instability. The study met the above objective by following a modified Moreira and Bayraktar (2005) and Agénor, Bayraktar and El Aynaoui (2006) model in which two behavioural equations are presented to reflect the two dependent variables explained above. The modelling follows Sims (1980) modelling philosophy where there is no need to establish theoretical basis in the modelling process.

It is assumed that an economy that exhibits an increasing growth is favoured by investors who foresee increased profits in the future. Output growth increases consumption demand and savings, and therefore, funds for investment. Larraín and Vergara (1993) posit that there is a positive relationship between output

growth and private investment. Thus, the growth behavioural equation is defined as:

$$Y_p = y[P_{inv}, Aid, Tax, Fdebt] \quad (3.1)$$

where Y_p is real per capita GDP, Tax is the total tax revenue as a share of GDP, P_{inv} is private investment as a share of GDP, $Fdebt$ is Foreign debt as a share of GDP.

However, not all public investments are financed solely through aid and thus the need to be cautious on how to treat the public investment variable. Studies have recognised that including both aid and investment variables as regressors introduces a problem of double counting, since some part of investment will be funded by aid. In this regard, there have been possibilities of including the aid variable and omitting the investment variable, but this has the potentiality of resulting in model misspecification and a biased coefficient on the variable (Feeny, 2005). This coefficient is biased downwards as only a fraction of foreign aid is provided for investment purposes.

The foregoing situation is addressed by Gomanee *et al.* (2002) by using a generated regressor technique. The presence of an aid investment transmission mechanism is investigated in the first case through using investment as the dependent variable in a preliminary regression. Aid was included as an explanatory variable together with other potential determinants of investment variables. Given that the results indicated that an aid investment transmission exists, a new investment variable was constructed in a second stage, which

represented the part of public investment not attributed to foreign aid. It was constructed using the residuals from a bivariate regression in which investment was regressed on aid. The constructed investment variable was then substituted for public investment in the regression. This was to ensure that the model was correctly specified, there was no double counting, and the coefficient on the aid variable was unbiased. For the sake of this study, the public investment was omitted from the growth equation and instead the tax and foreign debt variables were found to be better substitutes as they formed major ways in which public investment was funded.

Public investment itself affects growth either directly via its productivity or indirectly via its effect on private investment. This is possible if public investment in human capital such as health and education, law and order, research and development, and social and economic infrastructure leads to the creation of positive externalities, which in turn improve the productivity of private investment. Thus, one would expect a positive relationship between public investment and economic growth (Barro, 1991; 1996; and 2003; Artadi and Sala-i-Martin, 2003). In line with the findings of Clements *et al.* (2003), total public investment as a share of domestic output depends positively on the aid as a share of domestic output, the lagged value of the tax-to-GDP ratio, and negatively on the ratio of foreign debt service to domestic output.

$$Ginv = gi[Pinv, Tax, Aid, Fdebt], \quad (3.2)$$

where $Ginv$ is public investment as a share of GDP and other variables as previously defined.

3.4.2 The Effect of Macroeconomic Policy Environment on the Aid-Growth Nexus

The second objective of the study was to examine the effect of macroeconomic policy environment on the aid-growth nexus. Macroeconomic stability is an important aspect of economic growth-aid nexus. High and rising inflation rates imply macroeconomic instability. Macroeconomic stability provides a more reliable economic environment for the investors to benefit from the existing profit opportunities (Larrain and Vergara, 1993; Servén and Solimano, 1993b).

Inflation takes on an important role in this context given its far-reaching effects on the economy. High and variable inflation causes many distortions in the economy. More importantly, it discourages savings, as the future value of money is worth less than its present value. Inflation also causes nominal interest rates to rise and this may affect demand for credit, thus affecting investment and economic growth negatively. Inflation also erodes the value of financial assets. Furthermore, investors become increasingly uncertain about the direction of economic policies in a highly inflationary environment. This uncertainty may have an adverse effect on planned capital investment. Inflation causes low levels of private investment as domestic and foreign investors foresee a low after-tax risk adjusted rate of return on capital (Herandez-Cata, 2000). According to Burnside and Dollar (1997, 2000), high inflation rates are an indication of macroeconomic instability, which is not good for foreign aid effectiveness. Thus, inflation is considered a monetary policy measure in the aid-growth debate (Fischer, 1993; Burnside and Dollar, 1997, 2000). It would

be assumed, therefore, that foreign aid flows would be predictable under situations of stable macroeconomic policy environment.

Trade openness, on the other hand, increases competitiveness and provides access to enlarged markets (Balassa, 1978; Feder, 1982). Foreign trade is, therefore, another variable that influences investment and ultimately economic growth. Neoclassical school of thought postulates that openness to trade has many advantages such as efficiency gains that come with specialisation and competition from international trade (Piazolo, 1995; Zhang and Zou, 1995; Harrison, 1996; Frankel and Romer, 1999). Other benefits include embodied technological transfer through imported inputs; diffusion of ideas through global interaction; and scale economies arising from expanded markets.

Likewise, competition arising from openness to trade may discourage innovation by making investment in research and development less profitable (Harrison, 1996). Underdeveloped domestic industries are exposed to competition from imports while exports are often exposed to very volatile world markets. The literature on trade and growth tends to focus on exports. However, there are two justifications for concentrating on imports. The first justification is that they represent capital, imported technology and intermediate goods. Secondly, it is used to some extent directly for investment. Thus, trade openness has been used as a trade policy variable in the role of macroeconomic policy environment in the aid growth nexus (Burnside and Dollar, 1997, 2000; Feeny, 2005; Javid and Qayyum, 2011). It could be argued

that increased trade openness would enhance the trade relations between the recipient and donor country. It would be assumed that in such a case, foreign aid flows would be predictable, arising from the increased trade flows between the countries.

To capture the fiscal policy aspect, Burnside and Dollar (1997) argued that budget deficit was also another good proxy. In this regard, it is expected that foreign aid would play an important role in filling the financing gap arising from budget deficit. Countries with huge budget deficits are also bound to be seen as being economically unstable. Thus, foreign aid can be used to finance the fiscal gap as argued by the gap theories. Budget deficit is an indication that there is increase in final government consumption expenditure beyond the revenue generating capacity of the economy. This study, therefore, uses the final government consumption expenditure as a proxy for fiscal policy. It would then be expected that countries with high final government consumption would not be good for aid predictability, especially if the expenditure is directed towards unproductive sectors or consumption.

Following Burnside and Dollar (1997) and World Bank (1998), economic growth depends on foreign aid, investment and macroeconomic policy environment. Thus, inflation, final government consumption as a percentage of GDP and degree of openness are considered as three proxy variables for macroeconomic policy environment. A composite variable (policy) was

constructed from the policy variables in line with Burnside and Dollar (1997).

Thus, the growth and investment behavioural equations are as follows:

$$Yp_t = y[Yp_{t-1}, Pinv_t, Aid_t, Tax_t, Fdebt_{t-1}, POLICY_t, AIP_t] \quad (3.3)$$

$$Ginv_t = gi[Ginv_{t-1}, Tax_t, Aid_t, Pinv_t, Fdebt_{t-1}, POLICY_t, AIP_t] \quad (3.4)$$

where AIP is an interactive variable of AID and Policy.

Constructing the Macroeconomic Policy Index

According to Burnside and Dollar (1997) and World Bank (1998), a good macroeconomic environment was essential for aid effectiveness. As a first step, this study constructed a policy index that builds on selected macroeconomic trends. Fiscal policy was proxied by government final consumption expenditure (Easterly and Rebelo, 1993), while monetary policy was proxied by inflation (Fischer, 1993; Burnside and Dollar, 1997, 2000). Trade policy was proxied by trade openness measure, which is (imports + exports)/GDP (Burnside and Dollar, 1997; Feeny, 2005; Javid and Qayyum, 2011).

Burnside and Dollar (1997, 2000), Feeny (2005) and Javid and Qayyum (2011) all assumed that distortions affect growth that will determine the effectiveness of aid. Thus, they assigned the weights to the policy variables according to their correlation with growth. In this respect, a regression was run in which economic growth was the dependent variable and inflation, final government consumption expenditure and degree of openness were explanatory variables. In this regression, foreign aid variable was not included. The coefficients from the resultant regression were used in the construction of the policy index.

Thus, the policy index constructed for the study is based on the following equation.

$$PolicyIndex = \alpha_1 INF + \alpha_2 FGC + \alpha_3 OPEN \quad (3.5)$$

where α_1 , α_2 and α_3 are the weights for inflation, final government consumption and openness. The signs attached to the weights are essential in the construction of the policy index such that $\alpha_1 < 0$, $\alpha_2 > 0$ and $\alpha_3 > 0$.

$$Policy\ index = -0.16020INF + 0.32203FGC + 0.12231OPEN. \quad (3.6)$$

Figure 3.7 shows the graphic representation of the policy index over the study period.

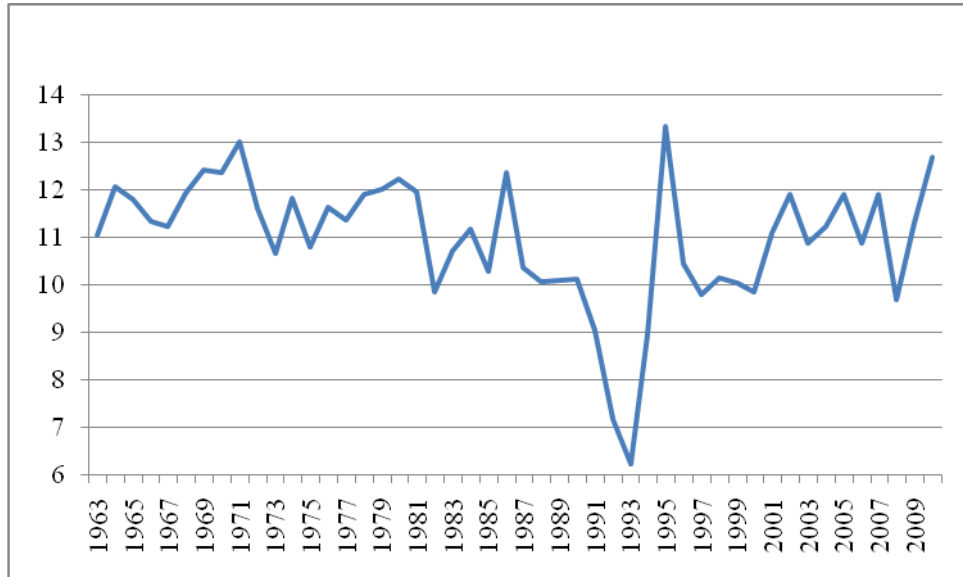


Figure 3.7: Policy Index 1963 -2010

The figure shows that Kenya's macroeconomic policies (fiscal, monetary and trade) have been unstable over the study period. Thus, these policies are affected by both external and internal shocks. It is observed that final

government consumption has a substantial impact on the policy index, followed by inflation and finally by trade openness. The index registered low levels during the early part of 1990s due to high inflation and high rate of final government consumption experienced during this period. This was especially the period after the 1992 multi-party elections that witnessed high inflation rates and final government consumption expenditure. Thus, 1993 registered the lowest point of the policy index.

Consequently, a variable representing the constructed policy variable (POLICY) was developed and was interacted with the foreign aid variable (Aid) (Aid*POLICY) to create an interactive variable AIP.

An important observation from the index is that inflation negatively affects the index, implying that periods of high inflation if not matched with consecutive increase in openness and final government consumption will lead to a fall in the index.

3.4.3 The Effect of Aid Predictability on Investment and Economic Growth

The third objective of the study was to analyze the effect of aid predictability on investment and economic growth. Lensink and Morrissey (2000) measured aid unpredictability by first estimating a forecasting equation so as to be able to determine the expected component of the variable under consideration. Secondly, the uncertainty (unpredictability) proxy was derived by calculating

the standard deviation of the residuals from the forecasting equation. However, the study used cross-section data, and therefore, would not provide a good measure for a country specific study. This study used a predictability indicator defined as the difference between commitments and disbursements as a percentage of disbursements (also known as the predictability per a unit of aid dollar) (see Celasun and Walliser, 2008). This measure of aid predictability is independent of the scale of aid as a share of GDP.

$$\chi Aid_t = ((C_t - D_t) / D_t) * 100 \quad (3.7)$$

where χAid_t is a predictability indicator, C_t is Commitments and D_t is disbursements.

The aid predictability indicator was constructed by finding the difference between commitment and disbursement. The second step included developing bounds such that the index ranged between 0 and 1. From the aid data in Appendix II Table A2, there are years where foreign aid disbursements were higher than commitments. In order to arrive at the aid predictability indicator, it was assumed that years in which aid disbursements were equal to or greater than commitments were equated to a value of 1. A proportional approach was used for years where aid commitments were higher than disbursements in order to ensure that the resultant value did not exceed 1. Thus, an aid predictability indicator (XAIDB) and an interactive variable linking predictability to macroeconomic policy environment (PRIP) were used in the regressions. The inclusion of the interactive variable was aimed at testing two hypotheses: the effects of aid unpredictability on economic growth depend on macroeconomic

policy environment, and that the effects of aid unpredictability on investment depend on macroeconomic policy environment.

In line with this objective, the study factored in this predictability indicator into equations (3.3) and (3.4), respectively, to result into the following behavioural equations for economic growth and public investment:

$$Yp_t = y[Yp_{t-1}, Pinv_t, Aid_t, Tax_t, Fdebt_{t-1}, POLICY_t, AIP_t, XAIDB_t], \quad (3.8)$$

$$Ginv_t = gi[Ginv_{t-1}, Yp_t, Tax_t, Aid_t, Pinv_t, Fdebt_{t-1}, POLICY_t, AIP_t, XAIDB_t] \quad (3.9)$$

where XAIDB is the predictability indicator and other variables as previously defined.

By interacting the policy variable with the predictability indicator, the study sought to examine the joint effects of macroeconomic policy environment and aid predictability. This variable (PRIP) was as a result of the multiplication of the predictability indicator with the policy variable. In this respect, the growth and investment equations were as follows:

$$Yp_t = y[Yp_{t-1}, Pinv_t, Aid_t, Tax_t, Fdebt_{t-1}, POLICY_t, XAIDB_t, AIP_t, PRIP_t], \quad (3.10)$$

$$Ginv_t = gi \left[\begin{array}{l} Ginv_{t-1}, Yp_t, Tax_t, Aid_t, Pinv_t, Fdebt_{t-1}, POLICY_t, \\ XAIDB_t, AIP_t, PRIP_t \end{array} \right], \quad (3.11)$$

where PRIP is an interactive term of the policy variable and aid predictability indicator.

3.5 Estimation Procedure

The study used an autoregressive distributed lag (ARDL) model as developed by Pesaran and Shin (1995, 1999), Pesaran *et al.* (1996), and Pesaran (1997) in a bid to examine the direction of causation between the variables. This approach has advantages over the Johansen (1988) and Johansen and Juselius (1990). Whereas the conventional cointegration approach estimates the long-run relationships within the context of a system of equations, the ARDL approach employs a single reduced form equation (see Pesaran and Shin, 1995). The approach also yields precise estimates of long-run parameters and valid t-statistics even in the presence of endogenous variables (Inder, 1993). Additionally, the ARDL approach does not necessarily require pre-testing of the variables, implying that the test is possible even if the underlying regression is purely $I(0)$, purely $I(1)$ or a mixture of the two. This uniqueness of the approach makes it superior to the other methods as the time series data are in most cases integrated of the same order. The ARDL approach also avoids the large number of specifications necessary for conventional cointegration tests. Some of these include the number of endogenous and exogenous variables (if any) to be included in the model, the differences in order of integration of variables, and the treatment of deterministic elements and the number of lags.

According to Pesaran and Smith (1998), the results of the conventional cointegration tests are generally very sensitive to the method and various alternative choices available in the estimation procedure. However, under the

ARDL approach, it is possible to have different optimal lags that could be used with limited sample data (30 variables), making it quite suitable for this study. According to Ghatak and Siddiki (2001), the ARDL model is, therefore, more statistically significant approach to determine the cointegration relation in small samples.

The ARDL approach is conducted in two steps (Pesaran and Pesaran, 1997) such that in the first stage, the hypothesis of no cointegration is tested. The null hypothesis in this case is that the coefficients on the lagged regressors (in levels) in the error-correction form of the underlying ARDL model are jointly zero. The approach uses the F -test, although the asymptotic distribution of the F -statistic in this context is non-standard irrespective of whether the variables are $I(0)$ or $I(1)$. The critical values as provided by Pesaran and Pesaran (1997) would have been used, but this study used those provided by Narayan (2004), due to their appropriateness for small samples (Boakye, 2008). Two sets of values are tabulated. The first assumes that all the variables are $I(1)$ and the second that they are $I(0)$. This band allows for the fact that variables may be stationary, integrated of order one, or even fractionally integrated. In this respect, when the calculated F -statistic is above the upper value of this band, the null hypothesis will be rejected, indicating cointegration between the variables irrespective of whether they are $I(1)$ or $I(0)$. If the F -statistic falls below the band, then the null hypothesis of no cointegration cannot be rejected. A value within the band implies the test is inconclusive.

In the second stage, the long and short-run parameters were then estimated using the ARDL method. The initial lag length was then set at two periods on all variables in the general ARDL equation. In this procedure, cointegration relationship was estimated by OLS once the lag order of the model was identified. Thus, once cointegration was established, the conditional ARDL (p , q_1 , q_2 , q_3 , q_4 , q_5 , q_6 , q_7 , q_8) long-run model for Yp_t in equation (3.10) was estimated as:

$$\ln Yp_t = \delta_0 + \sum_{i=1}^p \delta_{1i} \ln Yp_{t-i} + \sum_{i=0}^{q_1} \delta_{2i} \ln Tax_{t-i} + \sum_{i=0}^{q_2} \delta_{3i} \ln Pinv_{t-i} + \sum_{i=0}^{q_3} \delta_{4i} \ln Aid_{t-i} + \sum_{i=0}^{q_4} \delta_{5i} \ln POLICY_{t-i} + \sum_{i=0}^{q_5} \delta_{6i} XAIDB_{t-i} + \sum_{i=1}^{q_6} \delta_{7i} \ln Fdebt_{t-i} + \sum_{i=0}^{q_7} \delta_{8i} AIP_{t-i} + \sum_{i=0}^{q_8} \delta_{9i} PRIP_{t-i} + \varepsilon_t, \quad (3.12)$$

where p , q_1 , q_2 , q_3 , q_4 , q_5 , q_6 , q_7 , q_8 are the lag lengths for each of the variables.

From equation (3.11), the conditional ARDL (r , s_1 , s_2 , s_3 , s_4 , s_5 , s_6 , s_7 , s_8 ...) long-run model for public investment model was estimated as:

$$\ln Ginv_t = \beta_0 + \sum_{i=1}^r \beta_{1i} \ln Ginv_{t-i} + \sum_{i=1}^{s_1} \beta_{2i} \ln Yp_{t-i} + \sum_{i=0}^{s_2} \beta_{3i} \ln Pinv_{t-i} + \sum_{i=0}^{s_3} \beta_{4i} \ln Aid_{t-i} + \sum_{i=0}^{s_4} \beta_{5i} \ln Tax_{t-i} + \sum_{i=0}^{s_5} \beta_{6i} \ln POLICY_{t-i} + \sum_{i=0}^{s_6} \beta_{7i} XAIDB_{t-i} + \sum_{i=1}^{s_7} \beta_{8i} \ln Fdebt_{t-i} + \sum_{i=0}^{s_8} \beta_{9i} AIP_{t-i} + \sum_{i=0}^{s_9} \beta_{10i} PRIP_{t-i} + \varepsilon_t, \quad (3.13)$$

where r , s_1 , s_2 , s_3 , s_4 , s_5 , s_6 , s_7 , s_8 ... are the lag lengths for each of the variables.

The short-run dynamic parameters were obtained by estimating an error correction model associated with the long-run estimates. This was specified as follows for both the growth and investment equations:

$$\begin{aligned}
\Delta \ln Yp_t = & \varphi_0 + \sum_{i=1}^n \varphi_{1i} \Delta \ln Yp_{t-i} + \sum_{i=1}^n \varphi_{2i} \Delta \ln Tax_{t-i} + \sum_{i=1}^n \varphi_{3i} \Delta \ln Pinv_{t-i} + \sum_{i=1}^n \varphi_{4i} \Delta \ln Aid_{t-i} + \\
& \sum_{i=1}^n \varphi_{5i} \Delta \ln POLICY_{t-i} + \sum_{i=1}^n \varphi_{6i} \Delta XAIDB_{t-i} + \sum_{i=1}^n \varphi_{7i} \Delta \ln Fdebt_{t-i} + \sum_{i=1}^n \varphi_{8i} \Delta AIP_{t-i} + \\
& \sum_{i=1}^n \varphi_{9i} \Delta PRIP_{t-i} + \pi ecm_{t-i} + \varepsilon_t,
\end{aligned} \tag{3.14}$$

where $\varphi_1, \varphi_2, \varphi_3, \varphi_4, \varphi_5, \varphi_6, \varphi_7, \varphi_8, \varphi_9$ are the short-run dynamic coefficients of the model's convergence to equilibrium, and π is the speed of adjustment to long-run equilibrium following a shock to the system.

$$\begin{aligned}
\Delta \ln Ginv_t = & \theta_0 + \sum_{i=1}^n \theta_{1i} \Delta \ln Ginv_{t-i} + \sum_{i=1}^n \theta_{2i} \Delta \ln Yp_{t-i} + \sum_{i=1}^n \theta_{3i} \Delta \ln Pinv_{t-i} + \\
& \sum_{i=1}^n \theta_{4i} \Delta \ln Aid_{t-i} + \sum_{i=1}^n \theta_{5i} \Delta \ln Tax_{t-i} + \sum_{i=1}^n \theta_{6i} \Delta \ln POLICY_{t-i} + \sum_{i=1}^n \theta_{7i} \Delta XAIDB_{t-i} + \\
& \sum_{i=1}^n \theta_{8i} \Delta \ln Fdebt_{t-i} + \sum_{i=1}^n \theta_{9i} \Delta AIP_{t-i} + \sum_{i=1}^n \theta_{10i} \Delta PRIP_{t-i} + \pi' ecm_{t-1} + \varepsilon_t,
\end{aligned} \tag{3.15}$$

where $\theta_1, \theta_2, \theta_3, \theta_4, \theta_5, \theta_6, \theta_7, \theta_8, \theta_9$ are the short-run dynamic coefficients of the model's convergence to equilibrium, and π' is the speed of adjustment to long-run equilibrium following a shock to the system.

3.6 Working Hypotheses

- (i) Foreign aid has a positive effect on economic growth;
- (ii) Foreign aid has a positive effect on investment;
- (iii) Macroeconomic policy instability has a negative effect on economic growth;
- (iv) Macroeconomic policy instability has a negative effect on investment;
- (v) Foreign aid unpredictability has a negative effect on economic growth;
- (vi) Foreign aid unpredictability has a negative effect on investment.

3.7 Definition and Measurement of Variables

Variable Name	Variable Definition	Measurement
Real Per capita income (Yp)	Real income divided by the population. Per capita income is often considered an indicator of a country's standard of living.	Growth of real GDP per capita in constant (2000) U.S. dollars
Public Investment (Ginv)	Investment in human capital, law and order, research and development, and social and economic infrastructure. It entails the payment for acquisition of land, buildings and other non-financial assets to be used for more than one year in the production process.	The total government development expenditure as percentage of GDP.
Private Investment (Pinv)	An injection of capital into a business from a private investor. It was proxied by the gross capital formation less public investment.	Gross capital formation less public investment, as a share of GDP.
Tax Revenue (Tax)	Income gained by the Government through taxation.	Share of GDP
Foreign aid (Aid)	Official Development Assistance (ODA), which includes all loans with a grant component above 25 per cent.	Share of GDP
Aid Predictability Indicator (Xaid)	The difference between commitments and disbursements (also known as the unpredictability per a unit of aid dollar).	Percentage of disbursements
External Debt (Fdebt)	The stock of resources borrowed externally by the Government	Share of GDP
Openness to trade (Open)	The degrees to which countries or economies permit or have trade with other countries or economies. The trading activities include import and export, foreign direct investment (FDI), borrowing and lending, and repatriation of funds abroad	Summation of exports and imports as a percentage of GDP
Inflation (Inf)	A rise in the general level of prices of goods and services in an economy over a period of time. This indicates the overall ability of the government to manage the economy.	Changes in the Consumer Price Index
Final Government Consumption (FGC)	A transaction of the national account's use of income account representing government expenditure on goods and services that are used for the direct satisfaction of individual needs (individual consumption) or collective needs of members of the community (collective consumption).	Share of GDP
Policy Index (POLICY)	Constructed from selected marcoeconomic trends such as inflation (monetary policy), degree of openness (trade policy) and final government consumption (fiscal policy).	
Interactive variable of Policy and Aid (AIP)	Constructed through interacting the foreign aid variable (Aid) with the policy Index (POLICY). It is computed as (Aid*POLICY).	
Interactive variable of Aid Predictability Indicator and Policy (PRIP)	Constructed through interacting the aid predictability indicator (XAIDB) with the policy index (POLICY). It is computed as XAIDB*POLICY.	

3.8 Data Type and Sources

The study used secondary sources of data for its analysis covering the period 1966 – 2010. The data on real GDP, degree of openness, final government consumption expenditure and private investment were from the World Bank, *Africa Development Indicators* database. Other complimentary sources were Economic Survey, and Statistical Abstract. Foreign aid data (commitments and disbursements) were from the Organization for Economic Corporation and Development (OECD), *OECD.Stat* online database. This data was supplemented with those from the World Bank, Africa Development Indicators. Data on external debt, tax, public investment and inflation were from Economic Survey (various issues). To ensure consistency, efforts were made towards ensuring that data came from one source.

3.9 Data Collection, Cleaning and Refinement

The study used data collected from secondary sources. The identification of the data sources was the first step in the data collection process. The data collection instrument was essential in this exercise. Efforts were made at ensuring that data sources were consistent for all the variables. Time series tests were conducted on the selected data prior to their use in the models.

3.10 Time Series Properties

The data used in this study was recorded over the period 1966 and 2010. A basic assumption when conducting regression on time series data is that the data series must be stationary. Thus, a test for the existence of unit roots for

each series using the Augmented Dickey-Fuller (ADF) was done. This is explained in detail in the next sub-section.

3.10.1 Stationarity of Data

Time series data generally tend to be non-stationary in nature or have unit roots. A non-stationary series may have a number of unit roots and is often referred to as integrated to the order of d [I(d) where $d = 1, 2, \dots$]. A stationary series is said to be integrated to the order of 0 [I(0)]. There are important differences between non-stationary and stationary time series in terms of their responses to shocks. Shocks to a stationary time series are temporary, over time the effects of the shocks will dissipate and the series will revert to its long term equilibrium level. As such, forecasts of a stationary series will converge to the mean of the series. Shocks to a non-stationary series persist over time, since the mean and variance of a non-stationary series are time dependent. As a result of non-stationarity, regressions with time series data are likely to result in spurious results.

In light of the above, the study tested for the existence of unit roots for each series using the Augmented Dickey-Fuller (ADF). The ADF is an extension of the simple Dickey-Fuller (DF) method. DF despite its limitations has become a benchmark for comparison with other tests of unit roots. The equation form of the DF unit root test is

$$Y_t = \rho Y_{t-1} + \varepsilon_t \quad (3.16)$$

where $-1 \leq \rho \leq 1$ (when a series is stationary), t represents time and ε represents a random white noise error term.

Conducting a regression analysis based on the above equation could help in estimating the value of ρ . The basis of the Dickey-Fuller unit root tests is testing the hypothetical value of ρ . Equation (3.16) could be transformed as follows:

When Y_{t-1} is subtracted from both sides of the equation, this yields

$$Y_t - Y_{t-1} = \rho Y_{t-1} - Y_{t-1} + \varepsilon_t, \quad (3.17)$$

Equation (3.17) could be simplified as

$$\Delta y_t = (\rho - 1)y_{t-1} + \varepsilon_t \quad (3.18)$$

The above could be further simplified as

$$\Delta y_t = \delta y_{t-1} + \varepsilon_t, \quad (3.19)$$

where $\delta = \rho - 1$, implying that $\delta = 0$ when $\rho = 1$.

In conducting the Dickey-Fuller tests, it is usually assumed that the error terms are uncorrelated. In the time series data used in this study, error terms are likely to be correlated and so the Augmented Dickey-Fuller (ADF) test was used. The ADF test was conducted by augmenting the previous three test equations (equations 3.16-3.19) by adding lagged values of the dependent variables

Δy_t (Dickey and Fuller, 1981). The ADF tests the null hypothesis that $|\rho| = 1$ against an alternative $|\rho| < 1$. The ADF equations are given as:

$$\Delta y_t = \delta y_{t-1} + \alpha_i \sum_{i=1}^m \Delta y_{t-i} + \varepsilon_t, \quad (3.20)$$

This is known as the ADF without intercept and trend.

$$\Delta y_t = \beta_1 + \delta y_{t-1} + \alpha_i \sum_{i=1}^m \Delta y_{t-i} + \varepsilon_t, \quad (3.21)$$

This is an ADF with an intercept but no trend.

$$\Delta y_t = \beta_1 + \beta_2 t + \delta y_{t-1} + \alpha_i \sum_{i=1}^m \Delta y_{t-i} + \varepsilon_t, \quad (3.22)$$

This is an ADF with both the intercept and trend.

3.10.2 Logarithmic Transformation

The study observed the importance of logarithmic transformations of variables. Such transformations are important given that many economic time series data exhibit a strong trend. According to Asteriou and Price (2007), taking the natural logarithm of a series effectively makes linear the exponential trend (if any) in the time series data, given that the log function is the inverse of an exponential function. Finally, such transformation allows the regression coefficients to be interpreted as elasticities. In light of the foregoing, all variables except predictability indicator and the interactive variables (foreign aid and macroeconomic policy; and predictability and macroeconomic policy) were transformed into natural logarithms. Logarithmic transformation was not

done for the above mentioned examples due to the fact that they contained negative entries in some cases.

3.10.3 Correlation Analysis

Correlation can be defined as a quantitative measure of the degree or strength of relationship that may exist between two variables. If X and Y are two variables, the correlation coefficient is given by the ratio of the covariance between X and Y to the product of the standard deviation of X and that of Y.

This can be expressed as:

$$r_{XY} = \frac{Cov(X, Y)}{\sigma_X \sigma_Y} \quad (3.23)$$

The covariance in the numerator gives a measure of the simultaneous change in the two variables and is divided by product of the standard deviation of X and Y to make the measure free of any unit in order to facilitate a comparison between more than one set of bivariate data which may be expressed in different units. Thus, this measure of correlation coefficient is independent of a shift in the origin and a change of scale. The correlation coefficient lies between +1 and -1. The correlation coefficient is positive when the two variables tend to move in the same direction. In the event of the two variables tending to move in the opposite directions, the correlation coefficient assumes a negative value.

From the foregoing explanations, the study conducted correlation analysis on the data collected in order to determine the nature of relationship. This was

essential in order to ensure that there was no multi-collinearity amongst the variables. Given that the study used interactive variables, such analysis was essential in determining how such variables enter the model. In this respect, interactive variables were included if they improved the adjusted R-squared or minimised the standard errors of the regression without affecting the significance of the t-statistics. It may be observed that correlation does not imply causality.

3.10.4 Cointegration Analysis

The essence of a cointegrating relationship is that the variables in the system share a common unit root process. This methodology is also particularly suitable in this context because it provides a flexible functional form for modelling the behaviour of the variables under the long-run equilibrium condition. This approach is also appealing because it treats all variables as endogenous; it thus avoids the arbitrary choice of the dependent variable in the cointegrating equations.

The study used the bound testing procedure as developed by Pesaran and Pesaran (1997). This is the first step in an ARDL approach as it makes it possible to determine whether there exists a long-run relation between the variables. In this regard, the hypothesis of no cointegration was tested. The null hypothesis in this case is that the coefficients on the lagged regressors (in levels) in the error-correction form of the underlying ARDL model are jointly zero. The null hypothesis is defined by $H_0: \delta_1 = \delta_2 = 0$ and tested against the

alternative of $H_1: \delta_1 \neq 0; \delta_2 \neq 0$ (where δ_1, δ_2 are the coefficients of the lagged regressors). The approach uses the F -test although the asymptotic distribution of the F -statistic in this context is non-standard irrespective of whether the variables are $I(0)$ or $I(1)$. Critical values are provided by Pesaran and Pesaran (1997), but the study used those provided by Narayan (2004), due to its appropriateness to small samples.

3.10.5 Lag Length Selection

The selection of an appropriate number of lag lengths for the model is important because the use of long lags uses up degrees of freedom. Further, the number of observations in the study is few and therefore caution must be made in pinning down the lag length. One possibility to minimize this loss of degrees of freedom is to use different lag lengths for each variable in the system. However, Enders (1995) suggests that using different lag lengths causes asymmetry in the system. Therefore, in order to preserve symmetry, the study used the same lag length for all the variables as this allowed for the efficient use of the ordinary least squares (OLS) estimation method.

Therefore, when selecting lag lengths, the study was mindful that if lag length was too small, the model could be mis-specified, and if it was too large, degrees of freedom would be wasted (Enders, 1995). Given these scenarios, an appropriate lag selection criterion was used. The orders of the lags in the ARDL model are selected using either Akaike information criteria (AIC) or the Schwartz-Bayesian information criteria (SIC or SBC).

According to Shrestha and Chowdhury (2005), the model selection criterion is a function of the residual sums of squares and is equivalent asymptotically. This study used the SBC to select the orders of the ARDL specifications due to its comparative advantages over the AIC (Kargbo, 2012). Pesaran and Shin's (1999) comparison of AIC and SIC in the Monte Carlo experiments they ran showed that though the ARDL-AIC and ARDL-SBC had quite similar small-sample properties, the ARDL-SBC performed slightly better in the majority of the experiments. Therefore, they suggested that this could be due to the fact that the Schwartz criterion was a consistent model selection criterion whereas the Akaike was not. Thus, the SBC is more parsimonious with the lag length selection and is a consistent model selection criterion (Pesaran and Shin, 1999). For annual data, Pesaran and Shin (1999) recommended choosing a maximum of 2 lags. From this, the lag length that minimized SBC was selected. This also ensured that degrees of freedom were not lost given the number of observations in the study.

3.11 Diagnostic tests

Diagnostic testing has become an integral part of model specification in econometrics. There have been several important advances over the past 20 years. Various diagnostic tests were conducted to ensure that the coefficients of the estimates were consistent and could be relied upon in making economic inferences. Diagnostic tests for autoregressive conditional heteroscedasticity, serial correlation, functional form and heteroscedasticity were conducted. In this respect, the study used Breuch-Godfrey lagrange multiplier (LM) for serial

correlation, the lagrange multiplier test for conditional heteroscedasticity (ARCH) were used on the residuals to determine the OLS assumption on the error term. The Ramsey RESET test was conducted for the correct specification of the error-term. The Jarque-Berra statistic was used to determine whether the sample data have the skewness and kurtosis matching a normal distribution.

The study examined the stability of the long-run parameters together with the short-run movements for the equations and relied on cumulative sum (CUSUM) and cumulative sum squares (CUSUMSQ) tests as proposed by Borensztein *et al.* (1998). This same procedure has been utilized by Pesaran and Pesaran (1997), Suleiman (2005), and Mohsen and Ng (2002) to test for the stability of the long-run coefficients. According to Pesaran and Pesaran, (2009), the CUSUM test is particularly important for detecting systematic changes in the regression coefficients, while the CUSUMSQ test is useful in situations where the departure from the constancy of the regression coefficients is haphazard and sudden.

Unlike the Chow test that requires break point(s) to be specified, the CUSUM tests can be used even if the structural break point is not known. Thus, the CUSUM test uses the cumulative sum of recursive residuals based on the first n observations and is updated recursively and plotted against break point. The CUSUMSQ makes use of the squared recursive residuals and follows the same procedure. When the plot of the CUSUM and CUSUMSQ stays within the 5

per cent critical bound, the null hypothesis that all coefficients are stable cannot be rejected. However, when either of the parallel lines are crossed, then the null hypothesis (of parameter stability) is rejected at the 5 per cent significance level.

3.12 Hypothesis Testing

The t-statistic was used to test the hypothesis that a coefficient was equal to zero, while the F-statistic was used to test that all the coefficients in the estimated response equations were zero. The t-statistic was interpreted based on the absolute values and the probability (p-value), given that the coefficient was equal to zero. If the absolute value of the computed t-statistic was greater than 1.96 at 5 per cent level of significance, then the null hypothesis was rejected. The p-value was in this respect used to determine the level of significance of the coefficient. If the p-value was found to be less than 0.05, then the null hypothesis was rejected at 5 per cent level of significance. The null hypothesis was rejected if the p-value was found to be less than 0.01 at 1 per cent level of significance. The *F*-statistic was interpreted based on its associated p-value.

CHAPTER FOUR

EMPIRICAL FINDINGS

4.1 Introduction

This chapter presents the empirical findings of the study. The descriptive statistics are presented in section 4.2. The time series tests are presented in section 4.3, while section 4.4 presents diagnostic test results and section 4.5 presents hypothesis testing results. The results of the study are presented in section 4.6.

4.2 Descriptive Statistics and Correlation Results

The raw data presented in Appendix II Table A2 makes it hard to visualise what the data is showing. For this reason, descriptive statistics are very important in presenting the data in a more meaningful way that allows for simpler interpretation. Appendix III Table A3 presents the results of the descriptive statistics of the variables used in the study.

It is indicated that 45 observations of each variable were used. The table shows that the mean real per capita income figure was 346.16, with a median of 352.31 and standard deviation of 38.16. Public investment recorded a mean of 4.99, a median of 3.61 and a standard deviation of 2.16. Private investment had a mean of 18.66, a median of 18.70 and a standard deviation of 2.65. The mean of the foreign aid was 5.85, a median of 4.50 and a standard deviation of 3.15. Tax recorded a mean of 20.00, a median of 20.34 and a standard deviation of

3.85. Examination of the mean and standard deviations, show that there was no case where the standard deviation was greater than the mean. This therefore implied that the mean was a good estimator of the parameters. The foregoing presentation, therefore, provides a snap shot view of the key statistics of the variables that were relevant when examining the study objectives.

The correlation matrix for the variables is presented in Appendix III Table A4. The table shows that there was a near perfect correlation between foreign aid and foreign debt as one is a flow and the other a stock variable. There was also a strong correlation between foreign debt and the macroeconomic policy index, thus, the foreign debt was included in the model in lagged form. The near perfect correlation between the interactive variables of foreign aid and macroeconomic policy, on the one hand, and foreign aid predictability index and macroeconomic policy index on the other, was as expected due to the effects of the interaction. The results also shows that variables that did not have a strong correlation included private investment and real per capita GDP; public investment and private investment (which is in fact negative); foreign debt and final government consumption expenditure, macroeconomic policy index and final government consumption expenditure; final government consumption expenditure and the interactive variable of foreign aid and macroeconomic policy environment. Others are inflation and private investment, and inflation and final government consumption expenditure; degree of openness and real per capita income; degree of openness and foreign debt; degree of openness and predictability index; degree of openness and the

interactive variable of foreign aid and macroeconomic policy environment; and degree of openness and the interactive variable of predictability index and macroeconomic policy environment. The above correlations matrix was essential as a guide in the estimation of the models.

4.3 Time Series Property Results

4.3.1 Stationarity Analysis

Prior to testing for cointegration, a test of order of integration for each of the variables using ADF was conducted due to the likelihood of the error terms being correlated. Appendix IV Figure A1 shows the plots of variables in levels and first differences. The figure shows that some of the variables depicted a stationary trend while others exhibited stationary trend after first differencing. The results of the unit root tests of the variables are presented in Appendix V Table A5.

According to ADF test, variables were integrated of order 1 except the natural logarithm of private investment, which was integrated of order 0. The ADF test, therefore, found that the variables were integrated not of the same order. In addition, the dependent variables (natural logarithm of real per capita income and natural logarithm of public investment) were integrated of order one (I(1)), therefore, implying that an ARDL could be used to estimate the model (Pesaran and Shin, 1995; 1999). ARDL model can be estimated so long

as the dependent variable is I(1) and independent variables can either be I(1) or I(0) or a mix.

4.3.2 Cointegration Analysis Results

In this respect, equations 3.12 and 3.13 in Chapter 3 were estimated to examine the long-run relationship amongst the variables. As stated previously, a maximum of lags in the ARDL is 2 (see Pesaran and Shin, 1999; Narayan, 2004). The estimation was done for the period 1966 to 2010. The study also used the Schwartz-Bayesian criteria (SBC) to determine the optimal number of lags to be included in the conditional error-correction model (ECM) while taking into consideration that there was no serial correlation as emphasized by Pesaran *et al.* (2001). The calculated *F*-statistics for the cointegration test are shown in Appendix VI Tables A6 and A7 for the economic growth and investment models, respectively. The critical values reported in the table were compared against the critical values reported by Narayan (2004), since it was based on small sample size of between 30 and 80 observations.

For the growth equation, results in Appendix VI Table A6 show that the calculated *F*-statistic (4.948) was higher than the upper bound critical value at 5 per cent level of significance (3.723) using a restricted intercept and no trend. The calculated *F*-statistic was also higher than the upper bound critical value at 5 per cent level of significance (4.004) using restricted intercept and trend. Thus, the null hypothesis of no long-run relationship between the above

variable was rejected irrespective of the order of their integration implying that there was a long-run relationship between the variables.

The results of the F -statistics for the investment equation are presented in Appendix VI Table A7. The calculated F -statistics of the investment equation was 4.701. The statistic is above the critical level at 5 per cent level of significance (3.829) using a restricted intercept and no trend. The statistic was also above the critical level at 5 per cent level of significance (4.130) using a restricted intercept and trend. Therefore, it was concluded that there was a long-run relationship between the variables.

4.4 Diagnostic Tests Results

Diagnostic tests for serial correlation, autoregressive conditional heteroscedasticity, heteroscedasticity and functional form were conducted and the results are shown in Appendix VII Tables A8 and A9.

The table shows that for the two models, there was no evidence of autocorrelation in the disturbance of the error term with p-values of 0.785 for the growth model and 0.276 for the investment model. The study used Breuch-Godfrey lagrange multiplier (LM) to test for serial correlation. The ARCH tests suggest the errors were homoskedastic and independent of the regressors as evidenced by the p-values of 0.198 for the growth model and 0.348 for the investment model. The models passed the Jarque-Bera normality tests (p-value of 0.943 for the growth model and 0.162 for the investment model), suggesting

that the errors are normally distributed. The RESET test indicated that the models were correctly specified with p-values of 0.192 for the growth model and 0.269 for the investment model. It is therefore on the basis of these tests that it was reasonable to claim that the models had a good statistical fit.

The histogram is a frequency plot obtained by placing the data in regularly spaced cells and plotting each cell frequency versus the center of the cell. Appendix VIII Figures A2 and A3 show histograms of residuals and normal density of the models. The figure illustrates an approximately normal distribution of residuals produced by the models through a calibration process. A normal density function has been superimposed on the histogram.

Appendix VIII Figures A4, A5, A6 and A7 provides further incites on the adequacy of the model through examination of the residuals. Examining residuals is a key part of all statistical modeling and can tell whether the assumptions are reasonable and the appropriateness of the model chosen. The residuals and panels of plots of the residuals versus each of the regressors in the model are produced by default. Patterns in these plots are indications of an adequate model.

Appendix VIII Figures A8, A9, A10 and A11 show the plots of both the CUSUM and CUSUMSQ for the models. It can be seen from the figures that the plot of CUSUM stays within the critical 5 per cent bound for all equations, and CUSUMSQ statistics does not exceed the critical boundaries that confirms

the long-run relationships between the economic growth and the variables, on one hand, and public investment and the other variables, on the other. It also shows that the stability of co-efficient plots lie within the 5 per cent critical bound, thus providing evidence that the parameters of the model do not suffer from any structural instability over the period of study.

From the foregoing diagnostic tests, it is clear that the models passed all the required tests and thus paving way for interpretation of estimates of both the long-run and short-run coefficients as required in an ARDL approach.

4.5 Hypothesis Testing Results

Table 4.1 presents the results of the hypothesis tests for this study. The results show that all the null hypotheses could not be rejected. The p-values showed that the coefficients were statistically significant at 5 per cent and 1 per cent level of significance except for the foreign aid and investment relationship. It was therefore, based on the p-values concluded that the first, fifth and sixth hypotheses were significant while the third and fourth were highly significant based on the p-values.

Table 4.1: Hypothesis Testing

Hypothesis	Variable	Coefficient	t-statistic	p-value
Foreign aid has a positive effect on economic growth	Foreign Aid	0.161	2.016	0.054
Foreign aid has a positive effect on investment	Foreign aid	0.287	0.994	0.328
Macroeconomic policy instability has a negative effect on economic growth	Macroeconomic policy	-1.204	-5.162	0.000
Macroeconomic policy instability has a negative effect on investment	Macroeconomic policy	-9.185	-3.982	0.000
Foreign aid unpredictability has a negative effect on economic growth	Foreign aid predictability	-0.674	-2.620	0.009
Foreign aid unpredictability has a negative effect on investment	Foreign aid predictability	-2.543	-2.575	0.015

4.6 The Long-run and Short-run Dynamics

Equations 3.12 and 3.13 in Chapter 3 section 3.5 were estimated. The results of the long-run estimations of the growth and public investment equations are presented in Table 4.2 and 4.4, while those of short-run estimation obtained from estimation of the Error-Correction Model (ECM) as presented in equations 3.14 and 3.15 are presented in Table 4.3 and 4.5 for the growth and public investment equations, respectively. Given that the coefficient of the Log of tax was not statistically significant for the economic growth equation, it was dropped from the model and thus a parsimonious specification was used. Both the t-statistic and the p -value are presented in Tables 4.2 through to 4.5.

The results in Table 4.2 show that the coefficients of most of the variables are statistically significant and have the appropriate signs. The detailed interpretation of these results is given under the respective study objectives in the next sub-sections.

Table 4.2: Estimated Long-Run Coefficients of the Growth Model

ARDL (2,2,1,1,0,1,0) selected based on Schwarz Bayesian Criterion

Dependent variable is log real per capita GDP	Coefficient	p-value
Constant	3.956*** (7.017)	0.000
Log private investment	0.046 (0.388)	0.701
Log foreign aid	0.161** (2.016)	0.054
Log macro policy	-1.204*** (-5.162)	0.000
Aid interacted with policy	-0.007*** (-2.875)	0.008
Aid predictability indicator	-0.674** (-2.620)	0.009
Predictability interacted with policy	0.258** (2.483)	0.020
Log foreign debt(-1)	1.558*** (6.256)	0.000
Log foreign debt(-2)	-0.289*** (-2.983)	0.006

Note: ** Significant at 5 per cent and *** indicate significant at 1 per cent. t-statistic in parenthesis.

The results of the error-correction model for the growth model are presented in Table 4.3. In this table, changes in the variables are used to capture the short-run dynamics.

Table 4.3: Error Correction Representation for the Growth Model

ARDL (2,2,1,1,0,1,0) selected based on Schwarz Bayesian Criterion

Dependent variable is Δ Log real per capita GDP	Coefficient	p-value
Δ Log real per capita GDP1	0.496*** (3.850)	0.001
Δ Log private investment	0.027 (0.658)	0.516
Δ Log foreign aid	-0.011 (-0.449)	0.657
Δ Log macro policy	-0.199*** (-5.488)	0.000
Δ Aid interacted with policy	0.001* (1.667)	0.106
Δ Aid predictability indicator	-0.262*** (-3.442)	0.002
Δ Predictability interacted with policy	0.100*** (3.223)	0.003
Δ Log foreign debt(-1)	0.607*** (3.992)	0.000
Δ Log foreign debt(-2)	-0.112 (-4.286)	0.000
ecm(-1)	-0.390*** (-4.477)	0.000
R-Bar-Squared	0.752	
Akaike Info. Criterion	100.714	
Schwarz Bayesian Criterion	86.625	
DW-statistic	2.025	
F-statistic F(11, 31)	12.929	0.000

Note: (1) * indicate significance at 10 per cent, ** Significant at 5 per cent and *** indicate significant at 1 per cent. (2) Δ Log Real per capita GDP1 = Log Real per capita GDP(-1)-log Real per capita GDP (-2). (3) Δ is first difference estimator. (4) t-statistics in parenthesis.

According to Bannerjee *et al.* (1998), a highly significant error-correction term is a further evidence of the existence of a stable long-run relationship. Further, De Boef (2000) notes that an ECM is of great relevance in the estimation of the aid-growth relationship as the short-run change is necessary to maintain the long-run relationship. Table 4.3 shows that the coefficient of the ECM is highly significant and carries the expected negative sign. The coefficient of ECM (-1) in the model was -0.390, which implies that the deviation from the long-term in economic growth is corrected by 39 per cent in the coming year. The relatively slow speed of adjustment could be attributed to the structural rigidities that are inherent in developing countries such as Kenya, which slows down the adjustment process as intimated by (M'Amanja and Morrissey, 2005).

Table 4.4 presents the results of the estimated long-run coefficients of the public investment model. The results show that most of the variables are statistically significant judging by their p-values. The coefficients of the variables also had in most occasions the expected sign according to economic theory.

Table 4.4: Estimated Long-Run Coefficients of the Investment Model

ARDL(1,1,0,0,2,0,0,0) selected based on Schwarz Bayesian Criterion

Dependent variable is log public investment	Coefficient	p-value
Constant	-19.139*** (-4.767)	0.000
Log real per capita GDP	2.101** (2.397)	0.023
Log private investment	2.341*** (3.876)	0.001
Log foreign aid	0.287 (0.994)	0.328
Log macro policy	-9.185*** (-3.982)	0.000
Aid interacted with policy	0.008 (0.888)	0.382
Aid predictability indicator	-2.543** (-2.575)	0.015
Predictability interacted with policy	0.835** (2.120)	0.043
Log tax(-1)	-1.665** (-2.384)	0.024
Log foreign debt(-1)	7.849 *** (3.286)	0.003

Note: * indicate significance at 10 per cent, ** Significant at 5 per cent and *** indicate significant at 1 per cent. t-statistics in parenthesis.

In Table 4.5, the results of the error-correction representation for the public investment model are presented.

Table 4.5: Error Correction Representation for the Investment Model

ARDL(1,1,0,0,2,0,0,0) selected based on Schwarz Bayesian Criterion

Dependent variable is	Coefficient	p-values
Δ Log public investment		
Δ Log private investment	1.056 *** (2.779)	0.009
Δ Log foreign aid	0.412 (1.713)*	0.096
Δ Log tax	0.321 (0.765)	0.450
Δ Log macro policy	-0.251 (-0.087)	0.931
Δ Aid interacted with policy	-0.004 (-0.549)	0.587
Δ Aid predictability indicator	-0.580** (-2.159)	0.038
Δ Predictability interacted with policy	-0.000 (-0.949)	0.350
Δ Log foreign debt(-1)	5.491 *** (3.634)	0.001
Ecm(-1)	- 0.517 *** (-4.437)	0.000
R-Bar-Squared	0.436	
Akaike Info. Criterion	8.109	
Schwarz Bayesian Criterion	-4.218	
DW-statistic	2.226	
F-statistics F(9,33)	4.704	0.000

Note: (1) * indicate significance at 10 per cent, ** Significant at 5 per cent and *** indicate significant at 1 per cent. t-statistic in parenthesis (2) Δ is first difference estimator.

According to Granger (1988), a significant coefficient of the error-correction term (ECM) indicates long-run Granger causality running from the explanatory to the dependent variables. From Table 4.5, the estimated ecm_{t-1} indicates the speed of adjustment to long-run stable equilibrium and was negative and statistically significant, further confirming the existence of a long-run relation between public investment and the explanatory variables. The estimate of lagged error term or ecm_{t-1} for the model was equivalent to (-0.517), implying divergence from short span of time to long-run in public investment is 52 per cent for every year.

The following sub-section uses the results presented in the preceding tables to address each of the objectives of the study. Examination of the study findings in light of the findings from related studies is also done.

4.6.1 Foreign Aid, Investment and Economic Growth

The first objective of the study was to examine the effect of foreign aid on investment and economic growth in Kenya. The results of the estimation are presented in Table 4.2 through 4.5.

Results in Table 4.2 show that the elasticity of foreign aid was positive and statistically significant at 5 per cent in the long-run. The implication of this is that a 1 per cent increase in foreign aid would result in a 0.16 per cent increase in economic growth in the long-run. The study finding is in line with other studies such as Mosley (1980), Singh (1985), Mosley *et al.* (1987), Snyder

(1993), Murthy, Ukpolo and Mbaku (1994), Gounder (2001), Lloyd, Morrissey and Osei (2001), Mavrotas (2002), M'Amanja and Morrissey (2005), Karras (2006), Bhattarai (2009), and Kargbo (2012). The finding is, therefore, a dismissal of the displacement theorists (such as Griffin, 1970; Griffin and Enos, 1970), who argued that foreign aid negates economic growth.

This finding is an affirmation of earlier studies that found a positive relation between foreign aid and economic growth. According to Harrod-Domar model and as expounded by Chenery and Strout (1966), foreign aid inflows into a country are expected to positively contribute to the economic growth of that country. Chenery and Strout (1966) argued that foreign aid fills the savings and trade/foreign exchange gap typical in less developed countries such as Kenya, and in effect should contribute to fostering economic growth. Foreign aid in this respect is expected to have a long-run relationship with economic performance since aid is given mostly to boost investment and also to augment recurrent expenditure and short-term shocks in macroeconomic stability (Kargbo, 2012).

Results in Table 4.4 show that the elasticity of foreign aid was positive but not statistically different from zero. This could be explained by the inclusion of both foreign aid and foreign debt as variables in the model. Much of the foreign aid that is directed towards public investment has been in the form of loans and therefore properly accounted for in the foreign debt variable. For this

reason, it was possible to account for the effects of foreign aid on public investment through the foreign debt variable.

The study shows that foreign debt had a statistically significant positive effect on economic growth and public investment. Results in Table 4.2 shows that a 1 per cent increase in the growth of foreign debt has the potential to lead to 1.6 per cent increase in economic growth after a period of one year. This could be attributed to the increased reliance by the Government of Kenya on external loans in financing major public investments. Another possible explanation could be that loans secured on concessionary terms have a grace period after which the debt service has to commence. However, the study found that when the foreign debt was lagged twice its effect on economic growth was negative and statistically significant at 1 per cent level of significance. This implies that if foreign debt was to increase by 1 per cent, it would lead to 0.3 per cent decline in economic growth two years down the line. This finding is in line with Savvides (1992), who found that debt service issues arise from such external debt as resources that would have been invested in the short-run are used to repay the external debt. This finding is also in line with the findings by a number of studies (Ronge and Kimuyu, 1997; Were, 2001; Mbanga, 2002; Frimpong and Marbuah, 2010).

On foreign debt and public investment, the results in Table 4.4, show that foreign debt had a lagged effect on public investment, and was positive and statistically significant at 1 per cent level. The implication of this is that a 1 per

cent increase in foreign debt would result in a 7.8 per cent increase in public investment after a period of one year. This could be attributed to the fact that much of the external loans have been directed towards the productive sectors, and therefore, contributing positively to growth of public investment. The loans come with a grace period before repayment can commence and are in some cases obtained on concessional terms. Additionally, the Government of Kenya has been working (since the SAP period) towards sustainable debt management. According to Marinas *et al.* (2011) increasing public investment has a larger short-run impact on aggregate demand and a larger long-run multiplier effect on aggregate supply. In this respect, the multiplier effect of the public investment is considered to be lowered in the short term as a result of the temporal lags induced by the implementation of the new projects, and is considered higher on a long term as a result of the increase of the potential GDP (Ratto *et al.*, 2005).

The negative and significant effect of the lagged foreign debt on economic growth and public investment after a period of two years points to that fact that foreign debt management is an issue that Kenya needs to address. Kenya's foreign debt situation could thus be explained by what Cohen (1993) referred to as a "Laffer curve". According to this theory, as outstanding debt increases beyond a threshold level, the expected repayment begins to fall as a consequence of the adverse effects. Kenya therefore needs to ensure that it does manage her foreign debt situation as huge accumulation would depress the economy further. Studies (Greene and Villanueva, 1991; Serven and

Solimano, 1993a; Elbadawi, Ndulu and Ndungu, 1997; Deshpande, 1997; and Chowdhury, 2001) have found that such a situation could lead to a debt overhang.

Results in Table 4.2 show that private investment exerts positive effect on the economic growth. However, given that the coefficient is not statistically significant, it may be concluded that there is need to increase private investment to have a significant effect on economic growth. This calls for investment incentives that would enhance the growth of private investment necessary to steer the economy to the desired growth levels. This is because of the fact that private investment is more productive due to competition enhanced at this level and encouragement of private investment after the implementation of structural adjustment programmes during the late 1980s and early 1990s. Ellahi and Kiani (2011) found a positive and significant relationship between private investment and economic growth in the case of Pakistan.

Results in Table 4.4 shows that the elasticity of private investment was positive and statistically significant at 1 per cent level of significance. The finding shows that a 1 per cent increase in private investment had the potential to result in a 2.3 per cent increase in public investment. This finding implies the complementary nature of public investment and private investment in Kenya. The reason could be that increased private investment generates tax revenue with which the government undertakes its investment programmes, thus giving

rise to a positive relationship between private and public investment. In addition, increased private investment implies additional public investment on such investments as infrastructure. This finding is in line with Mataya and Veeman (1996), who found a positive relationship between private investment and levels of public investment in Malawi. However, the results differs from M'Amanja and Morrissey (2005), who found a negative but insignificant coefficient of private investment, confirming a possible crowding out effect of private investment in the long-run in Kenya.

Results in Table 4.4 shows that the coefficient of the lagged tax was negative and statistically significant at 5 per cent. This finding is in line with the theory of taxation in a number of ways. Firstly, higher taxes can discourage the investment rate, or the net growth in the capital stock through high statutory tax rates on corporate and individual income, high effective capital gains tax rates, and low depreciation allowances (Engen and Skinner, 1996). Secondly, taxes may attenuate labour supply growth by discouraging labour force participation or hours of work, or by distorting occupational choice or the acquisition of education, skills and training. Thirdly, tax policy has the potential to discourage productivity growth by attenuating research and development, and the development of venture capital for “high-tech” industries, activities whose spill-over effects can potentially enhance the productivity of existing labour and capital. Fourthly and according to Harberger (1962, 1966), tax policy can also influence the marginal productivity of capital by distorting investment from heavily taxed sectors into more lightly taxed sectors with lower overall

productivity. Finally, heavy taxation on labour supply can distort the efficient use of human capital by discouraging workers from employment in sectors with high social productivity (Engen and Skinner, 1992).

The role of economic growth in public investment was also captured. As shown in Table 4.4, economic growth had a positive effect on public investment. The study found that if the economy was to grow by 1 per cent, then public investment will grow by 2.1 per cent. This implies that economic growth is essential for public investment decisions.

4.6.2 Macroeconomic Policy Environment, Foreign Aid, Investment and Economic Growth

The second objective of the study was to examine the effect of macroeconomic policy environment on foreign aid, investment and economic growth. To address this objective, the macroeconomic policy environment was included in the two models.

Results in Table 4.2 show that coefficient of the log of macroeconomic policy environment was negative and statistically significant at 1 per cent. This implies that a 1 per cent increase in the macroeconomic policy environment (instability) leads to a decrease in economic growth by 1.2 per cent and points to the fact that Kenya has experienced macroeconomic instability for a greater part of the study period. It may be recalled that Kenya has experienced a very uneasy relation with her development partners. For example, the World Bank

in July 1982 did not release the second tranche of US\$50 million on the basis that Kenya was lax in undertaking policy reforms (Njeru, 2003). Further freezes were experienced in 1992 and 1997.

Turning to public investment, results in Table 4.4 shows that the coefficient of the macroeconomic policy environment was negative and statistically significant at 1 per cent level of significance. This implies that a 1 per cent increase in the macroeconomic policy environment (instability) would lead to a decrease in public investment by 9.2 per cent. Unstable macroeconomic policy environment would make the government lose the revenue necessary for public investment on one hand and also acts as a discouragement on the part of development partners to enter into new agreements thus affecting public investments. The major aid standoffs that Kenya has experienced with her development partners have also meant that a number of public investments have had to be delayed. Kenya undertook reforms as part of the Structural Adjustment Programme (SAP).

It was noted that the major sources of macroeconomic instability in most reforming countries were large fiscal deficits and rapid currency depreciation, the latter a consequence of the policy package implemented during the adjustment programme (Ikhide and Alawode, 2001). Inflation averaged 14 per cent between 1974 and 1984 and reached a peak of 46 percent in 1993. An average inflation rate of 19 per cent was recorded between 1985 and 1994. Commendable efforts at reducing inflation were noticeable between 1995 and

2002 where an average rate of 6.5 per cent was recorded. However, since then, there have been considerable up swings and down swings in the rate of inflation. An average of 12 per cent has been recorded between 2003 and 2010 indicating that inflation has still continued to be a problem to Kenya's macroeconomic stability. The foregoing situation points to the importance of stable macroeconomic policy environment for economic growth and public investment.

Burnside and Dollar (1997) found that aid was effective in a country with stable macroeconomic environment. Whereas this finding might be interpreted to be against the findings by Burnside and Dollar (1997), it resonates well with those of Collier and Dehn (2001), who suggested that targeting aid towards negative shock experiencing countries, could be more effective than towards good-policy countries.

The study further sought to examine the combined effect of the macroeconomic policy environment and foreign aid on economic growth and public investment. This was captured through the inclusion of an interactive variable between foreign aid and macroeconomic policy environment. Results in Table 4.2 show that the coefficient of the interactive variable of foreign aid and macroeconomic policy environment was negative and statistically significant. This implies that increasing foreign aid in unstable macroeconomic policy environment negatively affects economic growth. This further emphasizes the importance of stable macroeconomic policy environment. On

public investment, the results shown in Table 4.4 indicate that the combined effects of foreign aid and macroeconomic policy environment were positive but not statistically significant.

4.6.3 Aid Unpredictability, Foreign Aid, Investment and Economic Growth

The third objective was to analyse the effect of aid unpredictability on investment and economic growth. To respond to this objective, aid predictability indicator was added in the models. This objective arises from the fact that development partners have committed to providing predictive aid as indicated in the Paris Declaration for Aid Effectiveness in 2005, Accra Agenda for Action in 2008, and Busan Partnership on Development Effectiveness in 2011.

Results in Table 4.2 shows that the coefficient of the aid predictability indicator is negative and statistically significant at 5 per cent. This implies that aid is unpredictable in Kenya. The study found that a 1 per cent increase in aid predictability (interpreted as unpredictability) led to a 0.7 per cent decline in economic growth.

Results in Table 4.4, on the other hand, show that the coefficient of the foreign aid predictability indicator was negative and statistically significant at 5 per cent. This implies that a 1 per cent increase in the indicator (interpreted as aid unpredictability) led to 2.6 per cent decrease in public investment. This finding

underscores the importance of aid predictability for public investment decisions.

The study also sought to examine the combined effects of foreign aid predictability and macroeconomic policy environment on economic growth and public investment. This was examined through the inclusion of the interactive variable of foreign aid predictability indicator and macroeconomic policy environment.

Results in Table 4.2 shows that the coefficient of the interactive variable of aid predictability indicator and macroeconomic policy environment was positive and statistically significant at 5 per cent level. Turning to the public investment equation, results in Table 4.4 shows a positive relationship between the interactive variable and public investment. This implies that a 1 per cent increase in the combined effects of foreign aid predictability and macroeconomic policy environment resulted in 0.8 per cent increase in public investment. The underlying assumption in this case is that foreign aid is predictable and the macroeconomic policy environment is stable.

The study findings are in line with the fact that aid disbursements have largely fallen short of commitments. Foreign aid disbursements were higher than commitments during the periods 1968-70, 1981, 1985, 1992-95, and 2001-2002. This could be explained by a number of reasons. The situation obtaining between 1968 and 1970, up to 1981 could be due to the effects of the oil

shocks that necessitated the need for foreign aid to cushion the Kenyan economy. The period between 1992 and 1995 coincided with the funding of Structural Adjustment Programmes (SAPs) by International Monetary Fund (IMF) and World Bank. The situation seen between 2001 and 2002 coincided with the optimism in terms of possible change of government in 2002 coupled with low commitments on the part of Kenya's development partners. Thus, unpredictable foreign aid flows makes fiscal planning and implementation of a country's development agenda difficult, given the short term nature of the commitments when compared to the government's long term planning; makes ownership of development programmes difficult as their continuity is pegged to the availability of aid resources which is uncertain; and increases the likelihood of fiscal and monetary instability with the government being forced to reschedule some of the development activities. Such a situation has a debilitating effect on economic growth and public investment. These changing contexts account to the resultant aid unpredictability and macroeconomic imbalance with significant effects on both economic growth and public investment.

The foregoing findings underscore the essence of aid predictability and stable macroeconomic policy environment. This finding resonates with the findings of Lensink and Morrissey (2000), and Bulir and Hamann (2001) that have argued for the inclusion of the predictability indicator (accounting for uncertainty or unpredictability in such studies). This finding is also in line with what the development partners have been pushing for in Kenya. The

development partners have argued that Kenya should ensure that a stable macroeconomic environment exists. The results of this study confirm that a stable macroeconomic policy environment is essential for the development partners to make foreign aid predictable. Development partners such as IMF and World Bank have been keen on Kenya's macroeconomic policy reforms.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Introduction

This chapter presents the summary, conclusions and policy implications of the study. The chapter is divided into three sections. Section 5.2 presents the summary of the study, section 5.3 presents the main conclusions, section 5.4 covers the policy implications arising from the study findings, and section 5.5 presents areas for further research.

5.2 Summary

Since independence in 1963, Kenya has been dependent on foreign aid for capital investments such as roads, power, water supply, and telecommunications infrastructure. However, the flow of foreign aid has not been predictable. This has been despite the government and development partners' commitment to Paris Declaration for Aid Effectiveness in 2005, Accra Agenda for Action in 2008, and Busan Partnership on Development Effectiveness in 2011. The study was driven by the fact that previous studies on aid effectiveness in Kenya did not factor a variable to account for the fact that foreign aid was unpredictable and yet this phenomenon has effects on economic growth and public investment.

The study sought to examine the effect of foreign aid on investment and economic growth in Kenya; examine the effect of macroeconomic policy environment on foreign aid, investment and economic growth; and analyse the effect of aid unpredictability on investment and economic growth.

To address the above specific objectives, time series data was collected for the period 1966 to 2010. An autoregressive distributed lag estimation procedure was used because it yields precise estimates of long-run parameters and valid t-statistics even in the presence of endogenous variables. The test is possible even if the underlying regression is purely I(0), purely I(1) or a mixture of the two approaches. Two models that were estimated were on economic growth and aid nexus, and the public investment and aid relationship.

The study factored in the macroeconomic policy environment variable in line with the debate on the importance of stable macroeconomic policy environment for aid effectiveness. Using data on foreign aid disbursements and commitments in Kenya, foreign aid predictability indicator was computed and included in the model. Interactive variable of foreign aid and macroeconomic policy environment, on the one hand, and foreign aid predictability indicator and macroeconomic policy environment, on the other, were constructed and included in the models in order to examine the joint effects.

Overall, the study found that foreign aid had a positive and significant effect on economic growth and public investment in Kenya in the long run. Foreign aid

in form of foreign debt was found to positively affect economic growth and public investment with a lag. However, the negative effect of foreign debt on economic growth and public investment was evident after a period of two years due to possible effects of external debt service.

Kenya's macroeconomic environment was found to be unstable over the study period thus negatively affecting economic growth and public investment. This was despite the macroeconomic policy reforms that the Government of Kenya has undertaken and the push for such reforms by the development partners.

Foreign aid flows to Kenya were found to be unpredictable and negatively affecting economic growth and public investment despite Kenya and her development partners having committed to work towards predictable foreign aid.

The combined effect of macroeconomic policy environment and foreign aid predictability on economic growth and public investment was positive and statistically significant. The study thus underscored the importance of stable macroeconomic policy environment for aid effectiveness.

The empirical findings show that private investment positively affected economic growth and public investment. It was found that there was a complementary relationship between private investment and public investment. This finding emphasized the crucial role of private investment for economic

growth and public investment and therefore the need to examine effective mechanisms for link between development partners and the private investment.

5.3 Conclusion

The ARDL econometric approach was used to model the short and long run investment and economic growth models for Kenya. A major revelation was that, foreign aid positively affects public investment and economic growth in Kenya. The lagged effects of foreign debt positively affect economic growth and public investment after one year and negatively thereafter. Private investment is essential to Kenya's economic development and compliments public investment. Kenya's macroeconomic policy environment has been unstable thus negatively affecting economic growth and public investment. However, good macroeconomic policy environment is essential for aid effectiveness. Foreign aid flows to Kenya were found to be unpredictable, negatively affecting economic growth and public investment.

5.4 Policy Implications

Concerning the policy implications, the empirical results provide invaluable information for policy formulation and implementation. The results from the estimation indicated that the overall impact of foreign aid on economic growth and public investment is positive. The Government of Kenya and her development partners should review the Kenya Joint Assistance Strategy (KJAS) in light of the changing context both in Kenya and globally. This is

because of the importance of foreign aid to Kenya's economic growth and public investment.

To enhance the positive effects of foreign aid on economic growth, Development partners and the Government of Kenya should work towards aid-for-trade initiatives. These initiatives could develop the trade-related skills and infrastructure needed to implement and benefit from trade agreements and to expand their trade.

Kenya's foreign debt is an issue of concern as evidenced by its negative effect on economic growth and public investment in the long-run. The Government of Kenya should strike a balance between her efforts towards sustainable debt management and the growing public investment needs particularly in the infrastructure sector. Alternative financing mechanisms for public investment such as infrastructure bonds could be explored.

The Government of Kenya should examine and respond to impediments to private investment as a matter of priority. This is in line with this study's finding that private investment positively affects economic growth and public investment. This will further require that the targets set within the Vision 2030 in regard to private investment be given due regard. This is due to the fact that private investment is a major source of revenue for public investment and the complementarity between private and public investment. Further, the Government of Kenya should provide incentives that would boost investments

through Public Private Partnerships (PPP). The Government of Kenya needs to increase the share of public investment in GDP significantly through increasing allocation of resources towards development expenditure.

Development partners should explore creative ways of working with the private sector in Kenya. One possible way could be through risk sharing initiatives such as loans and guarantees. Development partners could aggressively explore this possibility given that enhanced cooperation with the private sector is one of the requirements of the Busan Partnership for Development Effectiveness.

To further enhance public investment, the Government of Kenya should work towards sustainable economic growth of over 10 per cent for a long period of time. Such growth targets will ensure that macroeconomic stability is realised with more resources allocated towards public investment.

The Government of Kenya should work towards ensuring macroeconomic stability. This is because of the negative effects of macroeconomic instability on economic growth and public investment as evidenced by this study. Macroeconomic policies are also important in the effectiveness of foreign aid, as aid has a more positive impact on growth in countries with good fiscal, monetary, and trade policies. In the presence of poor policies, on the other hand, aid could have no positive effect on growth. Accordingly, there is a need of not only good policies but also the implementation of these policies as well

as the proper monitoring of the aid-utilizing projects is necessary in order to avoid the mis-utilization and the mismanagement of the foreign capital resources.

The Government of Kenya, through the Central Bank should aim at keeping inflation to low levels and maintaining a low interest rate regime. Additionally, the government could ensure that the final government consumption expenditure is kept within manageable levels through ensuring fiscal discipline. This could require re-examination of the key components of government expenditure in order to reduce waste and ensure that resources are directed to key sectors that would contribute to Kenya's economic growth. In this regard, the need to reduce the bludgeoning budget deficit will be a challenge more so in light of the devolution as a result of the new constitutional dispensation.

The results of this study show that foreign aid has continued to be unpredictable thus negatively affecting economic growth and public investment in Kenya. In this regard, development partners should live by their commitments in realizing development effectiveness. They should be more open and transparent in aid allocation and disbursement thereby making aid predictable. Development partners should in this respect inform the Government of Kenya early enough in the event that the planned disbursements will not be forthcoming. Additionally, development partners should ensure transparency in aid disbursement and setting conditionalities that have been negotiated by their development partners.

Development partners should discuss with the Government of Kenya the impediments to foreign aid disbursement flows as a way of enhancing transparency. The open data approach should be embraced by all development partners and the Government of Kenya. This will ensure that citizens have access to the data and advocate for accountability.

5.5 Areas for Further Research

There are a number of issues that still require further research in the aid-growth nexus in Kenya. Kenya's ability to raise investment remains heavily reliant on the stability of foreign capital inflows and adequate reforms in the state institutions. However, the analysis carried out in this study did not elaborate on ways to strengthen state institutional capability to ensure that the country could achieve sustainable economic growth. Particularly, issues of maintaining the external viability are often related to adopting a prudent macroeconomic policy, attracting foreign aid and foreign direct investment and access to international trade. These are some very complex issues still to be evaluated. How to advance the capacity and capability of the state and institutions to improve the macroeconomic environment deserves further study.

While it is generally accepted that foreign aid plays an important role in Kenya's economic growth, factors that lead to the aid flows being unpredictable needs to be examined. There is need to examine the determinants of foreign aid predictability in Kenya. Additionally, since Kenya receives foreign aid from both bilateral and multilateral donors, it would be of essence

to identify how aid predictability varies amongst them. This would help the Government of Kenya to target the aid flows from the various donors and correctly factor the commitments into the budget with some level of certainty.

One of the main contributions of this study is in the application of econometric modelling to analyse the potential effects of foreign aid on economic growth and investment in Kenya. Although the models are capable of explaining how aid inflow may influence economic performance in Kenya, the model developed in this study is in the aggregate form. It would be more interesting if the impact of aid on economic growth and investment could be disaggregated according to sectors such as agricultural sector, the industrial sector and the services sector. By doing this, the channels through which aid may affect economic growth and investment could be highlighted.

REFERENCES

- Agénor, P. (2004). *The Economics of Adjustment and Growth*, 2nd edition, Boston (Mass.): Harvard University Press.
- Agénor, P. R., Bayraktar, N., and El Aynaoui, K. (2006). Roads out of Poverty? Assessing the Links between Aid, Public Investment, Growth, and Poverty Reduction, unpublished, World Bank, June. Retrieved at http://www-wds.worldbank.org/servlet/WDSContentServer/WDSP/IB/2005/02/14/000112742_20050214154456/Rendered/PDF/wps3490.pdf.
- Agénor, P. R., and Montiel, P. J. (1996). *Development Macroeconomics*. Princeton, New Jersey: Princeton University press.
- Alesina, A., and Dollar, D. (2000). Who gives foreign aid to whom and why? *Journal of Economic Growth*, Vol. 5, pp.33–63.
- Arrow, K. J. (1962). The Economic Implications of Learning by Doing, *Review of Economic Studies*, June, 29, pp. 155-73.
- Artadi, E. V., and Sala-i-Martin, X. (2003). The Economic Tragedy of the XXth Century: Growth in Africa, Cambridge, MA: *NBER Working Paper Series WP9865*.
- Asteriou, D., and Price, S. (2007). *Applied Econometrics - A Modern Approach*, Basingstoke: Palgrave Macmillan.
- Bacha, E. L. (1990). A Three-gap Model of Foreign Transfers and the GDP Growth rate in Developing Countries. *Journal of Development Economics*, Vol. 32, pp. 279 – 296.

- Balassa, B. (1978). Exports and Economic Growth-Further Evidence. *Journal of Development Economics*, Vol. 5 (2): pp. 181-189.
- Barnett, R. R. (1993). Preference Revelation and Public Goods. In M. P. Jackson (Ed.), *Current Issues in Public Sector Economics*, London: Macmillan Press. Pp. 94 – 131.
- Bannerjee, A., Dolado, J., and Mestre, R. (1998). Error Correction Mechanism Tests for Cointegration in Single Equation Framework. *Journal of Time Series Analysis*, 19, pp. 267-283.
- Barro, R. J. (1991). Economic Growth in a Cross-Section of Countries. *Quarterly Journal of Economics*, 106 (2): pp. 407-443.
- Barro, R. J. (1996). Determinants of Economic Growth: A Cross-Country Empirical Study. Cambridge, MA: *NBER Working Paper Series* WP5698.
- Barro, R. J. (2003). Determinants of Economic Growth in a panel of Countries. *Annals of Economics and Finance*, 4: pp. 231-274.
- Barro, R. J., and Sala-i-Martin. X. (1992). Convergence. *Journal of Political Economy*, April, Vol. 100 (2), pp. 223-51.
- Bearce, D. H., and Tirone, D. C. (2008). Foreign Aid, Recipient Growth, and the Strategic Goals of Donor Governments. Unpublished manuscript, University of Pittsburgh. Retrieved on 2011-04-05 at http://www.allacademic.com//meta/p_mla_apa_research_citation/2/0/9/5/5/pages209559/p209559-1.php.
- Bergson, A. (1938). A Reformulation of certain Aspects of welfare Economics. *Quarterly Journal of Economics*, 52, pp. 310 - 334.

- Bevan, D. L. (2005). Seminar on Foreign Aid and Macroeconomic Management Paper prepared for a High-Level seminar hosted by the Government of Mozambique and organized by the IMF Institute and the African Department of the IMF, and co-financed by the Governments of the UK. (DFID) and Germany. (InWEnt).
- Bhattarai, B. P. (2009). Foreign Aid and Growth in Nepal: An Empirical Analysis. *Journal of Developing Areas*, 42(2), pp. 283–302.
- Boakye, P. F. (2008). Foreign Aid and Economic Growth in Ghana (1970-2005). (Unpublished Masters dissertation), University of Science and Technology, Kumasi, Ghana.
- Bolnick, B. R. (1978). Tax efforts in Developing Countries: What do Regression Measures Really Measure? In J.F.J. Teye (Ed.), *Taxation and Economic Development, England: Frank Cass and Company Ltd.* pp. 62 - 77.
- Borensztein, E., De Gregorio, J., and Lee, J. W. (1998). How does foreign direct investment affect economic growth? *Journal of International Economics*, 45, pp. 115–135.
- Branson, H. W. (1989). *Macroeconomic Theory and Policy*. 3rd edition. New York: Harper and Row Publishers.
- Bulir, A., and Hamann, J. (2001). How Volatile and Unpredictable are Aid Flows, and What are the Policy Implications? *Working Papers UNU-WIDER Research Paper*, World Institute for Development Economic Research (UNU-WIDER).

- Bulir, A., and Hamann, J. (2008). Volatility of Development Aid: From the Frying Pan to the Fire? *World Development*, 36(10), pp. 2048-2066.
- Bulir, A., and Lane, T. (2002). Aid and Fiscal Management. *Working Paper* 02/112, International Monetary Fund.
- Burnside, C., and Dollar, D. (1997). Aid Spurs Growth – in a Sound Policy Environment, *Finance and Development*, Vol. 34 (4), pp. 4-7.
- Burnside, C., and Dollar, D. (2000). Aid, Policies, and Growth. *American Economic Review*, 90(4), pp. 847–868.
- Celasun, O., and Walliser, J. (2008). Predictability of Aid: Do Fickle Donors Undermine the Predictability of Aid? *Economic Policy*, 23(55), pp. 545-86.
- Central Bank of Kenya. (2009). Annual Report 2009. Nairobi.
- Chenery, H. B., and Bruno, M. (1962). Development Alternatives in an Open Economy: The Case of Israel. *Economic Journal*, 72, pp. 79-103.
- Chenery, H., and Strout, A. (1966). Foreign Assistance and Economic Development. *American Economic Review*, Vol. 66. No.4, pp. 679-733.
- Chenery, H. B., and Carter, N.G. (1973). Foreign Assistance and Development Performance, 1960-1970. *American Economic Association*, Vol.63, No.2.
- Chowdhury, A. R. (2001). Foreign Debt and Growth in Developing Countries, paper presented at WIDER Conference on Debt Relief (Helsinki: United Nations University) (August).

- Clements, B., Bhattacharya, R., and Nguyen, T. Q. (2003). External Debt, Public Investment, and Growth in Low-Income Countries, *International Monetary Fund Working Paper* No. 03/249, December.
- Cohen, D. (1993). Low Investment and Large LDC Debt in the 1980s. *American Economic Review*, Vol. 83, No. 3 (June), pp. 437–49.
- Cohen, J. M. (1995). Ethnicity, Foreign Aid, and Economic Growth: The Case of Kenya, HIID Development Discussion Paper No. 520.
- Collier, P., and Dehn, J. (2001). Aid, Shocks, and Growth. *World Bank Policy Research Working Paper* No. 2688, October.
- Cooksey, B. (2004). Elixir or poison chalice? The Relevance of Aid to East Africa. Retrieved at www.oecd.org/dataoecd/42/11/34098651.PDF.
- De Boef, S. (2000). Modeling Equilibrium Relationships: Error Correction Models with Strongly Autoregressive Data. *Political Analysis*, 9(1), pp. 78–94.
- Desai, R. M., and Kharas, H. (2010). The Determinants of Aid Volatility. *Global Economy and Development Working Paper* No. 42, September.
- Deshpande, A. (1997). The Debt Overhang and the Disincentive to Invest. *Journal of Development Economics*, Vol. 52 (February), pp. 169–87 (Netherlands).
- Diarra, G. (2011). Aid unpredictability and Absorptive Capacity: Analyzing Disbursement Delays in Africa. *Economics Bulletin*, No. 31, Issue 1, March.
- Dornbusch, R., Fischer, S., and Startz, R. (2003). *Macroeconomics*, Eighth edition, New Delhi: Tata McGraw-Hill Company Limited.

- Durlauf, S. N. (2002). Policy Evaluation and Empirical Growth Research, University of Wisconsin at Madison. Retrieved on 2011-04-05 at <http://ideas.repec.org/p/chb/bcchwp/205.html>.
- Easterly, W. R., and Rebelo, S. T. (1993). Fiscal Policy and Economic Growth: An Empirical Investigation. *Journal of Monetary Economics*, 32(3). pp. 417–58.
- Easterly, W. (1999). The Ghost of Financing Gap: Testing the Growth Model used in the International Financial Institutions. *Journal of Development Economics*, 60, pp. 423-438.
- Easterly, W., Levine, R., and Roodman, D. (2003). New Data, New Doubts: A Comment on Burnside and Dollar's Aid, policies and growth. (2000). *NBER Working Paper No. 9846*, Cambridge, MA.
- Ellahi, N., and Kiani, A. (2011). Investigating Public Investment-Growth Nexus for Pakistan 2011 International Conference on E-business, Management and Economics, IPEDR Vol.25.
- Elbadawi, I. A., Ndulu, B. J., and Ndung'u, N. (1997). Debt Overhang and Economic Growth in Sub-Saharan Africa. In Z. Iqbal and R. Kanbur (eds.), *External Finance for Low-Income Countries*, pp. 49–76 (Washington: International Monetary Fund).
- Ekanayake, E. M., and Chatrna, D. (2009). The Effect of Foreign Aid on Economic Growth in Developing Countries. *Journal of International Business and Cultural Studies*.
- Enders, W. (1995). *Applied Econometric Time Series*. New York: John Wiley and Sons Inc.

- Engen, E., and Skinner, J. (1992). Fiscal Policy and Economic Growth. *NBER Working Paper* No. 4223. Cambridge, MA: National Bureau of Economic Research.
- Engen, E., and Skinner, J. (1996). Taxation and Economic Growth. *National Tax Journal*, Vol. 49 no. 4 (December), pp. 617-42.
- Fayissa, B., and El-Kaissy, M. I. (1999). Foreign Aid and Economic Growth of Developing Countries (LDCs): Further Evidence. *Studies in Comparative International Development*.
- Feder, G. (1982). On Exports and Economic Growth. *Journal of Development Economics*, Vol. 12, No. 1/2.
- Feeny, S. (2005). The Impact of Foreign Aid on Economic Growth in Papua New Guinea. *The Journal of Development Studies*, Vol.41, No.6, August 2005, pp.1092 – 11.
- Fischer, S. (1993). The Role of Macroeconomic Factors in Growth. *Journal of Monetary Economics*, 32(3), pp. 485-512.
- Frankel, J. A., and Romer, D. (1999). Does Trade Cause Growth? *American Economic Review*, Vol. 89, No.3, pp. 379-399.
- Frimpong, J. M., and Marbuah, G. (2010). The Determinants of Private Sector Investment in Ghana: An ARDL Approach. *European Journal of Social Sciences – Volume 15, Number 2 (2010)* 250.
- Froyen, T. R. (2002). *Macroeconomics Theories and Policies*. Seventh edition. New Delhi: Pearson Education Pte Ltd.
- Ghatak, S., and Siddiki, J. U. (2001). *Financial Liberalisation and Endogenous Growth: the Case of Bangladesh*, Kingston University, UK.

- Gomanee, K., Girma, S., and Morrissey, O. (2005). Aid and Growth in Sub-Saharan Africa: Accounting for Transmission Mechanisms. *Journal of International Development*, Vol. 17, No.8, pp. 1055 – 1075.
- Gómez, L. M. (2005). Nicaragua: Harmonisation and Alignment Process, presented at Workshop on “The International Aid System: What’s Next?” Accessed on 2011-04-05 at www.oecd.org/dev/meetings/aidworkshop.
- Gong, L., and Heng-fu, Z. (2001). Foreign Aid Reduces Labour Supply and Capital Accumulation. *Review of Development Economics*, Vol. 5, No. 1, pp. 105 – 118.
- Gounder, R. (2001). Aid-Growth Nexus: Empirical evidence from Fiji. *Applied Economics*. Vol. 33, pp. 1009- 1019.
- Granger, C. W. J. (1988). Some Recent Developments in a concept of Causality. *Journal of Econometrics*, Vol.39, No. 1/2, pp. 199–211.
- Greene, J., and Villanueva, D. (1991). Private Investment in Developing Countries. *IMF Staff Papers*, Vol. 38, No. 1 (March), pp. 33–58.
- Griffin, K. (1970). Foreign Capital, Domestic Savings and Economic Development. *Bulletin of the Oxford University Institute of Economics and Statistics*, 32(2), pp. 99-112.
- Griffin, K., and Enos, J. (1970). Foreign Assistance: Objectives and Consequences. *Economic Development and Cultural Change*, 18(3), pp. 313–27.
- Hagen, R. J., and Hatlebakk, M. (2005). Foreign aid and social sector spending in developing countries. SNF-report 61/02.

- Hall, R. E., and Jorgenson, D. W. (1971). Application of the Theory of Optimal Capital Accumulation. In G. Fromm (ed.), *Tax Incentives and Capital Spending*, Studies of Government Finance (The Brookings Institution, Washington, D.C.), pp. 9-60.
- Hansen, A. H. (1949). *Monetary Theory and Fiscal Policy*. New York: McGraw-Hill.
- Hansen, H., and Tarp, F. (2000). Aid and Growth Regressions. *Centre for Research in Economic Development and International Trade, Paper 00/7*, University of Nottingham, May.
- Harberger, A. C. (1962). The Incidence of the Corporation Income Tax. *Journal of Political Economy*, 70 No. 3 (June, 1962), pp. 215–40.
- Harberger, A. C. (1966). Efficiency Effects of Taxes on Income from Capital. In M. Krzyzaniak (Ed), *Effects of Corporation Income Tax*, Detroit: Wayne State University Press, 1966.
- Harms, P., and Lutz, M. (2004). The Macroeconomic Effects of Foreign Aid: A Survey, University of St. Gallen Economics Discussion Paper No. 2004-11, September. Retrieved on 2011-04-06 at http://www1.vwa.unisg.ch/RePEc/usg/dp2004/dp11_har.pdf.
- Harrison, A. (1996). Openness and Growth: A Time-Series, Cross-Country Analysis for Developing Countries. *Journal of Development Economics*, 48, pp. 419-447.
- Harrod, R. F. (1936). *The Trade Cycle*, Oxford: Oxford University Press.
- Harrod, R. F. (1948). *Towards a Dynamic Economics*, London: Macmillan and Co.

- Herandez-Cata, E. (2000). Raising Growth and Investment in Sub-Saharan Africa: What Can be Done? *Policy Discussion Paper: PDP/00/4*, International Monetary Fund: Washington, DC.
- Hermes, N., and Lensink, R. (2001). Changing the Conditions for Development Aid: A new paradigm? *Journal of Development Studies* 37(6), pp.1-16.
- Herzer, D., and Morrissey, O. (2011). Long-Run Aid Effectiveness. CSAE Conference 2011, Economic Development in Africa, Oxford, March 20-22, Paper No. 144, Retrieved on 2012-04-12 at www.csae.ox.ac.uk/conferences/2011-EDiA/papers/144-Morrissey.pdf.
- Hicks, J. R. (1950). *A Contribution to the Theory of the Trade Cycle*, Oxford: Oxford University Press.
- Hjertholm, P., Laursen, J., and White, H. (2000). Foreign Aid and the Macro economy. In Tarp (2000). *Foreign Aid and Development: lessons learned and directions for the future*. Routledge London and New York.
- Hoeffler, A. E. (2002). The Augmented Solow Model and the African Growth Debate. *Oxford Bulletin of Economics and Statistics*, Vol. 64, No. 2, pp. 135 – 158.
- Ikhide, S. I., and Alawode, A. A. (2001). Financial sector reforms, macroeconomic instability and the order of economic liberalization: The evidence from Nigeria. AERC Research Paper 112, African Economic Research Consortium, Nairobi, November.

- Inder, B. (1993). Estimating Long-Run Relationships in Economics: A Comparison of Different Approaches. *Journal of Econometrics*, Vol.57, pp.53–68.
- International Monetary Fund. (2007). *Fiscal Policy Response to Scaled-Up Aid*, Washington, DC: International Monetary Fund.
- Javid, M., and Qayyum, A. (2011). Foreign Aid-Growth Nexus in Pakistan: Role of Macroeconomic Policies. Retrieved on 2012-04-12 at <http://mpira.ub.uni-muenchen.de/29498/>.
- Johansen, S. (1988). Statistical Analysis of Cointegrating Vectors. *Journal of Economic Dynamics and Control*, 12(2–3), pp. 231–54.
- Johansen, S., and Juselius, K. (1990). Maximum Likelihood Estimation and Inference on Cointegration - with Applications to the Demand for Money. *Oxford bulletin of Economics and Statistics*, Vol. 52, pp. 169-210.
- Jorgenson, D. (1967). The Theory of Investment Behavior. In R. Ferber, (ed), *Determinants of Investment Behavior*, pp. 129-188, National Bureau of Economic Research, Inc.
- Karras, G. (2006). Foreign Aid and Long-run Economic Growth: Empirical Evidence for a Panel of Developing Countries. *Journal of International Development*, vol.18, no.7, pp.15–28.
- Kanbur, R. (2000). Aid, Conditionality and Debt in Africa. In F. Tarp. (ed.), *Foreign Aid and Development – Lessons Learnt and Directions for the Future*. Routledge, London. pp. 409-22.

- Kangoye, T. (2011). Aid and Governance: When aid unpredictability increases corruption in recipient countries, Retrieved on 2012-03-06 at www.csae.ox.ac.uk/conferences/2011-EDiA/papers/141-Kangoye.pdf.
- Kargbo, P. M. (2012). Impact of Foreign Aid on Economic Growth in Sierra Leone Empirical Analysis. UNU-Wider *Working Paper No. 2012/07*.
- Keynes, J. M. (1937). The General Theory of Employment. *Quarterly Journal of Economics*, pp. 209-223.
- Knack, S. (2000). Aid Dependence and the Quality of Governance: A Cross-Country Empirical Analysis. *World Bank Policy Research Paper*.
- Kormendi, R. C., Levy, V., and Meguire, P. (1988). Aid, Investment, and Economic Growth in Developing Countries. Retrieved on 2010-04-03 at http://pdf.usaid.gov/pdf_docs/PNABE324.pdf.
- Krueger, A. (1974). The Political Economy of the Rent-Seeking Society. *American Economic Review* 64, pp. 291-303.
- Larraín, F., and Vergara, R. (1993). Investment and Macroeconomic Adjustment: The Case of East Asia. In L. Servén and A. Solimano (eds.), *Striving for Growth after Adjustment*. World Bank: Washington, DC.
- Layard, P. R. G., and Walters, A. A. (1978). *Microeconomic Theory*. New York: McGraw - Hill Book Company.
- Legovini, A. (2002). Kenya: Macro Economic Evolution Since Independence. Retrieved on 2011-4-12 at <http://ebookbrowse.com/kenya-macro-economic-evolution-since-independence-doc-d28496277>.

- Lensink, R., and Morrissey, O. (2000). Aid Instability as a Measure of Uncertainty and the Positive Impact of Aid on Growth. *Journal of Development Studies*, 36(3), pp. 31-49.
- Levine, R., and Renelt, D. (1992). A Sensitivity Analysis of Cross-country Growth Regressions. *American Economic Review*, Vol. 82. No.4, pp. 942-63.
- Lewis, W. A. (1954). Economic Development with unlimited supplies of labour. *The Manchester School*, Vol. 22 No.2, pp. 139-91.
- Lloyd, T., Morrissey, O., and Osei, R. (2001). Aid, Exports and Growth in Ghana. *CREDIT Research Paper* 01/01. Nottingham: University of Nottingham.
- M'Amanja, D., and Morrissey, O. (2005). Foreign Aid, Investment, and Economic Growth in Kenya: A Time Series Approach. *Credit Research Paper*, Centre for Research in Economic Development and International Trade. University of Nottingham.
- Mallik, G. (2008). Foreign Aid and Economic Growth: A Cointegration Analysis of the Six Poorest African Countries. *Economic Analysis and Policy*, Vol. 38 No. 2, September.
- Mansfield, E. (1986). *Principles of Macroeconomics*. 5th edition. New York: W.W. Norton and Company.
- Marinaş, M. C., Socol, C., Socol A. G., and Măntescu, D. (2011). The Estimation of the Public Investment Multiplier in Romania. 2010 International Conference on Business and Economics Research vol.1

IACSIT Press, Kuala Lumpur, Malaysia. Retrieved at <http://www.ipedr.com/vol1/5-B00006.pdf>.

Martins, P. (2010). The Macroeconomic Management of Foreign Resource Inflows: Accelerating the Achievement of the MDGs. United Nations Development Programme, Bureau for Development Policy, September. Retrieved at <http://www.beta.undp.org/undp/en/home/librarypage/mdg/the-macroeconomic-management-of-foreign-resource-inflow.html>.

Mataya, C. S., and Veeman, M. M. (1996). The Behaviour of Private and Public Investment in Malawi. *The Canadian Journal of Economics*, Vol. 29, Special Issue: Part 2, April: pp. S438-S442.

Mavrotas, G. (2002). Aid and Growth in India: Some Evidence from Disaggregated Aid Data. *South Asia Economic Journal*, 3(19), pp. 19–48.

Mavrotas, G. (2003). Which Types of Aid Have Most Impact? Paper presented at WIDER. Discussion Paper No. 2003/85, December.

Mbanga, G. N. (2002). External Debt and Private Investment in Cameroon, *AJEP*, pp. 109-124.

McGillivray, M. (2003). Aid Effectiveness and Selectivity: Integrating Multiple Objectives in Aid allocations. *DAC Journal* 4(3), pp. 23-36.

McGillivray, M., Feeny, S., Hermes, N., and Lensink, R. (2005). It Works; It Doesn't; It Can, But That Depends... 50 Years of Controversy over the Macroeconomic Impact of Development Aid. *UNU-Wider Research Paper* No. 2005/54, August.

- McKinnon, R. (1964). Foreign-Exchange Constraints in Economic Development and Efficient Aid Allocation. *The Economic Journal* 74, pp.388 – 409.
- Mishan, E. J. (1981). Economic Efficiency and Social Welfare, *Selected Essays on Fundamental Aspects of the Economic Theory of Social Welfare*. London: George Allen and Unwin. Chapter 4, pp. 33 - 44.
- Mohsen, B. O., and Ng, R. W. (2002). Long-run Demand for Money in Hong Kong: An Application of the ARDL Model. *International journal of business and economics*, Vol. 1, No. 2, pp. 147-155.
- Moreira, E. P., and Bayraktar, N. (2005). A Macroeconomic Framework for Quantifying Growth and Poverty Reduction Strategies in Niger. *World Bank Policy Research Working Paper* No. 3506, January.
- Morrissey, O. (2001). Does Aid Increase Growth in Cameroon? *Progress in Development Studies*, Vol. 1, No. 1, pp. 37 – 50.
- Mosley, P. (1980). Aid, Savings and Growth Revisited. *Oxford Bulletin of Economics and Statistics*, Vol. 42 (2), pp. 79-95.
- Mosley, P., Hudson, J., and Horrell, S. (1987). Aid, the Public Sector and the Market in Less Developed Countries. *Economic Journal*, Vol. 97 No. 388, pp. 616-41.
- Murthy, V. N. R., Ukpolo, V., and Mbaku, J. M. (1994). Foreign Aid and Economic Growth in Cameroon: Evidence from Cointegration Tests. *Applied Economic Letters*, 1(10), pp. 161–3.
- Musgrave, A. R. (1986). Samuelson on Public Goods 1983. In A.R Musgrave (Ed.), *Public Finance in a Democratic Society. Vol. II, Fiscal Doctrine*,

Growth and Institutions, Sussex: The Hamster Press Group, pp. 319 - 334.

Mwega, F. M. (2004). Foreign Aid, Monetary Policy and Economic Growth in Kenya, paper prepared for Kenya Institute for Public Policy Research and Analysis (KIPPRA).

Mwega, F. M. (2009). A Case study of aid effectiveness in Kenya: Volatility and fragmentation of foreign aid with a focus on health. A paper commissioned by the Wolfensohn Center for Development at the Brookings Institution.

Narayan, P. K. (2004). Reformulating the Critical Values for the Bounds R statistics Approach to Cointegration: An Application to the Tourism Demand Model for Fiji. *Discussion Papers*, Department of Economics, Monash University, Australia.

Nelson, R. (1956). A Theory of the Low-level Equilibrium Trap in Underdeveloped Economies. *American Economic Review*, Vol. 46, pp. 894-908.

Newlyn, W. T. (1973). The Effect of Aid and Other Resource Transfers on Savings and Growth in Less Developed Countries: A Comment. *Economic Journal* 83(331), pp. 863-69.

Njeru, J. (2003). The Impact of Foreign Aid on Public Expenditure: The Case of Kenya. *AERC Research Paper* No. 135, November.

Nurkse, R. (1953). *Problems of Capital Formation in Underdeveloped Countries*. New York: Oxford University Press.

- Nyoni, T. S. (1998). Foreign Aid and Economic Performance in Tanzania. *World Development*, Vol. 26, pp. 1235-1240.
- O'Brien, F. S., and Ryan, T. C. I. (2001). Kenya. In S. Devarajan, D. Dollar and T. Holmgren (eds.), *Aid and Reform in Africa: Lessons from Ten Case Studies*. Washington, D.C.: The World Bank.
- Oduor, J., and Khainga, D. (2009). Effectiveness of Foreign Aid on Poverty Reduction in Kenya, *Global Development Network Working Paper* No. 34, November.
- OECD. (2005). Paris Declaration on Aid Effectiveness: Ownership, Harmonisation, Alignment, Results and Mutual Accountability. Paris.
- OECD. (2006). *Survey on Monitoring the Paris Declaration*, OECD, Paris.
- OECD. (2008). *Survey on Monitoring the Paris Declaration*, OECD, Paris.
- OECD. (2009). Better Aid: Aid Effectiveness, A Progress Report on Implementing the Paris Declaration, Paris. Retrieved on 2011-04-14 at <http://www.oecd.org/dataoecd/19/39/42111907.pdf>.
- Ouattara, B. (2006). Foreign aid and government fiscal behaviour in developing countries: Panel data evidence, *Economic Modelling*, vol.23, p.506-514.
- Pallage, S., and Robe, M. (2001). Foreign Aid and the Business Cycle. *Review of International Economics*, Vol. 9, No.4, pp. 641-672.
- Papanek, G. (1972). The Effects of Aid and Other Resource Transfers on Savings and Growth in Less Developed Countries. *Economic Journal*, Vol.82, No. 327, pp. 934-50.

- Papanek, G. (1973). Aid, Foreign Private Investment, Saving and Growth in Less Developed Countries. *Journal of Political Economy*, Vol. 81, No. 1, pp. 137-138.
- Pedersen, K. R. (1996). Aid, Investment and Incentives. *Scandinavian Journal of Economics*, Vol. 98, No. 3, pp. 423-438.
- Pesaran, M. H. (1997). The role of Economic Theory in Modeling the Long-run. *Economic Journal*, Vol. 107, pp. 178-191.
- Pesaran, H. M., and Pesaran, B. (1997). *Microfit 4.0*, Oxford: Oxford University Press.
- Pesaran, H. M and Pesaran, B. (2009). *Time Series Econometrics Using Microfit 5.0*, Oxford: Oxford University Press.
- Pesaran, H. M., and Shin, Y. (1995). An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis. *DAE Working Paper Series*, No.9514, Department of Applied Economics, University of Cambridge.
- Pesaran, H. M., Shin, Y., and Smith, R. (1996). Testing the Existence of a Long-run Relationship. *DAE Working Paper Series*, No.9622, Department of Applied Economics, University of Cambridge.
- Pesaran, M. H., and Smith, R. (1998). Structural Analysis of Cointegrating VARs. *Journal of Economic Surveys*, pp. 471-506.
- Pesaran, M. H., and Shin, Y. (1999). An Autoregressive Distributed Lag Modelling Approach to Cointegration Analysis, Chapter 11, in Storm, S., (ed.), *Econometrics and Economic Theory in the 20th Century: the*

Ragnar Frisch Centennial Symposium, Cambridge: Cambridge University Press.

Pesaran, M. H., Shin, Y., and Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, Vol. 16, pp. 289-326.

Piazolo, M. (1995). Determinants of South Korean Economic Growth, 1955-1990. *International Economic Journal*, 9 (4), pp. 106-133.

Pindyck, S. R., and Rubinfeld, D. L. (1996). *Microeconomics*. Englewood Cliffs, Prentice.

Radelet, S. (2006). A Primer on Foreign Aid. *Working Paper No 92*. Washington, Center for Global Development.

Ramey, G., and Ramey, V. (1995). Cross-Country Evidence on the Link between Volatility and Growth. *American Economic Review*, Vol.85, No.5, pp. 1138–1151.

Ratto, M., Röger, W., Veld J., and Girardi, R. (2005). An Estimated New Keynesian Dynamic Stochastic General Equilibrium Model of the Euro area, European Economy. *Economic Papers*, No. 220, pp. 5-20.

Republic of Kenya. (2003). *Economic Recovery Strategy for Wealth and Employment Creation (2003-2007)*. Nairobi: Government Printers.

Republic of Kenya. (2006). *Economic Survey*. Nairobi: Government Printers.

Republic of Kenya. (2008). *First Medium Plan. (2008-2012)*. Ministry of State for Planning, National Development and Vision 2030, Nairobi: Government Printers.

- Republic of Kenya. (2011). *Budget Statement for the Fiscal Year 2011/2012 (1st July – 30th June)*, Nairobi: Government Printers.
- Robinson, S., and Tarp, F. (2000). Foreign Aid and Development: Summary and Synthesis. In F. Tarp and P. Hjertholm (eds.), *Foreign Aid and Development: Lessons Learnt and Directions for the Future*, Routledge, London and New York.
- Rodrik, D. (2003). *In Search of Prosperity: Analytic Narratives on Economic Growth*, Princeton and Oxford: Princeton University Press.
- Ronge, E. E., and Kimuyu, P. K. (1997). Private Investment in Kenya: Trends, Composition and Determinants. IPAR. Mimeograph.
- Rosenstein-Rodan, P. N. (1961). International Aid for Underdeveloped Countries. *Review of Economics and Statistics*, 43 (May), pp. 107-48.
- Saasa, O. (2005). Features and Performance of Local Aid Systems, presented at Workshop on “The International Aid System: What’s Next?” Retrieved on 2011-05-12 at www.oecd.org/dev/meetings/aidworkshop.
- Sagasti, F., Bezanson, K., and Prada, F. (2005). The Future of Development Financing: Challenges, Scenarios and Strategic Choices. *Expert Group on Development Issues (EGDI) Secretariat, Ministry for Foreign Affairs, Government of Sweden. Institute of Development Studies. University of Sussex. Retrieved on 2011-06-05 at: www.new-rules.org/storage/documents/ffd/segasti-bezanson-prada04.pdf*.
- Sala-i-Martin, X., Doppelhofer, G., and Miller, R. I. (2003). Determinants of Long-Run Growth: A Bayesian Averaging of Classical Estimates

- (BACE) Approach, Paper presented at the CREI Euro conference on Innovation and Growth at Universitat Pompeu Fabra.
- Salisu, A. A., and Ogwumike, F. O. (2010). Aid, Macroeconomic Policy Environment and Growth: Evidence from Sub-Saharan Africa. *Journal of Economics Theory*, Vol. 4, Issue 2, pp. 59-64.
- Samuelson, P. A. (1954). The Pure Theory of Public Expenditure. *Review of Economics and Statistics*, 36, pp. 387 - 389.
- Samuelson, P. A. (1955). Diagrammatic Exposition of the Theory of Public Expenditure. *Review of Economics and Statistics*, 37, pp. 350 - 356.
- Samuelson, P. A. (1976). *Foundation of Economic Analysis*, College Edition, New York: Anthem.
- Samuelson, P. A. (1977). Reaffirming the Existence of Reasonable Bergson-Samuelson Social Welfare Functions. *Economica*, 44, pp. 81 - 88.
- Savvides, A. (1992). Investment Slowdown in Developing Countries during the 1980s: Debt Overhang or Foreign Capital Inflows. In *Kyklos*, Vol. 45, No. 3, pp. 363–78.
- Scitovsky, T. (1941). A note on Welfare Propositions in Economics. *Review of Economic Studies*, 9, pp. 77 - 88.
- Servén, L., and Solimano, A. (1993a). Debt Crisis, Adjustment Policies, and Capital Formation in Developing Countries: Where Do We Stand? *World Development*, Vol. 21, pp. 127–40.
- Servén, L., and Solimano, A. (1993b). Private Investment and Macroeconomic Adjustment: A Survey. I. L. Servén and A. Solimano (eds.), *Striving for Growth After Adjustment*. Washington D.C: World Bank.

- Shrestha, M. B., and Chowdhury, K. (2005). ARDL Modelling Approach to Testing the Financial Liberalization Hypothesis. *Economics Working Paper Series 05-15*. Wollongong: University of Wollongong.
- Silberberg, E. (1991). *The Structure of Economics: A Mathematical Analysis*, New York: McGraw-Hill.
- Sims, C. A. (1980). Macroeconomics and Reality. *Econometrica*, Vol. 48, pp. 1-48.
- Singh, R. D. (1985). State Intervention, Foreign Economic Aid, Savings and Growth in LDCs: Some Recent Evidence. *KYKLOS*, Vol.38, No.2, pp. 216-232.
- Snyder, D. W. (1993). Donor Bias towards Small Countries: An Overlooked Factor in the Analysis of Foreign Aid and Economic Growth. *Applied Economics*, Vol. 25, pp. 481-488.
- Stiglitz, J. E. (1988). *Economics of the Public Sector*, Second Edition, New York: W.W. Norton and Company.
- Suleiman, W. A. (2005). The Impact of Investment and Financial Intermediation on Economic Growth: New Evidence from Jordan. Abstract mimeo.
- Taylor, L. (1990). A Three-Gap Model. In McCarthy, F.D. (ed), *Problems of Developing Countries in the 1990s*, Washington DC, World Bank, pp. 55-90.
- Uneze, E. (2011). Testing the Impact of Foreign Aid and Aid Uncertainty on Private Investment in West Africa. *CSEA Working Paper WP/11/01*, February.

- Vargas, H. (2005). Assessing Rhetoric and Reality in the Predictability of Aid. *UNDP Human Development Report Office Occasional paper 2005/25*, UNDP.
- Varian, H. R. (1992). *Microeconomic Analysis*. Third Edition. New York: W.W. Norton and Company Inc.
- Varian, H. R. (1997). *Intermediate Microeconomics: A Modern Approach*, 4th Edition, New Delhi: Affiliated East-West press.
- Villanueva, D. (1994). Openness, Human Development, and Fiscal Policies: Effects on Economic Growth and Speed of Adjustment. *Staff Papers, IMF*, Vol. 41, pp. 1-29.
- Wawire, N. H. W. (2006). The Determinants of Tax Revenue in Kenya (Unpublished PhD Thesis), Nairobi, Kenyatta University.
- Wawire, N. H. W. (2011). The Determinants of Value Added Tax Revenue in Kenya. CSAE Conference 2011, Economic Development in Africa, Oxford, March 20-22, Paper No. 144, Retrieved on 2011-08-04 at www.csae.ox.ac.uk/conferences/2011-EDiA/papers/426-Wawire.pdf.
- Were, M. (2001). The Impact of External Debt on Economic Growth and Private Investment in Kenya: 1970-1996: An Assessment. UNU/WIDER Discussion Paper DP2001-120, Helsinki.
- White, H. (1992). The Macroeconomic Impact of Development Aid: A Critical Survey. *Journal of Development Studies*, Vol. 28, No.2, pp. 163-240.
- White, H. (1998). *Aid and Macroeconomic Performance: Theory, Empirical Evidence and Four Country Cases*, New York: St. Martin's Press.

- World Bank. (1998). *Assessing Aid: What Works, What Doesn't and Why*. New York: Oxford University Press.
- World Bank. (2007). *Global Monitoring Report 2007, Millennium Development Goals: Confronting the Challenges of Gender Equality and Fragile States*, Washington, DC: The World Bank.
- Zhang, X., and Zou, H. (1995). Foreign Technology, Imports and Economic Growth in Developing Countries. Washington, DC: The World Bank, *Policy Working Paper 1412*. Retrieved on 2011-07-03 at http://econ.worldbank.org/external/default/main?pagePK=64165259&theSitePK=469382&piPK=64165421&menuPK=64166093&entityID=000009265_3970311121400.
- Zimmermann, F. (2005). The International Aid System: A Question of Perspective. *OECD Policy Insight*, No. 12. Accessed on 2011-07-07 at www.oecd.org/dataoecd/25/23/35275333.pdf.

APPENDIX I: EVOLUTION AND PATTERN OF FOREIGN AID TO KENYA (1966-2011)

Table A1: Evolution and Pattern of Foreign Aid to Kenya (1966-2011)

Year	ODA at 2010 prices, US\$ Million	ODA at current prices, US\$ Million	Kenya's share of developing countries ODA, per cent	Kenya's share of Africa's ODA, per cent	ODA as share of GDP, per cent	Bilateral as share of total ODA, per cent	Central Government expenditure as a share of total ODA, per cent
1966	400.52	55.41	1.1	4.0	5.0	94.3	35.0
1967	280.30	36.71	0.7	2.5	3.0	89.3	21.0
1968	451.85	60.71	1.2	4.3	4.0	75.0	29.0
1969	411.22	55.81	1.1	4.1	4.0	80.9	23.0
1970	396.24	57.35	1.0	3.7	4.0	84.6	22.0
1971	428.94	66.85	1.0	3.9	4.0	89.1	21.0
1972	428.94	71.86	1.0	4.1	3.0	87.0	19.0
1973	470.86	94.97	1.0	3.4	4.0	82.0	23.0
1974	512.21	116.58	0.9	2.9	4.0	86.2	23.0
1975	473.18	124.82	0.7	2.1	4.0	83.6	21.0
1976	578.41	154.60	1.0	2.8	4.0	89.4	25.0
1977	539.23	160.76	0.9	2.3	4.0	75.4	21.0
1978	724.93	245.61	1.1	3.1	5.0	76.1	24.0
1979	890.90	348.34	1.3	4.0	6.0	81.4	29.0
1980	921.63	394.79	1.2	3.8	5.0	70.2	27.0
1981	1111.15	448.15	1.4	4.4	7.0	79.5	35.0
1982	1239.69	484.60	1.7	4.7	7.0	70.1	41.0
1983	1015.50	396.10	1.4	4.0	7.0	85.6	36.0
1984	1108.78	408.43	1.4	3.8	7.0	80.9	37.0
1985	1130.86	426.66	1.4	3.6	7.0	82.0	40.0
1986	986.60	442.96	1.3	3.4	6.0	88.1	33.0
1987	1038.07	557.22	1.4	3.6	7.0	80.6	38.0
1988	1412.08	832.03	1.9	4.7	10.0	72.8	54.0

Table A1: Evolution and Pattern of aid to Kenya (1966-2011) (continued)

Year	ODA at 2010 prices, US\$ Million	ODA at current prices, US\$ Million	Kenya's share of developing countries ODA, per cent	Kenya's share of Africa's ODA, per cent	ODA as share of GDP, per cent	Bilateral as share of total ODA, per cent	Central Government expenditure as a share of total ODA, per cent
1989	1818.77	1059.7	2.3	5.7	13.0	58.0	71.0
1990	1792.35	1181.29	2.1	4.7	14.0	62.7	74.0
1991	1325.03	916.46	1.5	3.5	11.0	65.6	67.0
1992	1221.76	883.14	1.5	3.5	11.0	57.3	68.0
1993	1290.09	914.39	1.6	4.0	16.0	45.1	109.0
1994	913.61	676.63	1.1	2.7	9.0	57.5	62.0
1995	870.80	731.85	1.2	3.0	8.0	60.4	54.0
1996	754.70	595.02	1.0	2.9	5.0	57.5	33.0
1997	620.75	448.62	0.9	2.4	3.0	66.6	22.0
1998	580.20	415.21	0.8	2.3	3.0	65.7	18.0
1999	417.67	310.47	0.6	1.8	2.0	81.8	15.0
2000	730.85	512.72	1.0	3.1	4.0	57.2	27.0
2001	724.22	471.23	0.9	2.7	4.0	57.3	22.0
2002	556.85	392.81	0.6	1.7	3.0	73.6	18.0
2003	655.39	523.00	0.7	1.9	4.0	61.4	19.0
2004	766.81	660.24	0.8	2.2	4.0	70.6	23.0
2005	855.51	759.20	0.7	2.1	4.0	68.3	23.0
2006	1041.47	946.70	0.9	2.1	4.0	81.6	25.0
2007	1354.60	1326.78	1.2	3.3	5.0	62.0	29.0
2008	1332.95	1365.96	1.1	3.1	4.0	70.2	37.0
2009	1789.52	1776.20	1.4	3.7	6.0	69.2	21.0
2010	1628.57	1628.57	1.2	3.4	5.1	71.5	27.8
2011	2341.90	2474.23	1.8	4.9	5.0	63.9	22.6

Source: OECD/DAC March 2013

APPENDIX II: DATA USED IN THE STUDY

Table A2: Raw Data

Year	YPC	AID	XAIDB	GINV	PINV	TAX	FDEBT	POLICY	AIP	PRIP	INF	FGC	OPEN
1966	247.9727	5	1	1.171075	14.71507	10.65641	18.49242	6.04776	9.733494	1.799688	5.5	13.72926	63
1967	248.1869	3	0	1.387892	18.67333	12.13539	19.55929	6.638524	7.293164	0	2.3	14.12994	57
1968	259.418	4	1	1.478006	18.51775	13.49003	18.86328	6.178346	8.565006	1.821051	0.9	15.20732	58
1969	271.0101	4	1	1.852549	17.99942	14.62609	16.41355	5.144067	7.131191	1.637844	0.3	16.43467	58
1970	249.9504	4	1	2.596043	19.68009	16.23826	29.78152	9.396246	13.02596	2.24031	2.7	16.25747	61
1971	295.267	4	0.790094	3.130412	22.70366	16.97421	27.99699	9.073486	12.57852	1.742439	4.3	17.98029	64
1972	334.0845	3	0.011818	2.974688	21.93728	15.56471	27.57879	9.070879	9.965379	0.02606	6.3	17.63221	56
1973	341.6906	4	0.502382	3.97091	20.75031	18.27622	33.75937	10.48165	14.53065	1.180411	9.8	16.45224	56
1974	343.2311	4	0	4.362496	19.20901	18.71029	38.81162	11.85057	16.42838	0	18	17.03592	75
1975	334.0623	4	0.405728	5.202473	20.20974	19.21367	39.58533	12.14149	16.83168	1.012951	20	18.3254	65
1976	329.0944	4	0.405238	5.053729	19.97799	18.29252	42.97913	13.35362	18.51204	1.050292	12	17.4601	64
1977	347.2467	4	0.024653	5.296521	20.96887	21.49417	36.91019	11.00753	15.25967	0.059133	15	17.20523	67
1978	357.7941	5	0.310724	5.368805	25.07647	20.47587	40.98499	12.98526	20.89898	0.796638	17	19.51477	68
1979	371.0154	6	0.033213	4.979101	23.19329	26.1175	43.64494	12.70773	22.76919	0.084433	8.5	19.19578	58
1980	377.4337	5	0.828783	5.244203	23.0959	25.0844	46.61612	13.81813	22.23942	2.176367	14	19.80338	66
1981	377.2768	7	1	5.232214	23.39396	22.68028	47.0956	14.39413	28.00968	2.66682	12	18.58875	64
1982	368.7871	7	0.499531	5.079661	19.02408	22.7227	52.36369	15.54934	30.25761	1.370723	21	18.43303	59
1983	359.6975	7	0.99152	3.375193	18.02815	22.30646	60.68165	18.17284	35.36272	2.875335	12	18.42165	54
1984	352.3084	7	0.433408	3.622541	18.08889	20.34275	56.71572	17.21771	33.50411	1.233452	11	17.38183	59
1985	353.6865	7	1	3.066105	17.48906	19.17597	68.14268	21.01108	40.88568	3.04505	14	17.46029	55
1986	364.9223	6	0.649688	3.934797	19.63559	21.12579	63.58219	19.49265	34.92614	1.929598	3	18.31957	56
1987	372.3028	7	0.744826	3.115409	19.6217	19.82528	72.55138	22.58764	43.95352	2.321922	9.1	18.56876	47
1988	380.9968	10	0.680171	4.251389	20.47358	22.16992	69.524	21.34132	49.1402	2.081763	13	18.40579	50

Year	Y _p	AID	XAIDB	GINV	PINV	TAX	FDEBT	POLICY	AIP	PRIP	INF	FGC	OPEN
1989	384.5879	13	0.865031	4.646291	19.45728	22.41542	71.19097	21.7145	55.69659	2.662547	14	18.05661	53
1990	386.6161	14	0.867254	6.209839	20.6482	21.41059	82.12648	25.54269	67.40863	2.810208	18	18.64243	57
1991	378.6154	11	0.592088	4.256998	19.02992	22.08847	91.42586	28.23084	67.69461	1.977818	21	16.77135	56
1992	362.7995	11	1	3.219257	16.55254	23.22137	83.90886	25.32565	60.72825	3.231818	28	15.68227	53
1993	351.8716	16	1	3.04579	16.93744	28.44646	123.6375	37.32948	103.4993	3.619783	47	14.47997	73
1994	349.1898	9	1	3.260163	18.87301	26.98327	99.66525	30.08084	66.09436	3.403888	29	15.15493	71
1995	352.714	8	1	2.970054	21.38572	26.38263	80.79566	24.40782	50.75463	3.194903	2.1	14.84292	72
1996	355.6874	5	0.783031	1.95087	16.00906	18.4636	56.56411	17.21554	27.70734	2.22836	9.4	15.18057	57
1997	346.4461	3	0.788094	1.562649	15.3879	18.90323	49.29254	14.72747	16.17978	2.119747	12	15.53615	54
1998	347.3655	3	0.747209	1.181232	15.67521	18.31292	48.42023	14.57627	16.01367	2.002067	7.2	16.24996	49
1999	345.4312	2	0	2.159334	15.59143	17.30741	50.20795	15.30281	10.6071	0	6.2	15.7533	48
2000	338.1616	4	0.2694	3.447327	16.70881	16.84982	48.38561	14.92593	20.69173	0.728215	11	15.05429	54
2001	341.7794	4	1	2.726625	18.15156	15.94663	42.47056	13.34226	18.4963	2.590937	6.2	15.97291	56
2002	334.7976	3	1	3.141902	17.23688	17.21826	46.56122	14.34399	15.75848	2.663331	2.5	17.078	55
2003	335.7626	4	0.580767	3.03964	15.83821	17.95123	46.0491	13.89057	19.25643	1.528121	10	18.13132	54
2004	343.8375	4	0	3.149971	16.25922	16.63281	42.96896	13.16138	18.24555	0	12	17.86007	60
2005	354.8077	4	0.602676	3.859598	18.71211	20.39018	34.30221	10.06851	13.95792	1.391829	11	17.38021	65
2006	367.541	4	0.171276	8.778779	19.07024	21.36069	29.42852	8.387364	11.62736	0.364257	15	17.45747	62
2007	384.1542	5	0.037933	8.884378	16.89549	22.27662	27.45996	7.340706	11.81441	0.075616	10	17.88468	63
2008	385.2076	4	0.901135	7.358602	14.60809	22.17496	25.13681	6.329095	8.773989	1.662736	27	16.48733	70
2009	394.067	5.48	0.3776	10.69847	13.50359	22.78831	27.85275	6.970357	11.8551	0.733173	9.7	15.76007	63
2010	398.4004	5.2	1	12.02168	14.55867	24.65972	26.74539	6.443	10.62231	1.862994	4.5	16.64724	65

Source: World Bank (Africa Development Indicators), OECD/DAC and Economic Survey (various issues)

Year	Aid Committed	Aid Disbursed	XAid	XAidBounded
1966	259.21	402.44	-35.5904	1.000000
1967	681.14	280.45	142.874	0.000000
1968	297.66	451.48	-34.0702	1.000000
1969	211.46	408.87	-48.2818	1.000000
1970	358.51	397.05	-9.70659	1.000000
1971	521.53	431.05	20.9906	0.790094
1972	804.19	412.79	98.81819	0.011818
1973	704.09	470.14	49.76177	0.502382
1974	1103.93	510.54	116.2279	0.000000
1975	748.75	469.65	59.42723	0.405728
1976	910.88	571.17	59.47616	0.405238
1977	1056.85	535.02	97.53467	0.024653
1978	1231.55	729.04	68.92763	0.310724
1979	1754.63	892.13	96.67874	0.033213
1980	1071.91	915.21	17.12175	0.828783
1981	997.20	1107.34	-9.94636	1.000000
1982	1840.97	1226.93	50.04686	0.499531
1983	1015.56	1007.02	0.848047	0.99152
1984	1706.99	1089.62	56.6592	0.433408
1985	1070.42	1126.32	-4.96307	1.000000
1986	1328.68	983.98	35.0312	0.649688
1987	1303.26	1038.31	25.51743	0.744826
1988	1864.72	1412.85	31.98287	0.680171
1989	2069.31	1823.23	13.49693	0.865031
1990	2042.93	1803.52	13.2746	0.867254
1991	1856.60	1318.69	40.79124	0.592088
1992	1148.36	1226.47	-6.36868	1.000000
1993	1072.40	1277.13	-16.0305	1.000000
1994	805.31	911.86	-11.6849	1.000000
1995	767.42	868.27	-11.6151	1.000000
1996	920.43	756.33	21.69688	0.783031
1997	753.43	621.69	21.19063	0.788094
1998	728.21	581.27	25.27913	0.747209
1999	863.52	415.77	107.6918	0.000000
2000	1252.02	723.46	73.06002	0.269400
2001	662.52	721.95	-8.23187	1.000000
2002	391.75	555.04	-29.4195	1.000000
2003	922.70	650.14	41.92328	0.580767
2004	1665.75	760.92	118.9126	0.000000
2005	1177.86	842.94	39.73237	0.602676
2006	1873.40	1024.43	82.87243	0.171276
2007	2642.12	1346.60	96.20674	0.037933
2008	1455.04	1324.13	9.886492	0.901135
2009	2885.26	1778.39	62.24	0.377600
2010	1631.22	3518.25	-1887.03	1.000000

APPENDIX III: DESCRIPTIVE STATISTICS AND CORRELATION

Table A3: Descriptive Statistics

	Yp	Pinv	Aid	Ginv	Tax	Fdebt	POLICY	XAIDB	AIP	PRIP	FGC	INF	Open
Mean	346.16	18.66	5.84	4.16	20.00	49.05	14.87	0.62	27.01	1.64	16.98	12.09	59.78
Median	352.31	18.70	5.00	3.45	20.34	46.00	13.82	0.70	18.50	1.78	17.20	10.80	58.00
Maximum	398.40	25.10	16.00	12.02	28.45	123.60	37.33	1.00	103.50	3.62	19.80	46.50	75.00
Minimum	247.97	13.50	2.00	1.17	10.66	16.40	5.14	0.00	7.13	0.00	13.70	0.30	47.00
Std. Dev.	38.16	2.65	3.12	2.35	3.85	23.35	7.18	0.37	21.04	1.07	1.48	8.73	6.76
Skewness	-1.36	0.26	1.58	1.51	-0.11	1.03	0.98	-0.53	1.62	-0.12	-0.27	1.58	0.31
Kurtosis	4.32	2.62	5.00	5.41	2.91	3.97	3.77	1.88	5.45	2.03	2.31	6.83	2.51
Probability	0.00	0.68	0.00	0.00	0.95	0.01	0.02	0.11	0.00	0.40	0.48	0.00	0.55
Observations	45	45	45	45	45	45	45	45	45	45	45	45	45

KEY:

Yp = Real per capita GDP

Pinv = Private investment as a share of GDP

Aid = Foreign aid as a share of GDP

Ginv = Public investment as a share of GDP

Tax = Tax revenue as a share of GDP

Fdebt = Foreign debt as a share of GDP

POLICY = Macroeconomic policy environment index

XAIDB = Foreign aid predictability index

AIP = Interactive variable of foreign aid and policy

PRIP = Interactive variable of predictability index and policy

FGC = Final Government Consumption Expenditure

OPEN = Degree of Openness

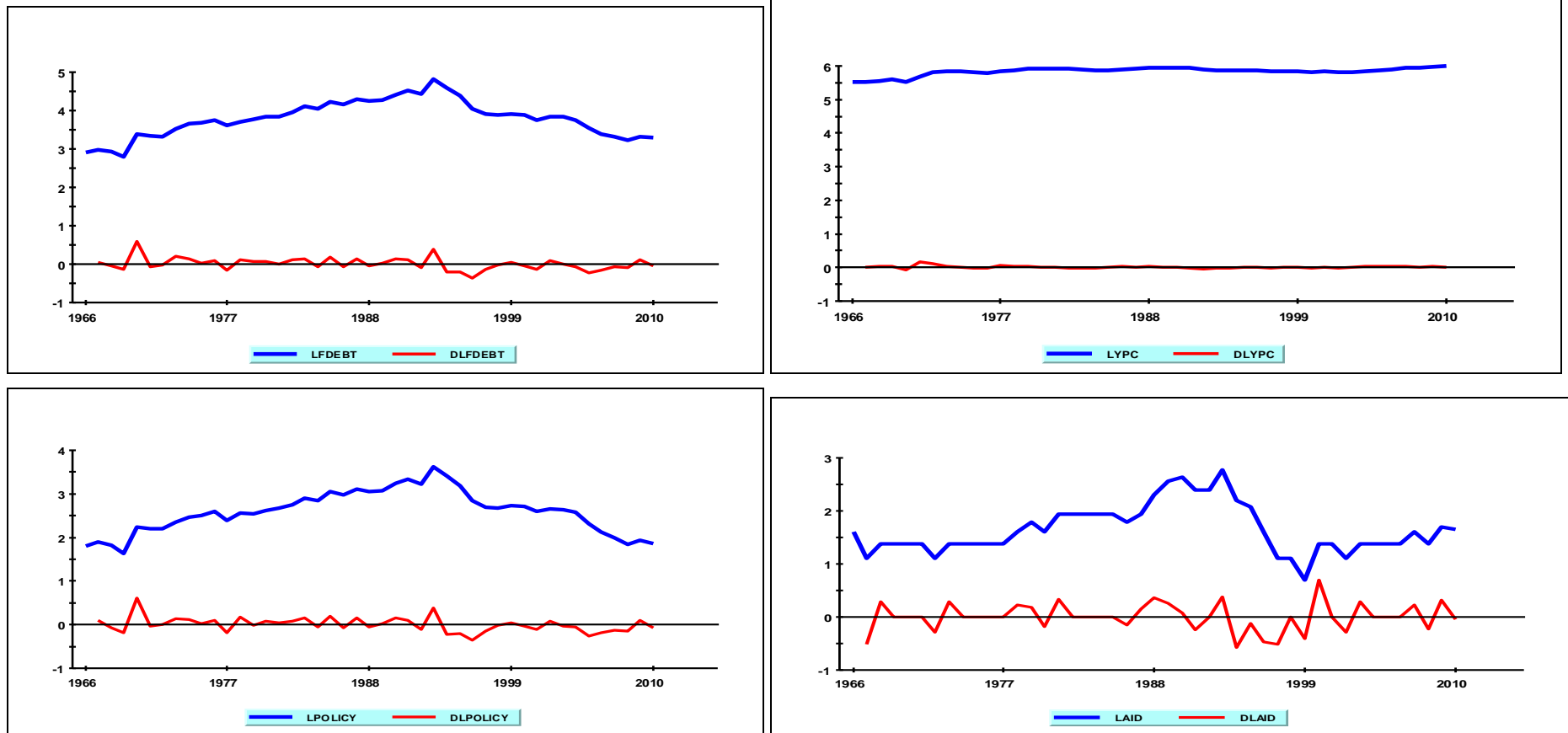
INF = Inflation

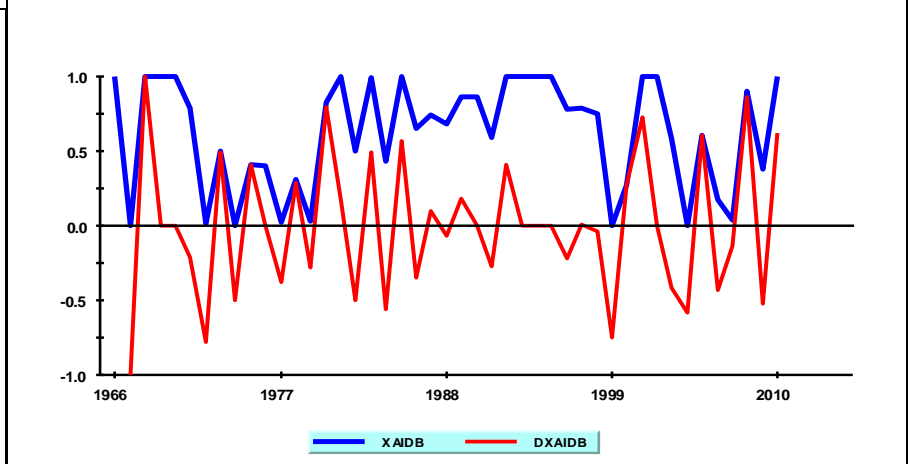
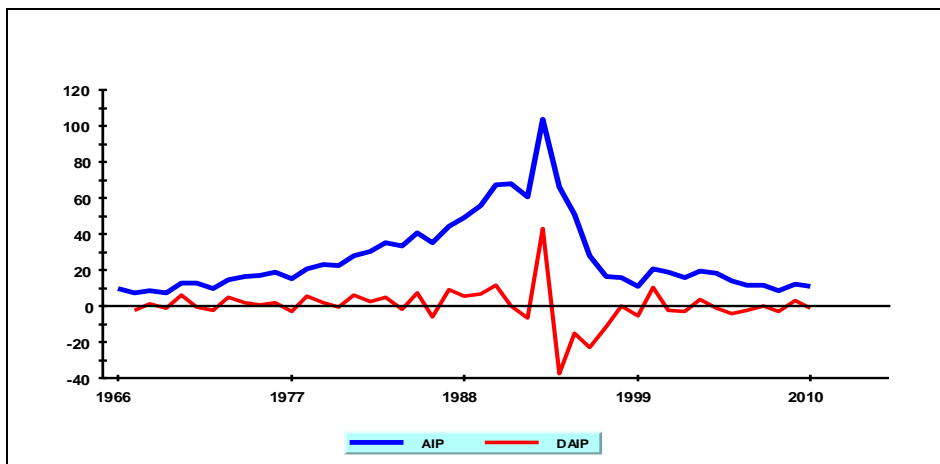
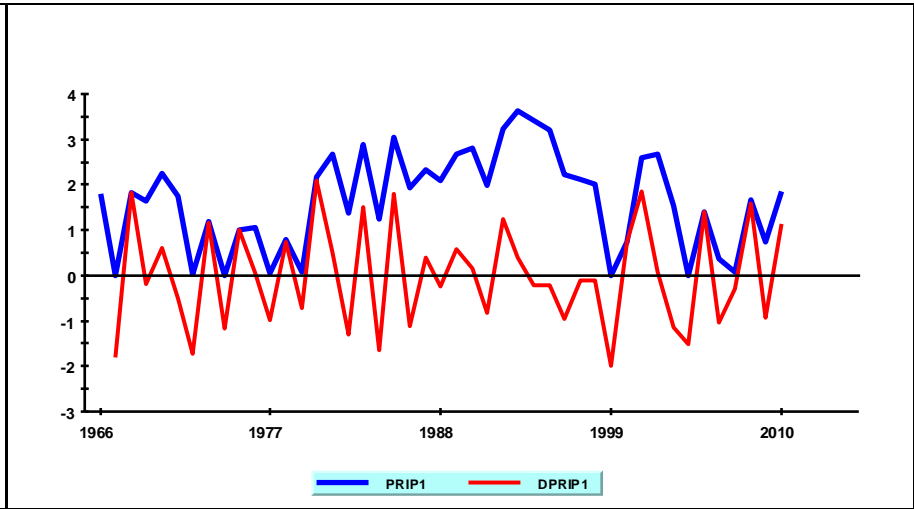
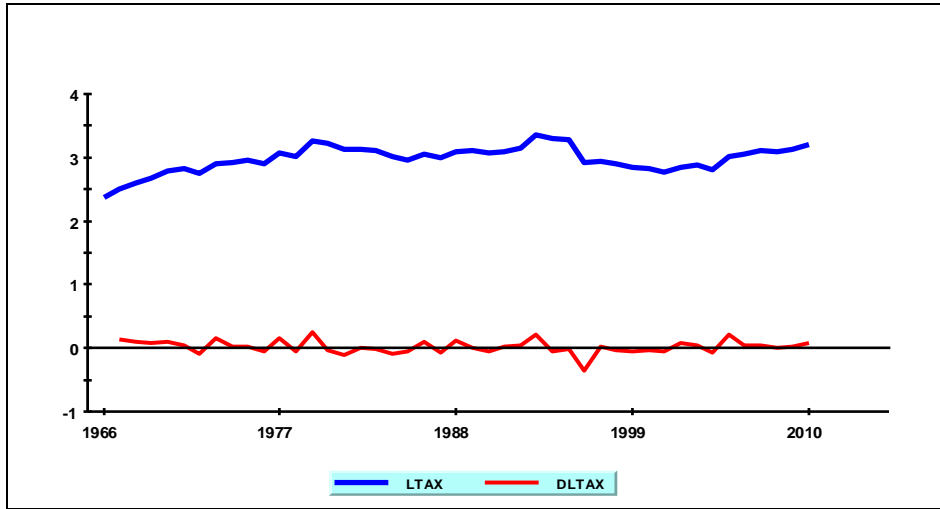
Table A4: Correlation Matrix

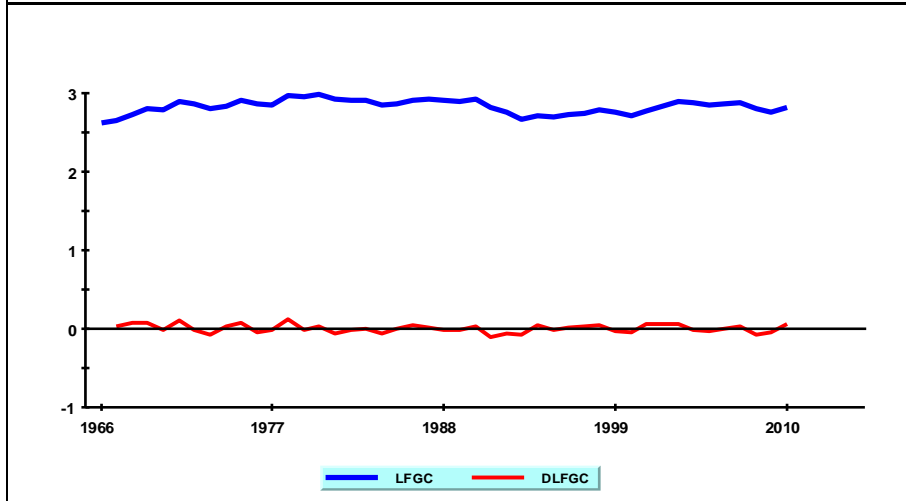
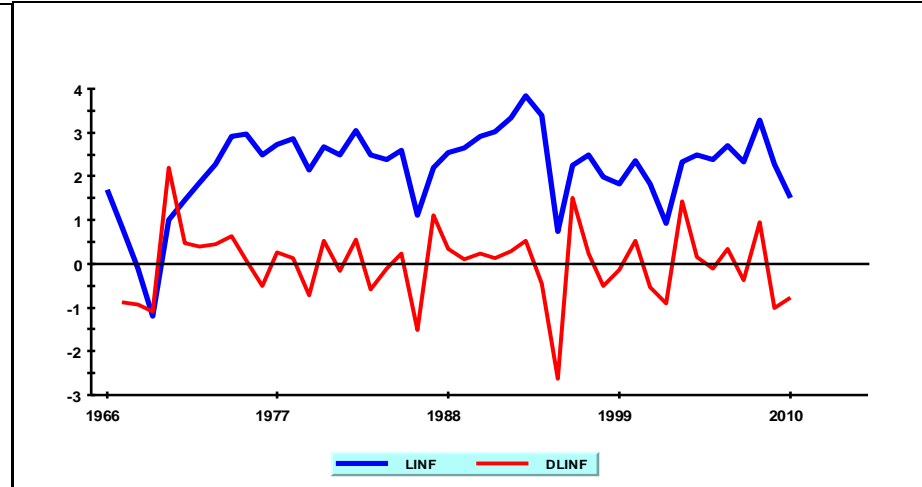
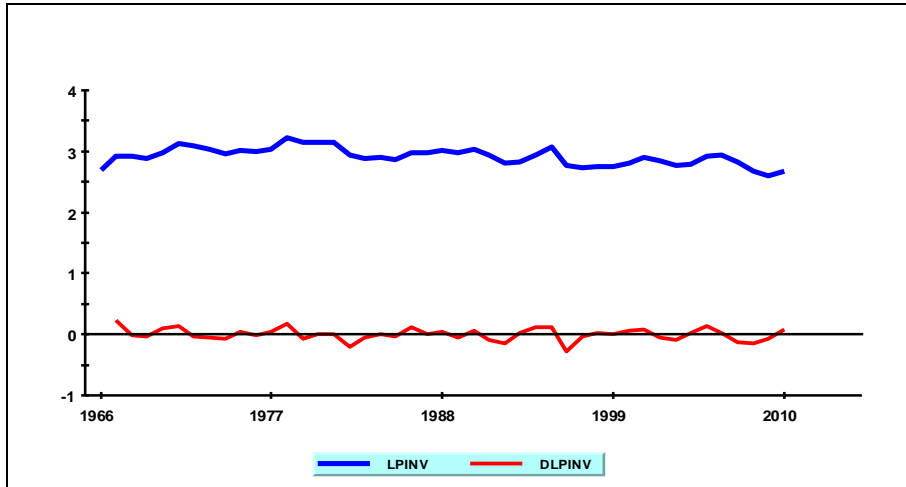
	Yp	Pinv	Aid	Ginv	Tax	Fdebt	POLICY	XAIDB	AIP	PRIP	FGC	INF	Open
Yp	1.0000												
Pinv	0.0188	1.0000											
Aid	0.3953	0.1082	1.0000										
Ginv	0.6187	-0.0355	0.0904	1.0000									
Tax	0.7596	0.1828	0.5942	0.4987	1.0000								
Fdebt	0.4266	0.0565	0.8160	-0.1607	0.6126	1.0000							
POLICY	0.3826	0.0885	0.8086	-0.2125	0.5641	0.9973	1.0000						
XAIDB	-0.0638	-0.1445	0.3844	-0.1781	0.1337	0.3188	0.3160	1.0000					
AIP	0.3704	0.1021	0.9352	-0.0888	0.6046	0.9587	0.9568	0.3686	1.0000				
PRIP	0.1118	-0.0587	0.6036	-0.2169	0.3327	0.6312	0.6299	0.9247	0.6497	1.0000			
FGC	0.4723	0.5732	0.0537	0.3388	0.2860	-0.0149	-0.0140	-0.2024	-0.0199	-0.1500	1.0000		
INF	0.4098	-0.0324	0.6125	0.1711	0.5868	0.6210	0.5988	0.0693	0.6594	0.2710	0.0146	1.0000	
Open	0.0056	0.1967	0.0538	0.3470	0.3529	-0.0416	-0.0648	-0.0120	0.0367	-0.0388	-0.0865	0.3765	1.0000

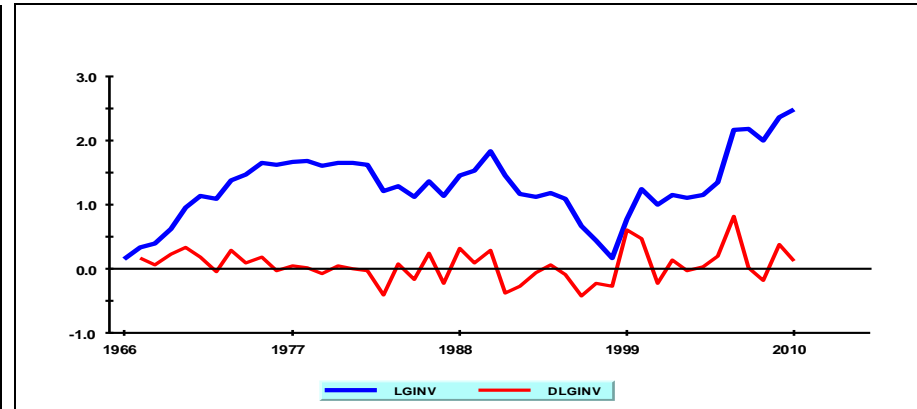
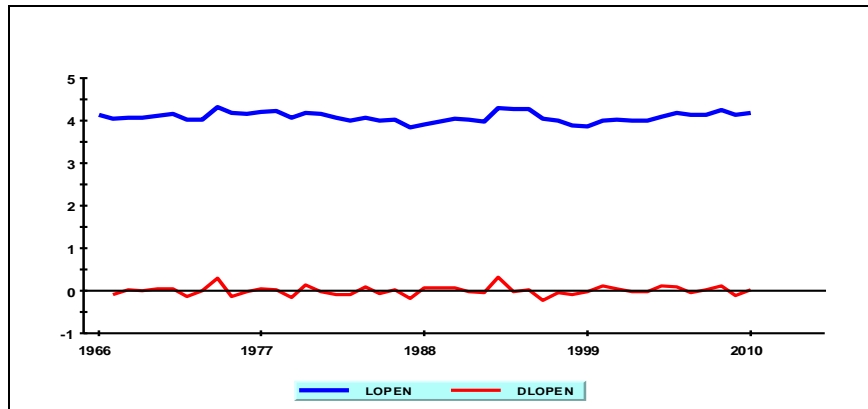
APPENDIX IV: PLOTS OF VARIABLES IN LEVELS AND FIRST DIFFERENCE

Figure A1: Plots of Variables in Levels and First Difference









APPENDIX V: RESULTS OF STATIONARITY TESTS

Table A5: Unit-Root Estimation (ADF Test)

Variable	ADF Test (with Intercept and trend)		Order of Integration
	Level	First Difference	
Log Real per capita GDP	-2.843	-4.404***	I(1)
Log Foreign Aid	-1.727	-4.368***	I(1)
Log Private investment	-3.814**	-	I(0)
Log Public Investment	-1.790	-4.330***	I(1)
Log Foreign Debt	-0.912	-4.995***	I(1)
Log Tax	-2.617	-4.045**	I(1)
Log Macroeconomic policy index	-0.502	-4.948***	I(1)
Predictability Indicator	-3.255*	-6.470***	I(1)
Log Final government consumption expenditure	-3.159*	-5.073***	I(1)
Log Inflation	-2.923	-6.402***	I(1)
Log degree of openness	-2.875	-5.733***	I(1)
Foreign aid interacted with macroeconomic policy	-1.368	-4.156***	I(1)
Predictability indicator interacted with macroeconomic policy	-2.564	-6.087***	I(1)

Note: *** indicate significance at 1 per cent and ** Significant at 5 per cent. Critical values at level (-4.184 at 1 per cent, -3.516 at 5 per cent and -3.188 at 10 per cent). Critical values at First difference (-4.190 at 1 per cent, -3.519 at 5 per cent and -3.188 at 10 per cent). The critical values are the MacKinnon critical values for rejection of hypothesis of a unit root.

APPENDIX VI: THE F-STATISTIC OF COINTEGRATION

Table A6: The *F*-Statistic of Cointegration Relationship (Growth Equation)

Test Statistic	Value	Lag	Significance Level	Bound Critical Values* (restricted intercept and no trend)		Bound Critical Values* (restricted intercept and trend)	
				I(0)	I(1)	I(0)	I(1)
<i>F</i> -statistic	4.948	1	1%	3.383	4.832	3.595	5.225
			5%	2.504	3.723	2.643	4.004
			10%	2.131	3.223	2.238	3.461

Note: * Based on Narayan (2004)

Table A7: The *F*-Statistic of Cointegration Relationship (Investment Equation)

Test Statistic	Value	Lag	Significance Level	Bound Critical Values* (restricted intercept and no trend)		Bound Critical Values* (restricted intercept and trend)	
				I(0)	I(1)	I(0)	I(1)
<i>F</i> -statistic	4.7012	1	1%	3.402	5.031	3.644	5.464
			5%	2.523	3.829	2.676	4.130
			10%	2.152	3.223	2.260	3.534

Note: * Based on Narayan (2004)

APPENDIX VII: RESULTS OF DIAGNOSTIC TESTS

Table A8: Results of Diagnostic Tests for the Growth Model

Test Statistics	LM Version	F Version
A:Serial Correlation	CHSQ[1] = 0.074(0.785)	F[1,26] = 0.045 (0.834)
B:Functional Form	CHSQ[1] = 1.702(0.192)	F[1,26] = 1.071 (0.310)
C:Normality	CHSQ[2] = 0.118(0.943)	Not applicable
D:Heteroscedasticity	CHSQ[1] = 1.656(0.198)	F[1,41] = 1.642 (0.207)

Note: p-values in parenthesis

A:Lagrange multiplier test of residual serial correlation

B:Ramsey's RESET test using the square of the fitted values

C:Based on a test of skewness and kurtosis of residuals

D:Based on the regression of squared residuals on squared fitted values

Table A9: Results of Diagnostic Tests for the Investment Model

Test Statistics	LM Version	F Version
A:Serial Correlation	CHSQ[1] = 1.187(0.276)	F[1,28] = 0.795(0.380)
B:Functional Form	CHSQ[1] = 1.222(0.269)	F[1,28] = 0.819(0.373)
C:Normality	CHSQ[2] = 3.637(0.162)	Not applicable
D:Heteroscedasticity	CHSQ[1] = 0.879(0.348)	F[1,41] = 0.856(0.360)

Note: p-values in parenthesis

A:Lagrange multiplier test of residual serial correlation

B:Ramsey's RESET test using the square of the fitted values

C:Based on a test of skewness and kurtosis of residuals

D:Based on the regression of squared residuals on squared fitted values

APPENDIX VIII: GRAPHS OF DIAGNOSTIC TESTS

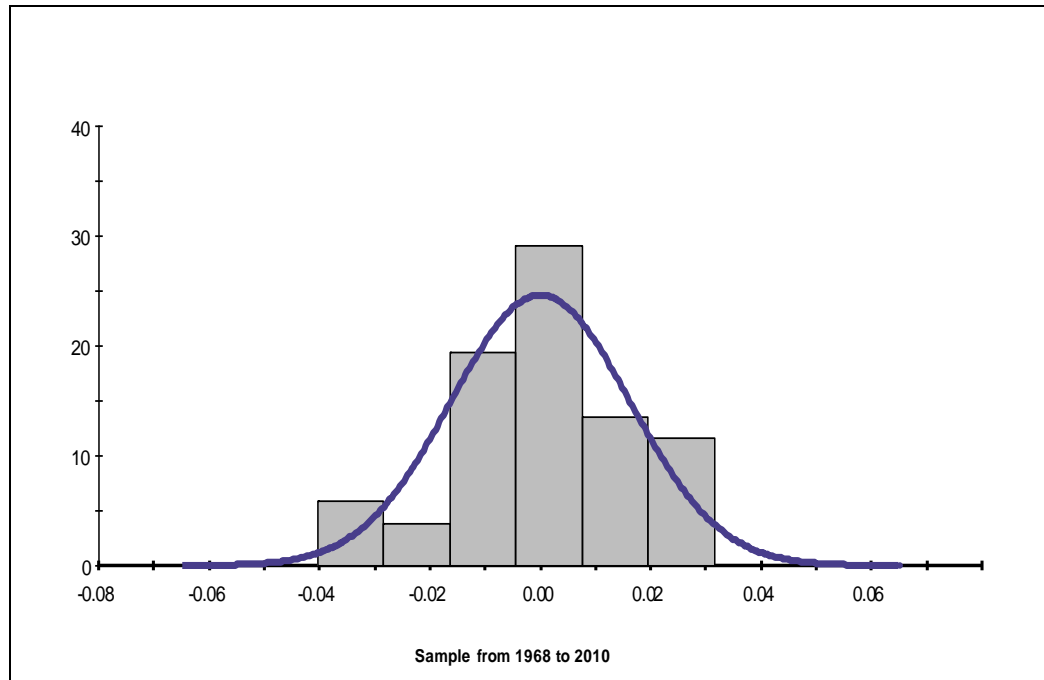


Figure A2: Histogram of Residuals and the Normal Density (economic growth model)

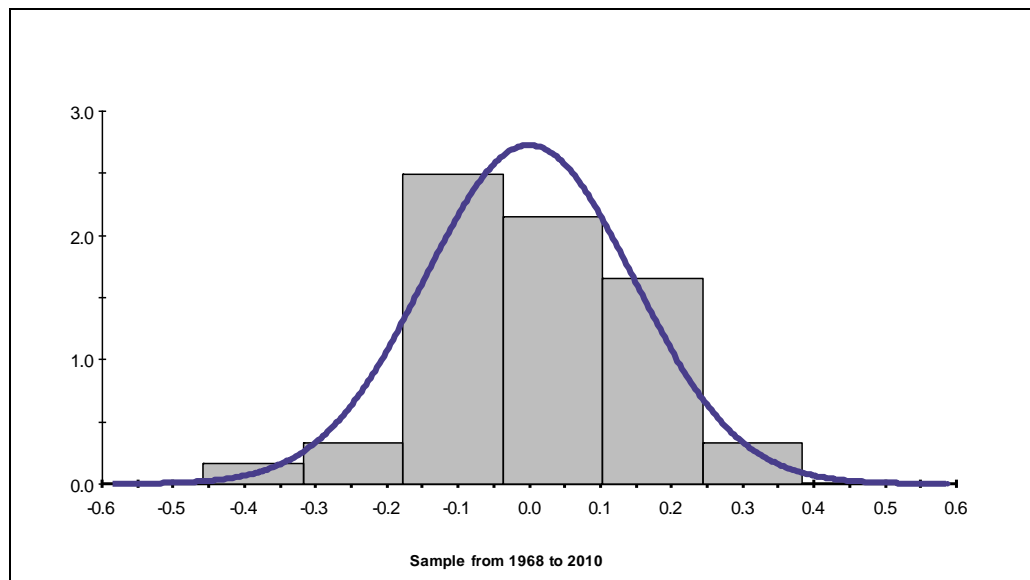


Figure A3: Histogram of Residuals and the Normal Density (Investment model)

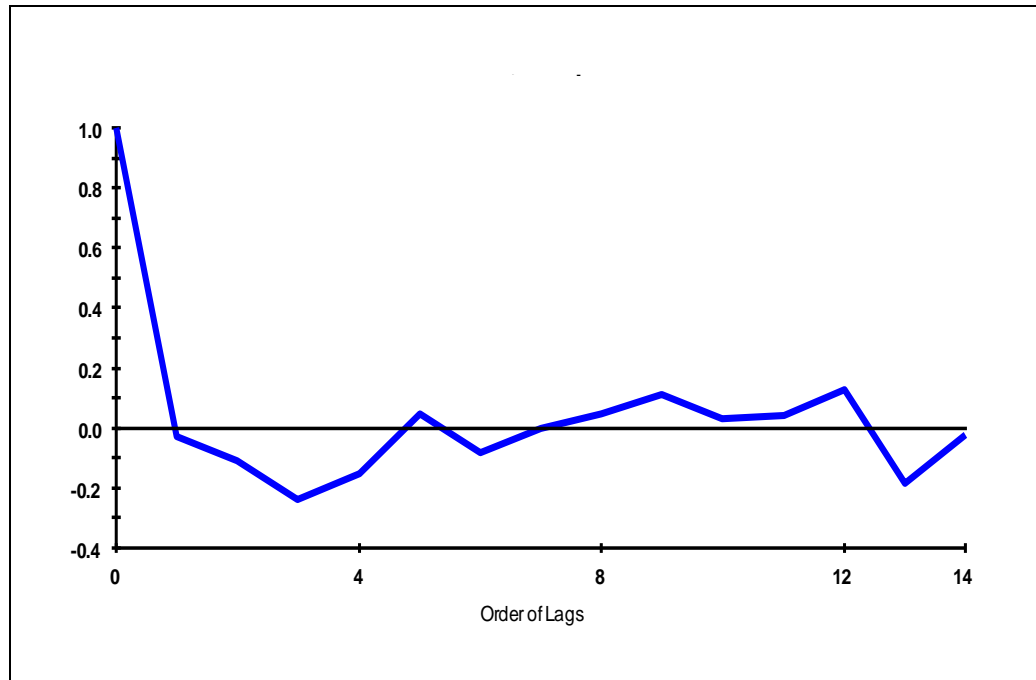


Figure A4: Autocorrelation Function of Residuals (Economic growth model)

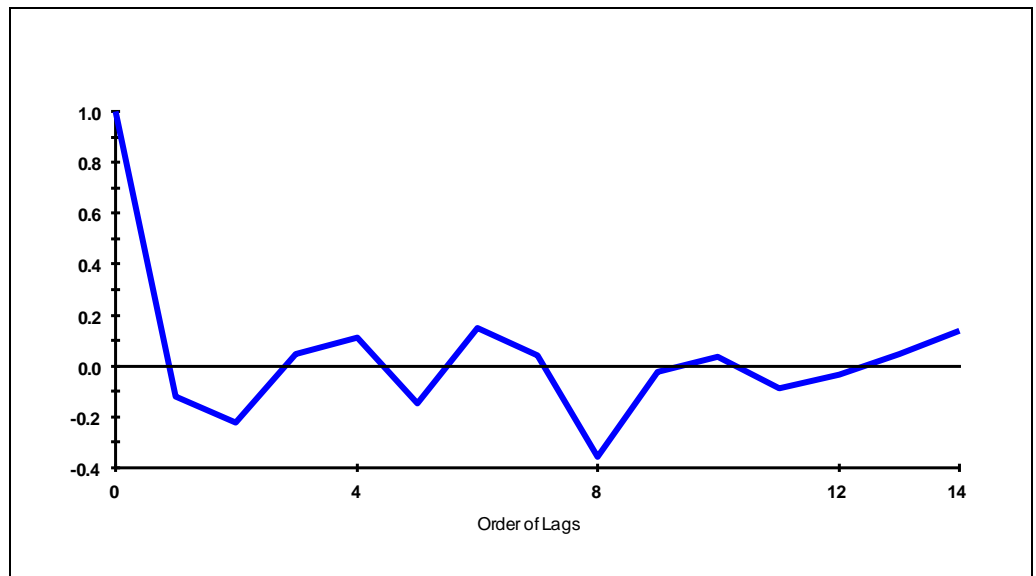


Figure A5: Autocorrelation Function of Residuals (Investment model)

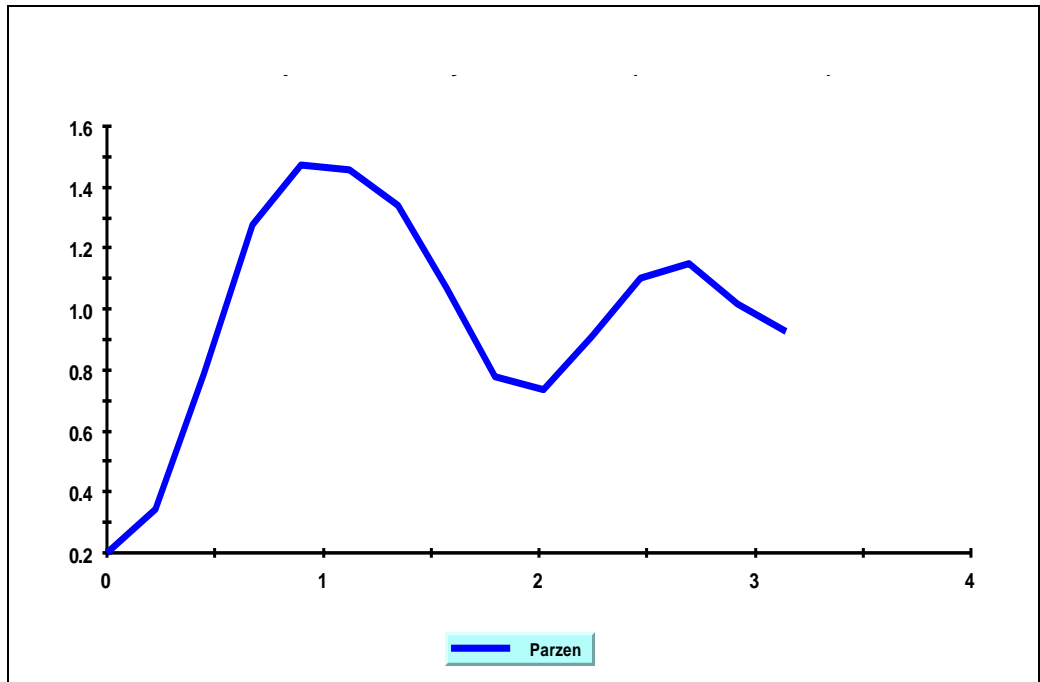


Figure A6: Standardized Spectral Density of Residuals (Economic growth model)

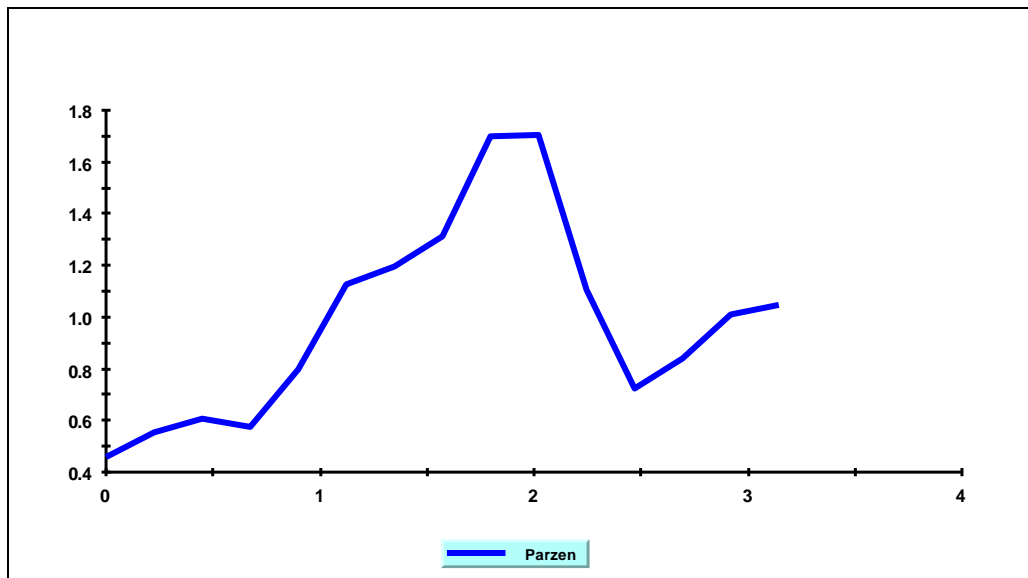


Figure A7: Standardized Spectral Density of Residuals (Investment model)

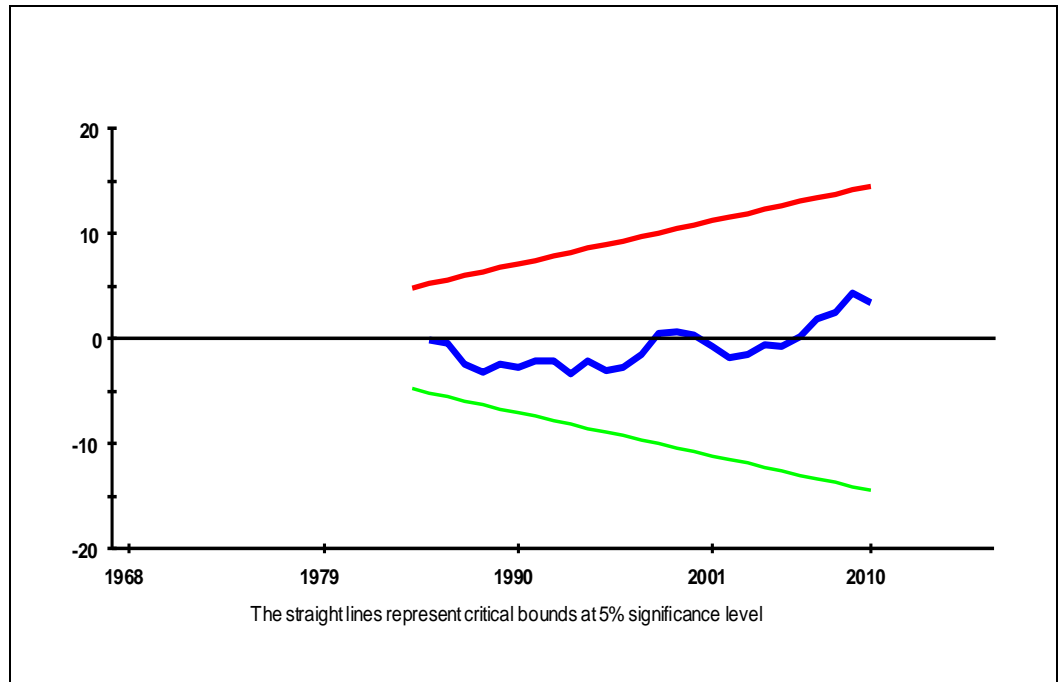


Figure A8: Cumulative Sum of Recursive Residuals (Growth equation)

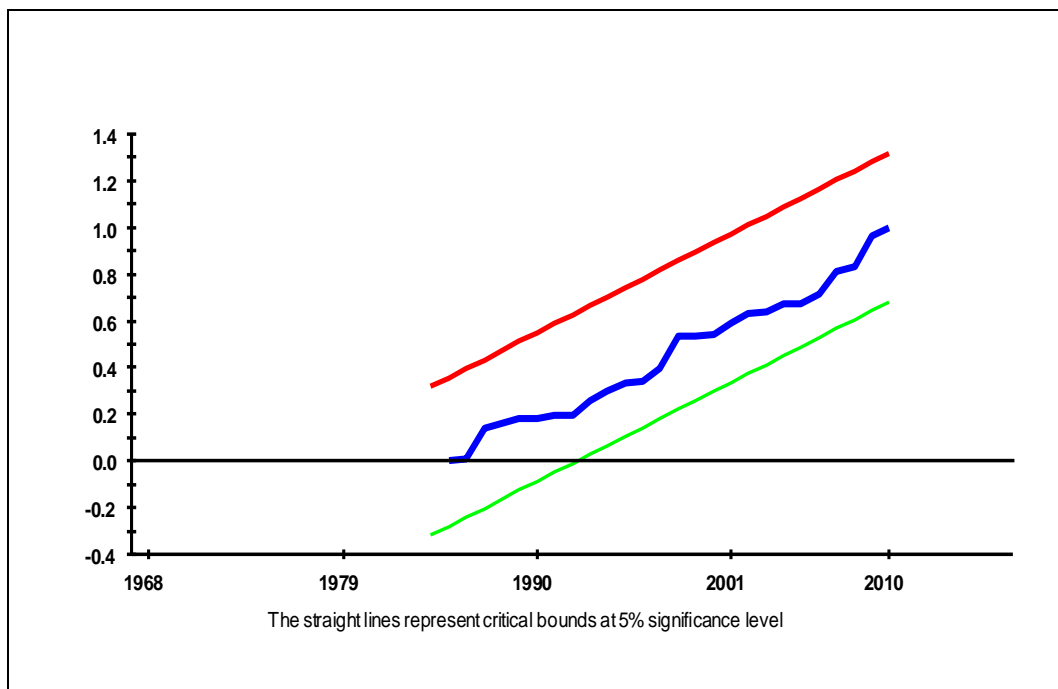


Figure A9: Cumulative Sum of Squares of Recursive Residuals (Growth equation)

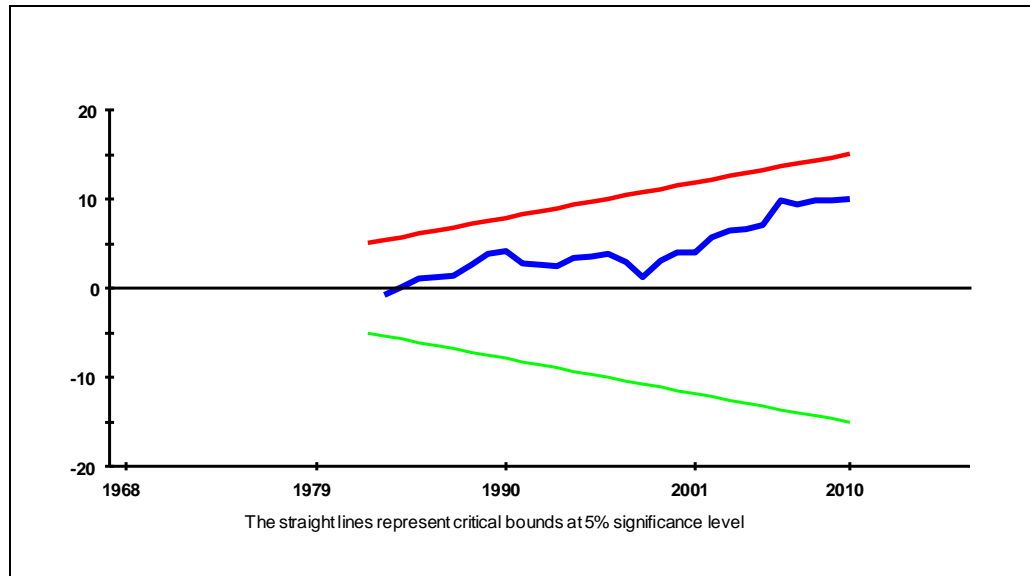


Figure A10: Cumulative Sum of Recursive Residuals (Investment equation)

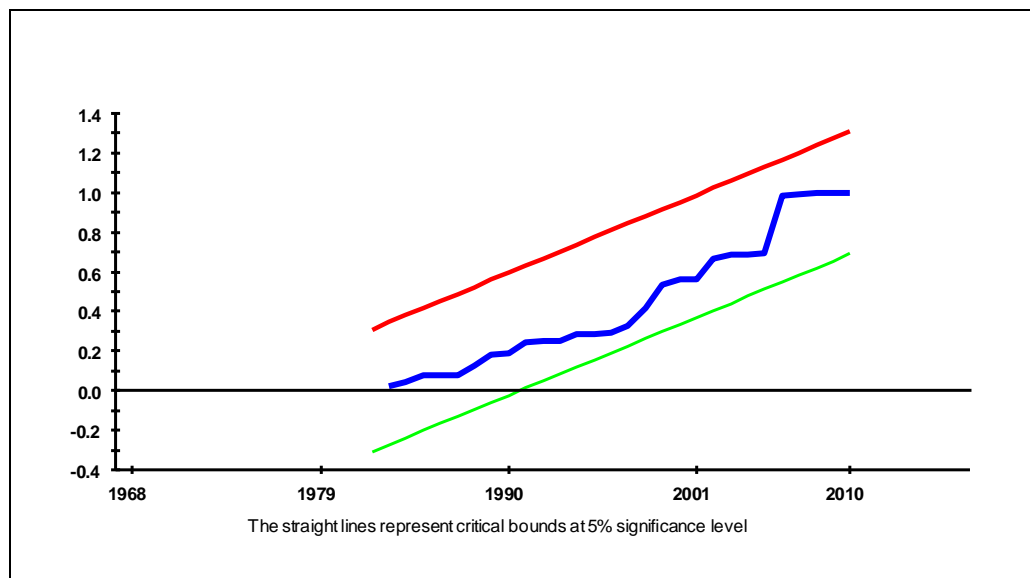


Figure A11: Cumulative Sum of Squares of Recursive Residuals (Investment equation)