FOREIGN AID AND ECONOMIC DEVELOPMENT: AID FUNGIBILITY IN MALAWI

By

MSOWOYA, Chimwemwe Don

THESIS

Submitted to
KDI School of Public Policy and Management
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Professor Kim, Taejong, Supervisor

Professor Lee, Kye-Woo

Professor Choi, Changyong

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ABSTRACT

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This paper sets out to produce credible empirical evidence on aid fungibility in Malawi. To this end, the paper looks at two forms of fungibility namely: substitution of aid for government funding; and whether or not aid is used to reduce taxes effort in Malawi. First and foremost, the paper investigates whether or not aid resources substitute for government funding in three key sectors that traditionally receive the lion's share of Official Development Assistance in Malawi namely; Agriculture, Education and Health sectors. Secondly, the paper also investigates whether or not aid resources substitute for government revenue collection efforts by examining the impact of ODA on tax effort in Malawi. The results of the fungibility analysis reveal that aid fungibility is prevalent most prevalent in the Ministry of Agriculture and not Education and Health. On the other hand, the results of the analysis of the impact of ODA on tax effort in Malawi show that ODA has a positive impact on the tax effort in Malawi which implies that aid resources are not used to substitute for tax revenue.

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LIST OF ABREVIATIONS

AfDB	African Development Bank
AfDF	African Development Fund
AFRODAD	African Forum and Network on Debt and Development
AoD	Aid on Delivery
ASWAP	Agriculture Sector Wide Approach
GBS	General Budget Support
CABS	Common Approach to Budge Support
DAC	Development Assistance Committee
DAD	Debt and Management Division
EC	European Commission
GDP	Gross Domestic Product
HSWAP	Health Sector Wide Approach
IDA	International Development Association
IMF	International Monetary Fund
LDCs	Less Developed Countries
MoF	Ministry of Finance
MTEF	Medium Term Expenditure Framework
NESP	Nationwide Education Sector Programme
ODA	Official Development Assistance
OECD	Organization of Economic Co-operation and Development
SBS	Sector Budget Support
UDF	United Democratic Front
UK	United Kingdom
VIF	Variable Inflation Factors

CHAPTER 1: INTRODUCTION

1.1 BACKGROUND

The term "foreign aid" can denote different interventions, ranging from humanitarian support to military assistance. In this paper, however, it refers to "Official Development Assistance (ODA)" or "aid" that is given to Less Developed Countries (LDCs) in order to increase economic growth and development, and consist of at least a 25% grant component in the total aid disbursed.[1] According to Whitaker (2006), "over the past 50 years, foreign aid has emerged as the dominant strategy for alleviating poverty in developing countries. During this time period major international institutions, such as the United Nations, World Bank, and International Monetary Fund gained prominence in global economic affairs. Yet it seems that sixty years later, the lesser developed countries of the world continue to suffer from economic hardship, raising questions of whether foreign aid is a worthwhile and effective approach to boosting growth and development in poor countries."[2]

Malawi has been a recipient of ODA since its independence in 1964. The share of aid resources in Malawi's national budget fluctuates between 33% and 57%, with project-tied aid constituting the main external source of funding. Throughout most of Malawi's period of independence, the African Development Bank/African Development Fund (AfDB/AfDF), the World Bank International Development Association (IDA), the United Kingdom through the Department of International Development (DFID), Japan through the Japanese Cooperation Development Agency (JICA), European Commission (EC),the United States through United States Agency for International Development (USAID), Ireland through Irish Aid, and

[1] John Degngol-Martinussen, and P. Engberg-Pedersen, "*Aid: Understanding International Development Cooperation*." (London and New York: Zed Books, 2003).

[2] Mark T. Whitaker, 2009. *The Impact of Foreign Aid on Economic Growth.* Diss., Duquesne University, Pennsylvania, 2009, 1-5

Germany through German Agency for Technical Cooperation (GTZ) have traditionally been the main sources of external financial assistance. The main aid instruments that are used in disbursing aid in Malawi are Direct Project Support, Sector Budget Support (SBS) and General Budget Support (GBS). In spite being a long term beneficiary of ODA, Malawi has failed to make headway in achieving impactful economic development. The country has remained much as it was when it attained independence 47 years ago if not worse. The economy remains heavily dependent on agriculture and 80% of the population still live in rural areas.[3] The obvious question would be to ask why the country has not succeeded in breaking the vicious poverty cycle that has long plagued its people despite receiving large inflows of foreign aid.

A critical issue that is widely discussed in the donor community in relation to aid ineffectiveness is aid fungibility." Simply put, aid fungibility is when categorical aid or aid that is earmarked for a certain sector or project (i) substitutes for government funding, (ii) is used to reduce taxes or (iii) is diverted to other unintended sectors.[4] When aid is fungible, its impact on a country's economic growth and development is rendered ineffective. Thus aid fungibility is seen as one of the potential factors contributing to the derailment of the impact of aid in LDCs. Given the potentially adverse effects of aid fungibility on aid effectiveness in aid recipient countries, it is imperative to investigate the extent to which the phenomena exists in the recipient countries in order curtail its negative impact. Thus paper seeks to investigate the existence of the aid fungibility phenomenon in Malawi. More specifically, the paper will seek to establish whether or not foreign aid substitutes for government funding and tax revenue in Malawi. Finally, the paper will endeavor to come up with policy recommendations on how aid can be made more effective in Malawi based upon the findings.

[3] Central Intelligence Agency (US). *The World Fact Book.* Retrieved May 28, 2011 <https://www.cia.gov/library/ publications/the-world-factbook/geos/mi.html>.

[4] Fumiko Tamura, "Spending Substitution or Additional Funding? The Estimation of Endogenous Foreign Aid Fungibility" (Department of Economics, Brown University, Rhode Island, USA, 2005).

1.2 PROBLEM STATEMENT

The rationale behind foreign aid disbursement is to provide developing countries like Malawi with a positive incentive for maximum national effort to increase the rate of economic growth. However, despite six years of registering consistent levels of economic growth, Malawi remains heavily dependent on foreign aid, whose payments account for more than 30% of government income. According to Tarekegn (2002), "One of the main channels through which foreign aid influences development outcomes is through its impact on the recipient country's public expenditures. This link between foreign aid and public expenditure is however, not straightforward, because some part of the aid is fungible."[5] Donors are concerned that instead of being used for economic growth and development, foreign aid is used to finance non-developmental expenditure such as procurement of military equipment, repayment of public debt, cover up for tax reduction, or even leak into politicians' pockets. Consequently, aid fungibility is frequently attributed to donor fatigue and therefore it is a phenomenon that is considered a very fundamental problem for aid recipient countries and donors alike.

Aid fungibility has several detrimental impacts on the effectiveness of aid in developing countries. If indeed aid is fungible, then it becomes very difficult to assess its impact in targeted sectors because of the fact that it becomes complicated and difficult to assess which activities the aid resources ultimately support. Consecutively, this makes it harder for the recipient countries to design ideal policies necessary for economic growth and development. In addition, the assessment of the efficacy of foreign aid becomes very problematical. In Malawi, the potential existence of aid fungibility raises two critical issues. Firstly, to what extent is aid fungible in Malawi? Secondly, which areas or sectors is aid fungibility most

[5] Jifar Tarekegn, "The Impact of Foreign aid on Public Spending: The case of Ethiopia" (master thesis, SCHOOL of Graduate Studies of Addis Ababa University), 3-6.

prominent? Thirdly, how does foreign aid influence tax revenue collection? Previous studies have revealed that a certain percentage of foreign aid is fungible and therefore can weaken domestic revenue collection, but there are other studies that have also found evidence indicating the other way round. However, if aid is indeed fungible, then aid is likely to be ineffective in boosting economic growth, reducing poverty and contributing to overall development. Moreover, if aid fungibility discourages the collection tax, it may propagate or even increase aid dependency in recipient countries.

1.3 STATEMENT OF PURPOSE

The generic purpose of this research study is to produce credible empirical evidence on aid fungibility in Malawi. To this end, the paper will look at two forms of fungibility namely: whether or not aid substitutes for government funding; and whether or not aid is used to reduce taxes effort in Malawi. First and foremost, the paper will investigate whether or not aid resources substitute for government funding in three key sectors that traditionally receive the lion's share of ODA in Malawi namely; Agriculture, Education and Health. Thereafter, the paper will investigate whether or not aid resources substitute for government revenue collection efforts. This will be achieved by investigating the impact of ODA on tax effort in Malawi.

The specific objectives of this paper are to:

- Investigate whether or not Malawi government contribution toward sector funding increases or decreases in response to inflows of ODA.
- Investigate whether or not the tax revenue collection in Malawi increases or reduces in response to inflows of ODA.

1.4 SIGNIFICANCE OF THE STUDY

To date, a significant level of fungibility literature is in existence. However, most of the aid fungibility studies that have been carried out were done using cross-country analysis. Thus, these studies do not clearly assess the effects of foreign aid on funding and spending in individual public sectors within the aid recipient countries.[6] This has been made apparent by the fact that most of the previous cross-country based studies have yielded mixed results on the impact of aid on public sectors spending. Therefore, the only credible way to clearly assess the different impact of aid on the targeted public sectors' spending is to conduct aid fungibility studies in a country specific context.

Surprisingly, there are only a few published studies that have been conducted on the impact of foreign aid in Malawi. The most recent and notable study was conducted by Fagernas and Roberts (2004) where they did a cross country based analysis on overall Fiscal Impact of Aid in Uganda, Tanzania and Malawi from 1970 to 2000. The theme of Fagernas and Roberts' paper is "The impact of aid on public expenditure and other fiscal aggregates in aid-recipient countries, seen as a link in the chain of causality leading from aid to economic growth and poverty reduction."[7] However, their paper does not focus on aid fungibility per se but uses econometric analysis to examine the impact of aid on economic growth in the three countries. Aside from this study, no other published studies on aid fungibility in Malawi exist. Thus, the findings from this study will go a long way in filling the information void on aid fungibility in Malawi.

In addition, fungibility is important in Malawi, because foreign aid constitutes a sizeable component in the country's public finance and expenditure. Thus an investigation into the

[6] Jifar Tarekegn, "The Impact of Foreign aid on Public Spending: The case of Ethiopia" (master thesis, SCHOOL of Graduate Studies of Addis Ababa University), 3-2.

[7] Sonja Fagernäs and Cedrik Schurich. The Fiscal Effects of Aid in Malawi. No. 7. 2004.1-2. http://kms1.isn.ethz.ch/serviceengine/Files/ISN/23406/ipublicationdocument_singledocument/4F08D720-4E42-47BC-8157-D3D995138335/en/esau_wp07.pdf

potential existence of aid fungibility may provide invaluable information about the intricacies of aid on public spending and thus help to lay down a solid platform for policy makers to take appropriate action in managing the fungibility phenomenon. Furthermore, the outcome of this study could be instrumental in implementation of public sector initiatives, monitoring and evaluation and improving public policy design in the area of foreign aid allocation to public spending.

1.5 OVERALL APPROACH AND DATA SOURCES

According to Tarekegn (2002), almost all studies on aid fungibility use an aid fungibility model which "is derived from utility maximization of government's choice for two types' of public goods that are used for consumption and investment purposes. The dependent variable is classified as non-developmental (consumption) and developmental (investment) spending. From the utility maximization of government choice, the model derives explanatory variables for sector specific government spending such as GDP (gross domestic product), sector specific aid and other aid which is given to other sector spending."[8] Such models utilize time series data for a specified period ranging from 20 to 30 years. However, the results from these cross-country regression based studies have produced confusion than robust conclusions. Furthermore, the findings from these studies have contributed little or nothing on the impact of aid fungibility in individual aid recipient countries.

Given the obvious failures of previous empirical approaches to produce useful insights, this study utilizes a less rigorous method of analyzing aid fungibility. The paper will use a simple fungibility analytical framework to examine aid fungibility in agriculture, education and

[8] Jifar Tarekegn, "The Impact of Foreign aid on Public Spending: The case of Ethiopia" (master thesis, SCHOOL of Graduate Studies of Addis Ababa University), 5-6.

health sectors from 1999-2006. Thus, the paper will use a simple regression model to examine the impact of ODA on tax effort in Malawi.

The research study will use secondary data on fiscal aggregates such as total government spending, development expenditure, recurrent expenditure, and ODA inflows. The data will be collected from various official government budget documents and reports and also from credible web-based data-banks which will include but are not limited to: the National Statistical Office of Malawi Data Base; Research Bank of Malawi Data Base; World Bank Data; International Monetary Fund Data Base; OECD Statistics; and Ministry of Finance (Malawi) Data Base.

CHAPTER 2: LITERATURE REVIEW

2.1 FOREIGN AID AND THE DEVELOPMENT DEBATE

Foreign aid can be defined as "the transfer of concessionary resources, usually from foreign government or international institution, to a government or non-governmental organization in a recipient country."[9] Foreign aid is disbursed for a milliard of reasons which include diplomacy, to influence development, for cultural and commercial reasons. Foreign aid resource flows are normally in the form of concessionary loans and grants which may jointly be generally described as ODA. However, this definition omits other concessional aid resources, more especially aid flows from voluntary or private agencies such as non-governmental organization or the civil society at large. More appropriately, the Development Assistance Committee's (DAC) definition of ODA includes grants or loans which are given

[9] Jifar Tarekegn, "The Impact of Foreign aid on Public Spending: The case of Ethiopia" (master thesis, SCHOOL of Graduate Studies of Addis Ababa University), 8-9.

to recipient country on concessional financial terms (for loans, the loan should comprise of at least a 25% grant element) with aim of promoting economic development and welfare. ODA is usually used to finance expenditures intended to induce or encourage economic growth and development in the receiving country such as building of schools and roads, and providing training, education, and heath. It should, however, be noted that there are some commentators that urge that aid the motive behind disbursement bilateral aid is not necessarily to promote economic growth and development in LDCs but rather it is used to promote strategic and political interests of bilateral donors. According to this line of thought, these strategic and political interests include supporting countries whose geopolitical positions are of strategic importance, gaining access to strategic natural resources, and creating and retaining allies.[10]

Developing countries, more particularly Sub-Saharan countries, have been recipients of large amounts of foreign aid since the 1970s because of their inability to finance domestic development projects and programs and the absence of well-established economic and political institutions that can attract foreign direct investments or foreign trade.[11] Generally, foreign aid is advocated as necessary for the promotion of economic development in the least developed countries (LDC's).[12] A more simplified way to view foreign aid is to consider it as a subsidy. In this regard, aid is meant to provide temporary financial assistance to the recipient country in order to encourage certain long-term development traits such as investment in human and physical capital, the establishment of the institutions of a developmental state and revenue collection. However, the debate on the actual impact that foreign aid has had on foreign aid in developing countries has been fraught with disagreement.

[10] AFRODAD. *A Critical Assessment of Aid Management and Donor Harmonization: The Case of Malawi* (2007). http://www.afrodad.org/downloads/publications/Aid%20Mgmt%20Malawi%20Final.pdf
[11] Sandrina Moreira, "Evaluating the Impact of Foreign Aid on Economic Growth: A Cross-Country Study" *Journal of Economic Development 25 vol. 30* (2005), http://www.jed.or.kr/full-text/30-2/J02_702.PDF.
[12] Eroğlu, Ömer and Ali Yavuz, "The Role of Foreign Aid in Economic Development of Developing countries," *Suleyman Demirel University*, http://ces.epoka.edu.al/icme/a14.pdf.

According to Todaro and Smith (2011), on the one hand are economists who claim that foreign aid has promoted growth and structural transformations in many developing countries. Evidence for successful aid is particularly strong in targeted programs with defined objectives, for example in Botswana and South Korea, where foreign assistance supported local development efforts and the countries were gradually weaned off aid. On the other hand are critics who contend that aid fails to promote faster economic growth but may hinder it by replacing investment and domestic savings and by worsening balance of payment deficits as a result of rising debt repayment and the linking of aid to donor-country exports.[13] Indeed, there are many cases where aid has seemingly failed to assist countries in accomplishing their developmental objectives. Instead, it has been contended that the aid has actually distorted expenditure decision-making, discouraged revenue collection and undermined the incentives to build state capacity.[14] Furthermore, some critics charge that foreign aid has been a failure because it has been appropriated by corrupt bureaucrats and has engendered a welfare mentality on the part of recipient nations. The prospect of detrimental effects of aid appears predominantly severe in sub-Saharan Africa, where most countries have now received substantial aid volumes for more than five decades. Views such as these seem to be gaining popular support given the fact that in almost all of sub-Saharan Africa developing countries, little economic development has taken place despite large inflows of foreign aid from developed countries. This is reflected in the persistently high levels of unemployment, indebtedness, absolute poverty and poor economic performance in these developing countries.

[13] M. Todaro and S. Smith, *Economic Development (New York: Addison-Wesley, 2011), 697.*
[14] Todd Moss, Gunilla Pettersson, and Nicolas Van de Walle. "An aid-institutions paradox? A review essay on aid dependency and state building in sub-Saharan Africa." *Center for Global Development working paper 74* (2006): 11-05.

The impact of foreign aid in developing countries has been made more ambiguous by the fact that most of the cross-country regression-based studies that have been carried out have produced baffling rather than robust conclusions. In addition, the literature from these cross-country based studies has little or nothing to contribute when it comes to individual countries.[15] For instance, using cointegration analysis to examine the effectiveness of foreign aid on economic growth in the six poorest and highly aid dependent African countries (Malawi inclusive), Mallik (2008) found evidence of a "long-run relationship between per-capita real GDP, aid as a percentage of GDP, investment as a percentage of GDP and openness." The long-run effect of aid on growth, however, was negative for most of the countries. On the contrary, using Papanek-type regression to evaluate impact on foreign aid on development in developing countries, Moreira (2005) found that aid has less effect on growth in the short-run than in the long-run. Other studies on the impact of aid on economic development in developing countries conducted by Nyoni (2000), Njeru (2003), Phijaisanit (2010) and Quibria (2010) have seemingly yielded mixed results, thus raising suggestions that the impact of foreign aid may differ across countries.

Given the uncertainty surrounding the role and impact of foreign aid in promoting economic development in developing countries, there is need for more country-specific studies in order to better analyze the intricate mechanisms and conditions that allow for the efficient and effective utilization of foreign aid in developing countries' development process.

[15] Ghulam Mohey-ud-din, *"Impact of Foreign Aid on Economic Development in Pakistan,"*(2005) < http://mpra .ub.uni-muenchen.de/1211/1/MPRA_paper_1211.pdf>.

2.3 EMPERICAL LITERATURE

According to Fagernäs and Schurich (2004), existing literature on the fiscal impacts of aid may be divided into two categories. The first is fungibility literature which concentrates on whether aid is spent on those sectors where it was intended, such as agriculture, education and health. The second is fiscal response literature which concentrates on the analysis of the impact of aid on fiscal aggregates such as total spending, tax revenue, public investment, public consumption, domestic borrowing and budget deficit.[16]

Numerous studies have been conducted on both aid fungibility and fiscal responses to aid. However, the issues have been approached in two different ways in most literature. The first approach is largely based on a model that was used by McGuire (1978) and is concentrates on the issue of aid fungibility. "According to this approach, foreign aid is said to be fungible if the recipient country uses the aid resources for purposes other than those intended by the donors. The assumption is that donors intend aid flow to finance specific activities and the question is whether the flow is diverted to other purposes."[17] This simply implies that aid meant for investment is deliberately diverted to government consumption spending, which reduces its impact on economic growth. In his study, McGuire (1978) developed a model of estimating the effect of a subsidy on the receiver's resource constraint with an application to the United States Local Governments. His findings indicate that a large and growing fraction of education grants were fungible. Studies that have adopted this approach include Feyzioglu et al. (1998), Pack and Pack (1990), Khilji and Zampelli (1991), and Swaroop et al. (2000). For instance, Pack and Pack analyzed the fiscal response of aid in Indonesia between 1970

[16] Sonja Fagernäs and Cedrik Schurich. The Fiscal Effects of Aid in Malawi. No. 7. 2004.1-2. http://kms1.isn.ethz.ch/serviceengine/Files/ISN/23406/ipublicationdocument_singledocument/4F08D720-4E42-47BC-8157-D3D995138335/en/esau_wp07.pdf

[17] Badri Prasad Bhattarai Foreign Aid and Government's Fiscal Behavior in Nepal: An Empirical Analysis School of Economics and Finance University of Western Sydney 2007

and 1990 using a variant of the McGuire (1978) type model. Their findings indicated that foreign aid did not reduce domestic revenue collection efforts, but rather stimulated total public expenditure.

The second approach is based on a type of model that was developed by Heller (1975). This approach postulates a government utility-maximizing behavior, and analyses the response of different elements of government expenditure to budget constraint such as foreign aid borrowing and revenue. According to Bhattarai (2007), the approach assumes that "governments set targets for various expenditures and also set revenue targets for tax and borrowing. Then they maximize their goal (economic growth or social welfare) by attaining these revenue and expenditure targets. The assumption here is that the realization of revenue and expenditure targets maximizes the goals. The flow of aid can change either the government's expenditure targets or revenue targets. Government can also adjust its both expenditure and revenue/borrowing targets in response to aid"[18]. In his study, Heller (1975) considered the impact of different types of aid (grant and loan) on several categories of public expenditures such as socio-economic consumption in the public sector, civil consumption in the public sector, public expenditure for developmental purposes, government revenue and domestic borrowing in eleven African countries. His findings indicated that aid increases both government investment and consumption and reduces taxes and domestic borrowing. Heller also found that, grant directly contributes to increased public consumption and indirectly to private consumption by reducing taxes.[19]

[18] Badri Prasad Bhattarai Foreign Aid and Government's Fiscal Behavior in Nepal: An Empirical Analysis School of Economics and Finance University of Western Sydney 2007.
[19] Peter .S Heller,. (1975) "A Model of Public Fiscal Behaviour in Developing Countries:Aid, Investment and Taxation" American Economic Review, 65: 429–45.

Studies that have adopted this approach include Mosley et al. (1987), Gang and Khan (1991), Khan and Hoshino (1992), Franco-Rodriguez et al. (1998), McGillivray (2000), and McGillivray and Ouattara (2003). For Instance, Khan and Hoshino analyzed the fiscal response to aid in five (5) South and South East Asian countries between 1956 and 1976) using a variant of the Heller (1975) type model. Their results indicate that loans are encourage investment more than grants, and that though grants reduced tax burdens, loans increased it. Appendix 1 provides a summary of studies of all the fiscal response models discussed in this paper.

2.4 THEORETICAL FRAMEWORK

This analytical framework is adopted from a study by Gupta et al. (2003) where they examined the foreign aid and revenue response. According to the framework, the relationship between foreign aid and revenues could be viewed in terms of the government's budget constraint in a given period, written as follows:

$$G = T + A + B, \quad (1)$$

where G is government expenditure, T is recurrent revenue, A is aid (comprising both grants and loans), and B is net domestic borrowing (countries are assumed to have no access to non-concessionary foreign borrowing). Thus, in response to an exogenous increase in aid, a government could either:

(i) Reduce the tax effort,

(ii) Increase expenditure,

(iii) Adjust downward domestic borrowing in order to meet budget constraints, or

(iv) Choose a combination of (i) through (iii).

In the first instance, the government chooses to pass the benefits of higher inflows to the private sector by reducing the tax effort. At the extreme, the government could decide to reduce the effort by the entire amount of the aid while holding aggregate public expenditure (G) and borrowing (B) constant. In an extreme case, this behavior can cause the tax effort to decline by the full amount of aid inflows. [20]

Under the second scenario, where expenditures increase in response to increase in aid, tax effort may either increase or decrease depending on the form aid takes and on the magnitude of the response of expenditures to aid. If the increase in expenditures is smaller than the increase in aid (which implies that the aid is fungible), holding domestic borrowing unchanged (B = 0), tax effort would decline. If the expenditures increase greater than the increase in aid, tax revenue should increase. Finally, consider the implications of a third scenario, where aid induces a decrease in domestic borrowing. In this scenario, the government chooses not to spend foreign aid resources. This may be the case when the government decides to increase deposits in the banking system in order to release resources for the private sector.

2.5 AID AND FISCAL POLICY IN MALAWI

2.5.1 Macroeconomic Background

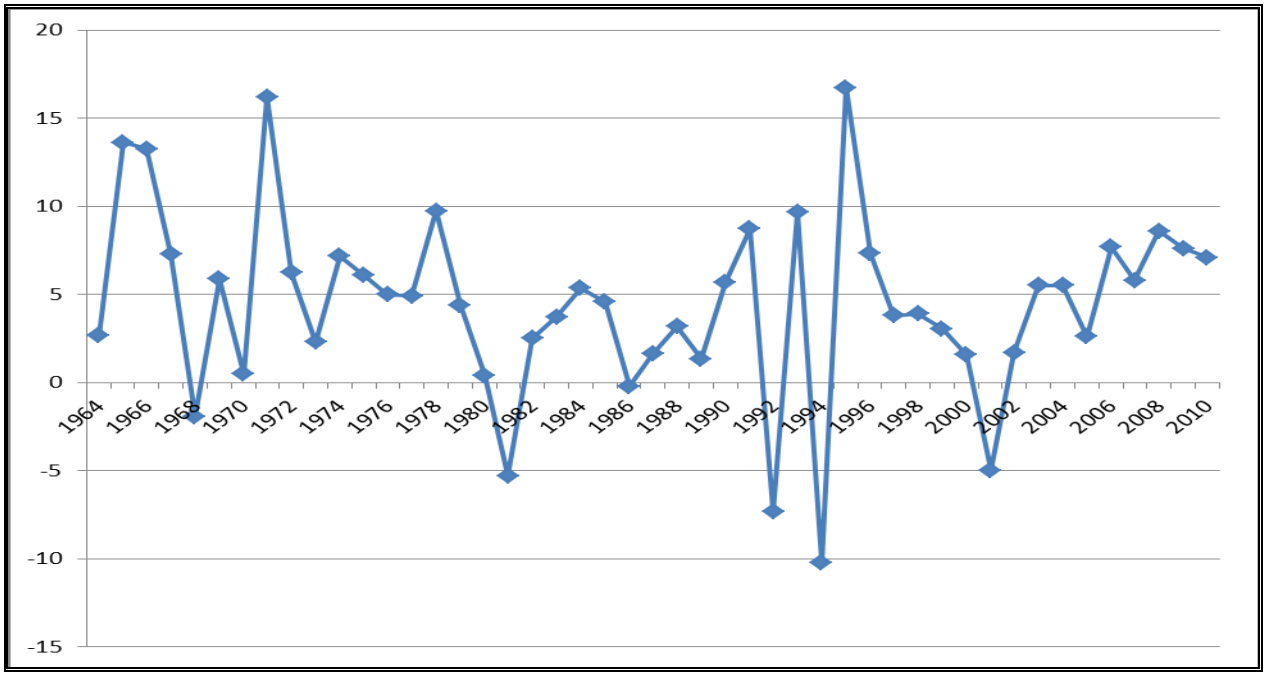
Malawi is a land landlocked country in the Southern Africa. It ranks among the world's least developed countries. The economy is heavily dependent on agriculture which accounts for more than 70% of GDP and 90% of export revenues. In addition, the economy is highly dependent on ODA from the World Bank, Africa Development Bank, International Monetary Fund, and other bilateral and multilateral donor nations. Malawi gained its independence in

[20] Sanjeev Gupta, Pivovarsky, Alexander, Benedict J. Clements, and Erwin Tiongson. Foreign aid and revenue response: does the composition of aid matter?. Vol. 3. International Monetary Fund, 2003.

1964 under a one party system (dictatorship) that was led by the Dr. Hastings Kamuzu Banda. Since gaining independence, macroeconomic stability has remained very elusive. For the most part, the country's macroeconomic background has been characterized by unstable GDP growth, persistent budget and current account deficits and high inflation and interest rates. [21]

In the 1970s, economic growth averaged about 7% per year. By historical standards, the GDP growth rates were quite high in this period with most of the resources that financed GDP and investment growth coming from international capital markets. A large share of these external resource inflows were in the form of non-concessional loans, though donor grant inflows were relatively low. However, the country's strong growth rates took a down turn in the 1980s.

Figure 2.1: MALAWI GDP Growth Rate Annual Percentage (1964-2010)

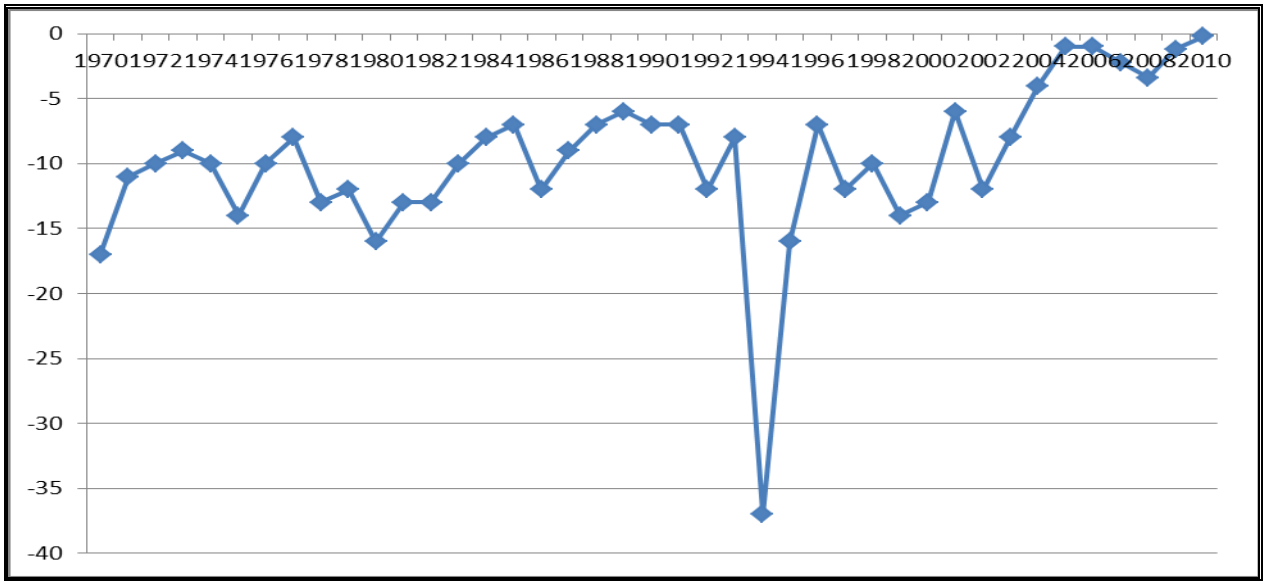


Source: World Bank

[21] Sonja Fagernäs and Cedrik Schurich. The Fiscal Effects of Aid in Malawi. No. 7. 2004.1-2. http://kms1.isn.ethz.ch/serviceengine/Files/ISN/23406/ipublicationdocument_singledocument/4F08D720-4E42-47BC-8157-D3D995138335/en/esau_wp07.pdf

Beginning in 1979, the country was hit by a series of internal and external shocks comprising of the global recession, falling tobacco prices on the world market, rising oil prices, and weak domestic economic policies.[22] In addition, between 1979 and 1981, Malawi lost its primary trade route that was used to transport about 80-90% of exports and imports, due to the closure of the railway line neighboring Mozambique and this led to a sharp rise in transport costs.[23] Consequently, the average growth rate dropped from a healthy 7% in the 1970s to about 2%. The situation was worsened by the fact that between 1978 and 1982, external debt servicing doubled to 28% of current expenditure which forced the country to reschedule its debt service obligations (IMF, 1997). This led to a deterioration of the budget and current account deficits despite government efforts to increase tax revenue to service its external debts.

Figure 2.2: Malawi Budget deficit (including Grants) as a share of GDP (1970-2010)



Source: IMF, MoF

Starting in 1981, Malawi undertook the first structural adjustment programme which was supported by the World Bank and International Monetary Fund. Not surprisingly, most of the

[22] Tobacco has always been Malawi's main export and therefore it is the main source of foreign currency
[23] Sonja Fagernäs and Cedrik Schurich. The Fiscal Effects of Aid in Malawi. No. 7. 2004.1-2. http://kms1.isn.ethz.ch/serviceengine/Files/ISN/23406/ipublicationdocument_singledocument/4F08D720-4E42-47BC-8157-D3D995138335/en/esau_wp07.pdf

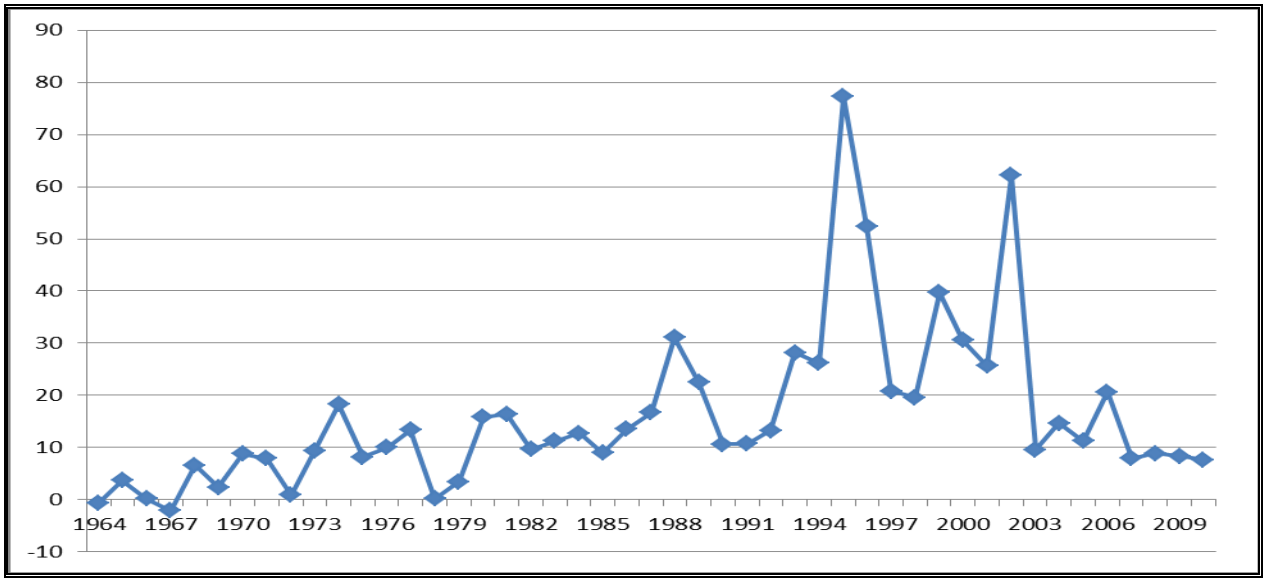
reforms were targeted at reforming agricultural sector. Following the reform, most of the pricing and agriculture marketing policies were gradually liberalized. However, despite these reforms, growth in the 1980s was still elusive mainly because of declining in the terms of trade, erratic implementation of the reforms, and a narrow agricultural production base.

Malawi started a transition to democracy in the early 1990s. This led to a significant rise in the number of donors and aid inflows. In the 1990s, IMF and World Bank policies attempted to focus on poverty reduction. The country also embarked on the second round of structural adjustment programmes which included domestic markets liberalization, reforms in trade, and privatization of parastatals. Despite the reforms, economic growth remained elusive between 1990 and 1994, averaging about 1.3% per year. The deteriorating economic conditions were further worsened by two major droughts (between 1992 and 1994), declining of tobacco prices on the world market and unrestrained spending in the final year of Dr. H. K. Banda's dictatorial regime.

According to an IMF Report (1997), in 1994, Malawi became a democratic state and held the first elections in its history. The elections were won by the United Democratic Front (UDF) party which was then led by Malawi's first democratically elected president, Dr. Bakili Muluzi. However, the new government came in at a time when the country was experiencing drought which compelled it to maintain high expenditure on drought relief. Worse more, in 1995, donors froze aid commitments in response to the loss of fiscal control by the government at the end of Dr. Banda's regime hence aid inflows dropped significantly. During this time, the budget deficit shot up to 37% of GDP (highest deficit on record to date) and inflation rose to about 79%.[24]

[24] International Monetary Fund (1997) Malawi – Recent Economic Developments, IMF Staff Country Report No. 97/107, IMF, Washington, DC

Figure 2.3: Inflation Rate in Malawi (1964-2010)



Source: World Bank

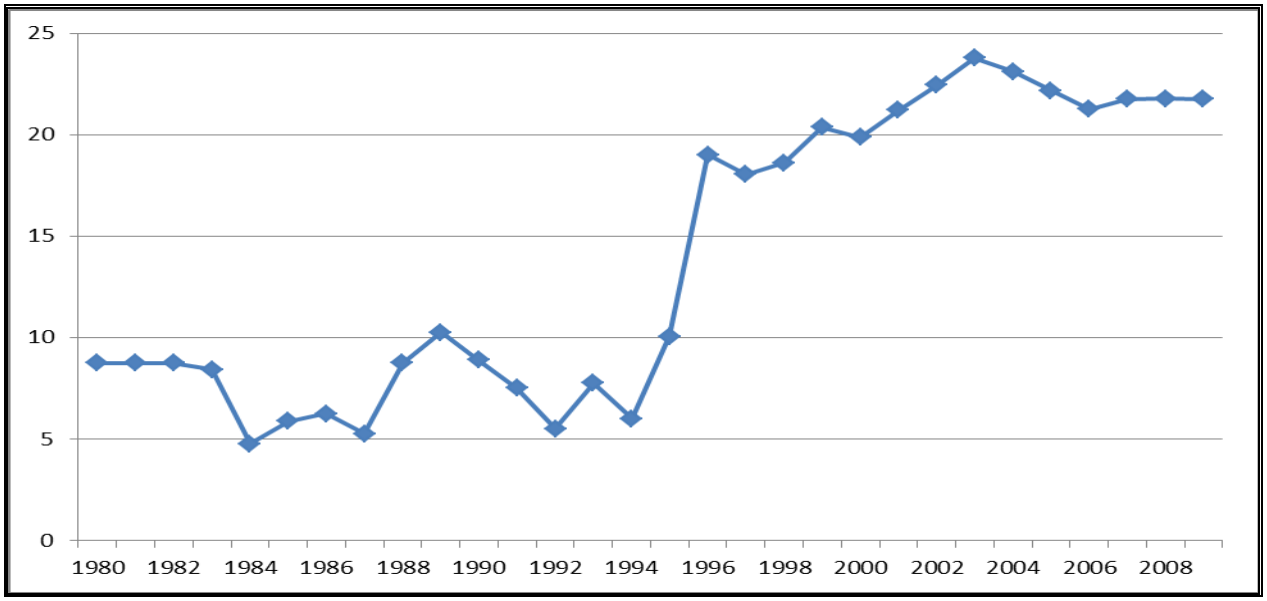
To its credit, the newly elected government was quick to respond to the deteriorating economic situation and managed to bring down the budget deficit to 7.5% of GDP and inflation to 8% by 1997. This was achieved through the introduction of a Medium Term Expenditure Framework (MTEF) in 1995 which gave Government Ministries a three-year resource basket to be spent according to medium-term strategies that were prioritized at the time. Furthermore, the introduction of a Cash Budget System in 1996 compelled Ministries to spend within the resources that were allocated to them which assisted government to keep expenditure in check.[25]

However, the fiscal deficit began to spiral out of control again in 1997, mostly owing to administrative failures in tax collection which led to lower revenue growth. Public expenditure in preparation to the 1999 elections also exacerbated the fiscal deficit. The macroeconomic situation further deteriorated when the country experienced droughts in 2001 and 2002. The situation was further compounded by the suspension of financial assistance by

[25] Sonja Fagernäs and Cedrik Schurich The Fiscal Effects of Aid in Malawi Economic and Statistics Analysis Unit Overseas Development Institute/Department for International Development, UK.

IMF and bilateral donors in 2001 and 2002 respectively due to fiscal mismanagement. Macroeconomic performance between fiscal years 2002 and 2003 was not satisfactory, but it improved significantly in 2004. Weak fiscal performance during this period brought the country to the verge of a financial crisis. The government ran large fiscal deficits of more than 6% of GDP in each fiscal year. Worse more, this period saw a substantial reduction in foreign budgetary aid which meant that the deficits had to be financed using domestic (borrowing) resources. The resulting increase in government borrowing (from local banks) pushed up interest rates to a record high of 24%. In addition, economic growth was significantly hindered by the impact of HIV and AIDS whose prevalence rate had reached 13% (MoF Report, 2006).

Figure 2.4: Interest Rate in Malawi (1980-2008)



Source: World Bank

The election of President Bingu wa Mutharika in 2004 brought significant improvements in economic management in Malawi. The new government adopted a policy of zero tolerance on corruption and upheld the principles of rule of law, thus ushering the country into a new era of sound governance and prudent economic policies that won back the support and confidence of donors (MoF, 2006). The country's economic growth also improved, averaging

6.5% between 2004 and 2008, compared to just 3.3% in the period between 1996 and 2005. In 2008, the economy grew by 9.7% in real terms compared to the 7.9% the previous year. The strong economic performance was largely attributed to good performance in agriculture production that was brought about by weather and the government's fertilizer subsidy for smallholder farmers who contribute 70% of agricultural GDP. In addition, inflation stood at 8.7%, sustaining single digit levels that were attained in 2007. The rate of inflation has been declining since 2005, due to the controlling in fuel and food prices and restrained credit growth.[26]

Despite the remarkable macroeconomic performance of recent years, Malawi is still very much susceptible to external shocks, particularly in terms of oil prices, due to high imports volumes and its geographical location (Malawi is a land locked country). Because the Malawi's economic is predominantly agricultural, its economic performance is at the mercy of weather conditions leaving it ever more exposed to climate change. Furthermore, the government faces a number of critical challenges chief among which satisfying foreign donors, dealing with environmental problems, development of a market economy, dealing with rampant corruption, dealing with the rapidly growing problem of HIV/AIDS and improving health care and educational facilities.

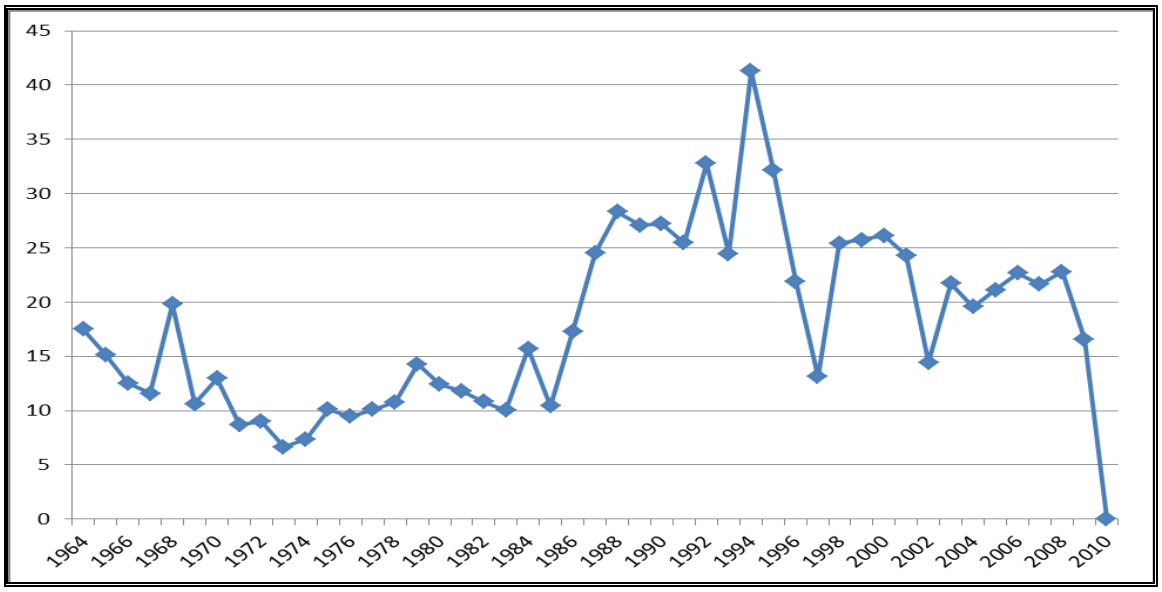
2.5.2 External Assistance in Malawi

Since independence, Malawi has been heavily reliant on external assistance to finance a large share of the government's development and deficit budgets. For instance, in the 2006/2007 fiscal year, ODA accounted for 80% of the development budget and 45% of the total budget for the Malawi Government. A visual inspection of figures 4.4 and 4.5 seems to indicate that

[26] Van Klaveren, Maarten, Kea Tijdens, Melanie Hughie-Williams, and N. Ramos Martin. "An overview of women's work and employment in Brazil." (2009). www.ituc-csi.org/IMG/pdf/Country_Report_No6-Malawi_EN.pdf

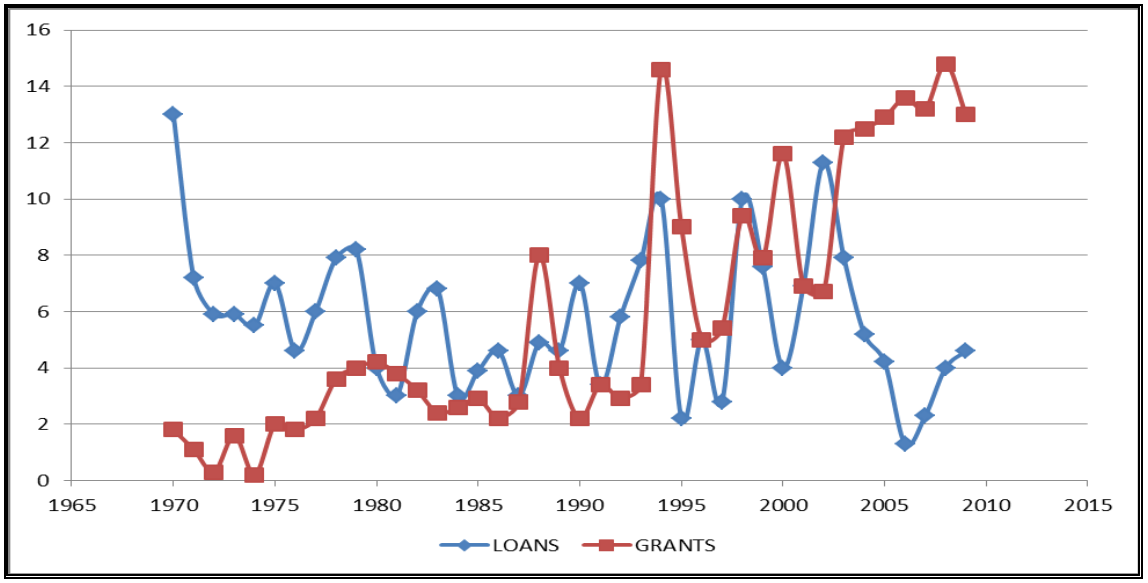
for the most part, ODA grants and loans are positively correlated. Between 1980 and the early 2000s loans and grants had crudely equal shares of GDP. Throughout this period, grants had been on the rise and much less volatile than loans which seem to have been very volatile. Beginning the early 2000s, grants have generally followed an upward trend as opposed to loans which seem to have been on a downward spiral.

Figure 2.4 ODA as a share of Malawi's Gross National Income (1964-2010)



Source: World Bank

Figure 2.5: Grants and Loans as a share of GDP in Malawi



Source: IMF, MoF

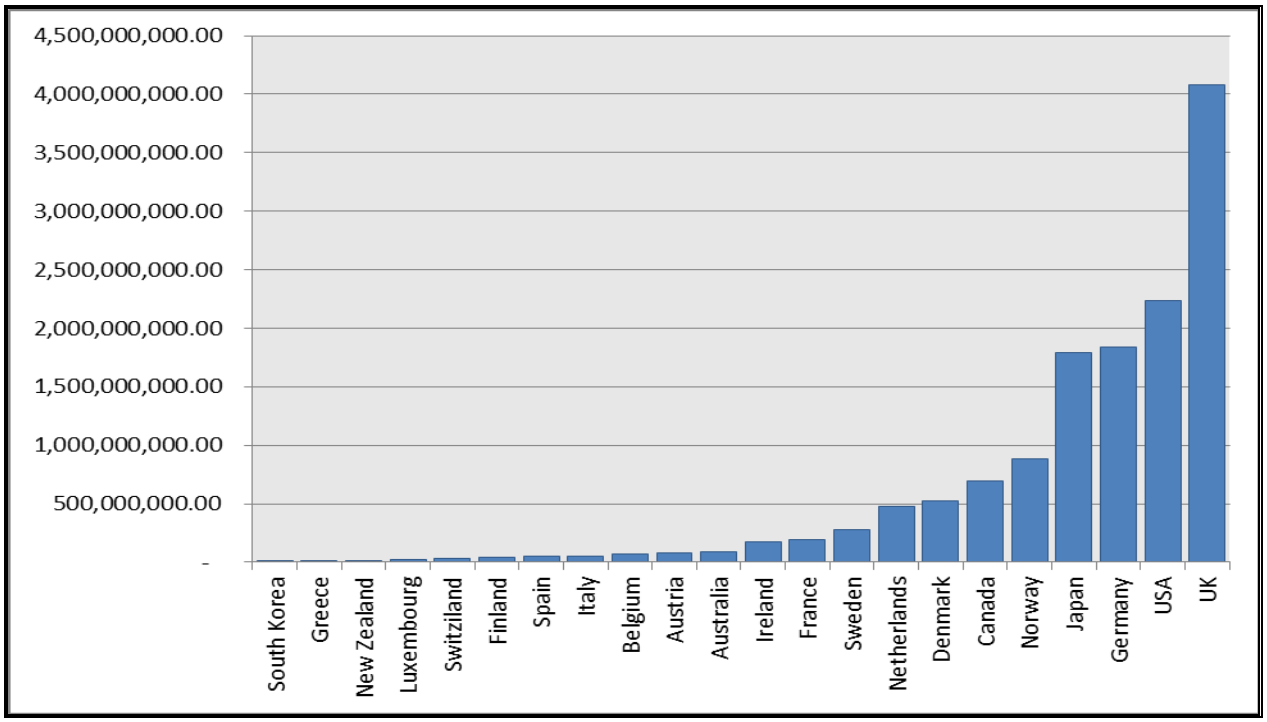
After bieng governed by a single-party system for three decades, a new government was elected into power in 1994 following the Malawi's first ever free and fair democratic elections. The change to a democratic sytem of government led to renewed aid commitments by blateral and multilateral aid agencies. Consequently, a number of donor agencies opened representative offices to in order to encourage closer discourse and to monitor implementation of programmes that the aid agencies supported. Since then, aid inflows to Malawi have varied within the ranges of USD 375 million to USD 550 million (MoF, 2010).[27] According to this report, the fluctuations are attributed to delays in project implementation and subsequent disbursements, by increased aid flows in response to major droughts – in the form of quick-disbursing emergency-type programmes, and by significant fluctuations in balance of payments support/GBS budget support associated with policy reform conditions.

2.5.3 Aid Disbursement Modalities in Malawi

In the 47 years that Malawi has been receiving foreign assistance, the largest donors have been the European Community. The UK by far remains Malawi's largest bilateral donor. However, Canada, Japan, Norway, Germany, USA, African Development Bank/African Development Fund (AfDB/AfDF) International Development Association (IDA) and have also contributed substantially to aid flowing into Malawi. Aid from these donors is comprised of disbursements that are made directly to government through project and budget support and those disbursements that are overseen by the donors themselves or through Non-Governmental Organizations (NGOs).

[27] Malawi Government, Ministry of Finance. *A Country Evaluation of the Paris Declaration for Malawi,* 2010. 9-6. www.oecd.org/countries/malawi/47655679.pdf

Figure 2.6 DAC Countries Contribution 1970-2009 (in US Dollars)

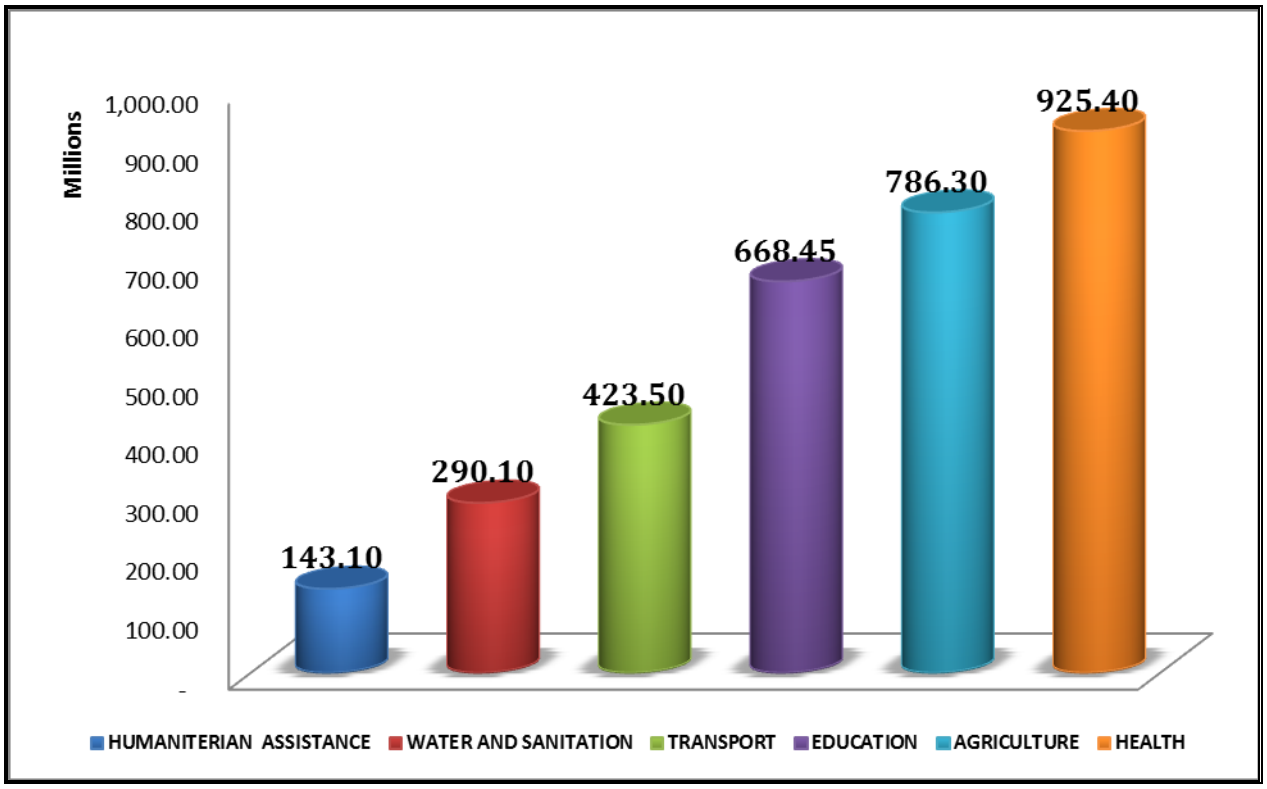


Source: World Bank

Throughout the period Malawi has been receiving development assistance, foreign aid has been equally spread between bilateral and multilateral aid (See Appendix 2A). According to Ministry fo Fiance Report (2010), Multilateral finance started in the mid 1980s by the World Bank through a series of structural adjustment operations that were a continuation of policy-based lending. Roughly 30% of multilateral lending has been provided as General Budgetory Support (GBS), while the other 70% has been in the form of project investment lending in sectors like health, road transport, education, and water supply, as well as emergency relief type operations.[28]

[28] Malawi Government, Ministry of Finance. *A Country Evaluation of the Paris Declaration for Malawi*, 2010. 9-6. www.oecd.org/countries/malawi/47655679.pdf

Figure 2.7: Aid Allocation in selected sectors in millions of USD (1995-2009)

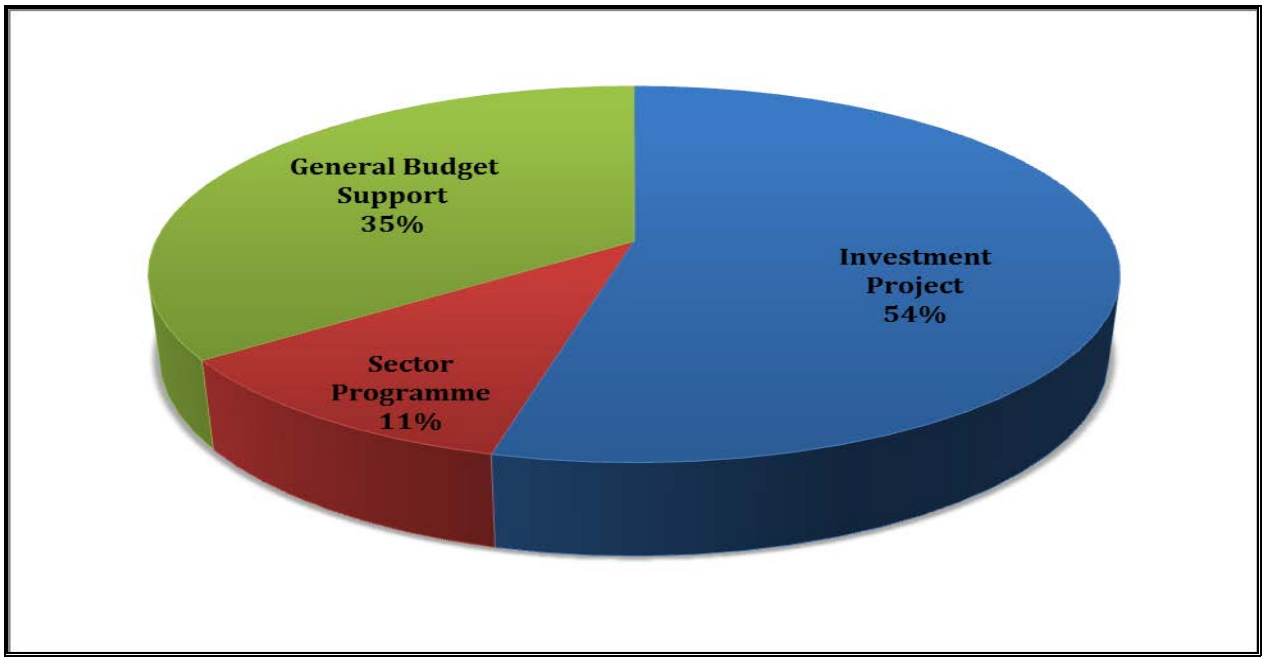


Source: OECD DAC CRS Database (2010)

With regard to the aid modalities, GBS became a more dominant channel of aid disbursement from the year 2002. Prior to 2002, most of the aid was through project support. Nevertheless, project support has continually risen since the 1990s. This is because donors have a bigger role in managing project aid compared to GBS. More importantly, project aid seems to have been more consistent than GBS because it has not been severely affected by political developments as compared to GBS (See Appendix 2C). It is important to note that most governments prefer GBS because it gives them flexibility in the way they can spend the aid funds. In addition, because GBS is channeled through the government financial system, it goes a long way in strengthening the public financial systems. However, donors prefer project support because of their skepticism about government commitment to spend aid funds on earmarked activities. Aside from the lack of confidence in the Malawi government's procurement accounting system, most donors fear that aid funds may be pocketed by corrupt

government officials and that is why most of the donors set up separate Programme Implementation Units (PIUs).[29]

Figure 2.8: Aid Modalities (1995-2009)



Source: OECD DAC CRS Database (2010)

To put this dichotomy of aid modalities into perspective, in the 2008/09 financial year, GBS constituted only 21% of total aid flow. On the other hand, direct project support constituted 56% of total funding while the remaining 23% was pooled funding[30].

As far as aid by themes is concerned, the breakdown received in 2008/09 shows that the most of the funding went to the Social Development theme, taking up 44% of total aid. Improved Governance was the second most funded theme (30%), followed by Sustainable Economic Growth (15%), Infrastructure Development (6%) and Social Protection and Disaster Risk Management taking up (5%). Within Social Development, the sector that has traditionally attracted most of the donor funding is Health. The aid resources that the Health

[29] AFRODAD. *A Critical Assessment of Aid Management and Donor Harmonization: The Case of Malawi* (2007). http://www.afrodad.org/downloads/publications/Aid%20Mgmt%20Malawi%20Final.pdf

[30] Pooled Funding or Busket funding is joint funding by a number of donors of a set of activities through a common account, which keeps resources separate from all other resources intended for the same purpose.

Sector receives include pooled funding for the Health Sector Wide Approach Programme (HSWAP). Within the same theme, the Education attracts the second largest portion of aid through the Nationwide Education Sector Programme (NESP). Within Sustainable Economic Development, the sector that traditionally attracts most of the donor funding is Agriculture since Malawi has a predominantly agriculture based economy. This sector includes budget funding for the Agriculture Sector Wide Approach Programme (ASWAP). In their totality, the HSWAP, NESP and ASWAP consume the largest share of donor aid funding.

In as far as aid coordination is concerned, the Ministry of Finance, through its Debt and Aid Management Division (DAD), is the main government agency responsible for the overall coordination of aid and its effectiveness. This responsibility is undertaken in collaboration with the Ministry of Development Planning and Cooperation. Thus far, the country has made a lot of headway in coming up with clear national priorities and, in the formulation of national and sector programmes such as the HSWAP, ASWAP and NESP. The country has also adopted the Medium Term Expenditure Framework and the Common Approach to Budget Support (CABS) that is mostly utilized by Norway, Britain through DFID, European Union and Sweden. This approach is expected to help improve the coherence and coordination of donor responses to national needs (AFRODAD, 2007). Other mechanisms in coordination efforts and management of aid resources efforts included holding frequent meeting with donors and Ministers of key Ministries.[31]

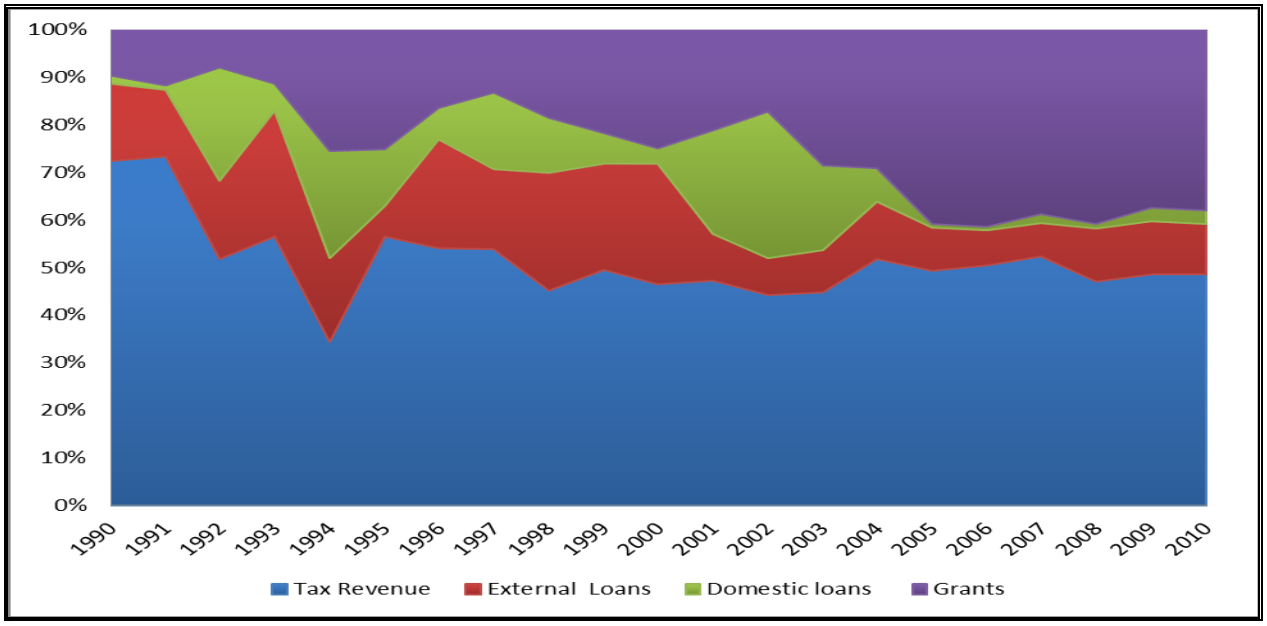
2.6 GOVERNMENT REVENUE AND EXPENDITURE TRENDS

Since gaining independence, Government revenues have widely fluctuated between 15% and 25% of GDP with the only exception being in 1994 when revenue rose to about 59% of GDP due to political elections (See Appendix 2D). Since the 1980s, grants and foreign loans

[31] AFRODAD. *A Critical Assessment of Aid Management and Donor Harmonization: The Case of Malawi* (2007). http://www.afrodad.org/downloads/publications/Aid%20Mgmt%20Malawi%20Final.pdf

consisted of about 15% each. However, beginning from the 1990s, grants began to increase due to a surge in the number of donors that were willing to give aid to a democratically elected Malawi government. Since then, grants have averaged about 10% of GDP as compared to loans which have averaged only 6%. Domestic revenue as a share of GDP increased from around 15% in the 1970s to over 20% in the 1980s which indicates that tax effort had increased. However, during the 1990s, the percentage declined to an average of 18% of GDP. In fact, between 1990 and 2010, domestic revenue as a share of GDP averaged 18% which indicates that the tax effort has not improved since 1980s.

Figure 2.10: Government Revenue by classification (1990-2010)

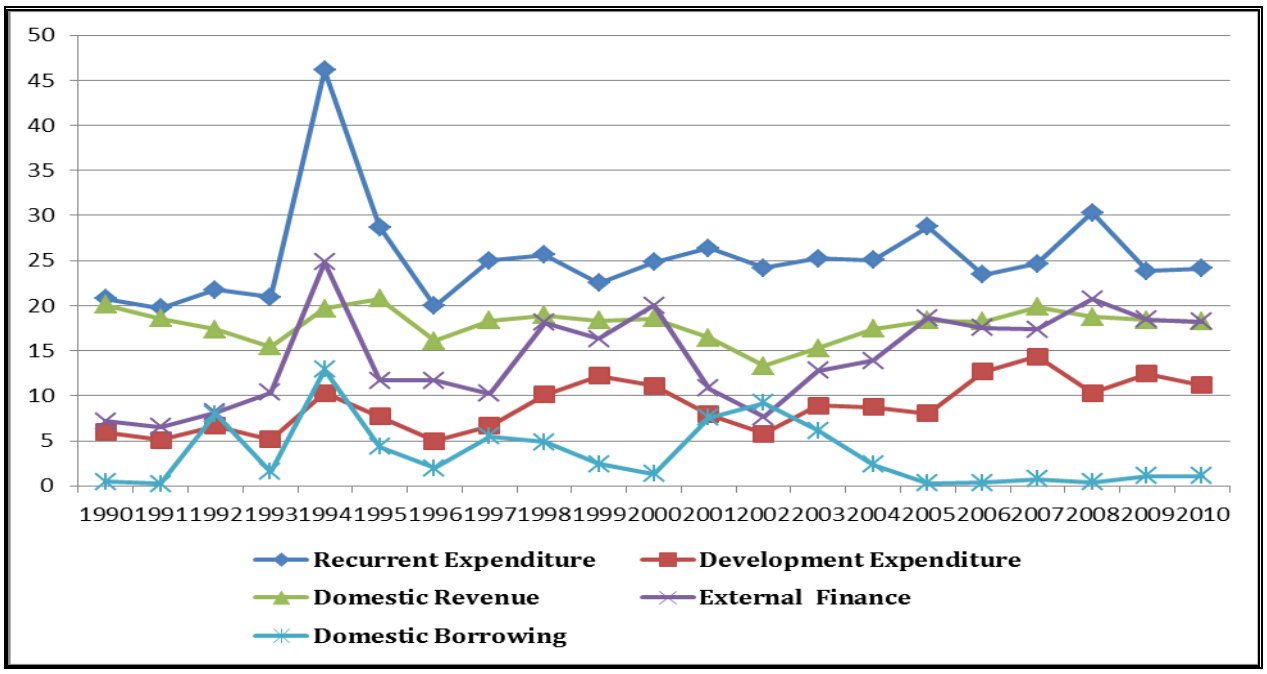


Source: *Ibid*

Total expenditure has fluctuated also widely between 20% and 40% of GDP throughout the period (See Appendix 2E). The only outlier was in 1994 where excessively high spending was as a result of uncontrolled fiscal spending in the last months leading to the first democratic elections and severe drought that the country experienced. However, the composition of government expenditure has changed over the years Total Government spending was classified based on economic and functional criteria, and comprises of other recurrent expenditure (ORT) and development expenditures. The ORT component in total

government spending declined throughout much of the 1970s from 70% to about 50% but was followed by an rising trend until the early 1990s.

Figure 2.11: Expenditure and sources of finance as shares of GDP



Source: World Bank, IMF, MoF

According to Fagernäs and Roberts (2004), "this supports the argument in favour of the alternative theoretical formulation for the budgetary process, where different sources of finance are used for entitlement and discretionary expenditure". The relationships observed suggest that most of the ORT expenditure is financed using domestic resources, while development expenditure is to a larger extend financed by external resources

CHAPTER 3: MODEL SPECIFICATION AND METHODOLOGY

3.1 MODEL SPECIFICATIONS

3.1.1 Analytical Framework for Fungibility

From the theoretical framework that was discusses in Chapter 2: Section 2.4, the government accounting formula is represented by:

$$G = T + A + B, \quad (1)$$

where G is government expenditure, T is recurrent revenue, A is aid (comprising both grants and loans), and B is net domestic borrowing (countries are assumed to have no access to non-concessionary foreign borrowing). For purposes of this study, however, I shall rearrange this identity as

$$G = R + A \quad (2)$$

Where the simplification of R is the sum of recurrent revenue (T) and domestic borrowing (B). Equation 2 falls short of revealing dynamic impact of aid on fiscal aggregates. However it makes it possible to look at the simple influence of aid and domestic revenue on government expenditure. Equation 2 suggests that a rise in aid may be used to either increase government expenditure (G), or may be used to substitute for domestic revenue (R) while holding government spending constant, or a combination of both. However, the overal impact of aid on government spending depends on the combined impact of domestic revenue and aid. For instance, if government expenditure rises by more than the rise in aid, an increase in domestic revenue is needed to finance the deficit.

The point of interest here is to find out how domestic revenue responds to increases in aid. In an ideal situation, domestic revenue and aid should rise simultaneously in order to have meaningful impact in the target sector. However, the government may decide to substitute domestic revenue with aid thereby reducing the net expenditure in that particular sector. In an extreme case, the government may decide to substitute domestic resources with the full amount of aid. In both cases, aid would be said to be fungible.

In order to determine the response of the Malawi Government to changing inflows of aid, the paper will use the following equation:

$$\Delta G = \Delta R + \Delta A \quad (3)$$

Where ΔG is the change in government expenditure, ΔR is the change in recurrent revenue (government contribution), ΔA is aid (donor contribution). In the event that fungibility exists, it would be expected that ΔR would increase in response to a decrease in ΔA for a particular sector. Similarly, it would be expected that ΔR would decrease in response to an increase in ΔA.

3.1.2 Model for Estimating Impact of Aid on Tax Revenue

In order to empirically examine the actual effects of ODA on government tax revenue collection, a more statistically rigorous method of analysis is required. Thus, the study will adopt and utilize a regression model that was used by Gupta et al. (2003) in an IMF paper that analyzed the effects of foreign aid on revenue response in several countries. The model is expressed as follows:

$$[T/GDP]_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 TRADE + \beta_4 SIZE + \beta_5 F + \beta_6 L + \varepsilon_{i,t} \quad \text{……..(4)}$$

Where, ***T/GDP*** is tax revenue as a share of GDP, ***F*** is share of grants flows as a share of GDP, and ***L*** is for loans flows expressed as share of GDP. To control for the structure of the economy, the model includes agricultural value added ***(AGR)*** and industry value added ***(IND)***; openness ***(TRADE)*** expressed as the sum of exports and imports in percentage of GDP; and the level of economic development ***(SIZE)*** expressed as real income per capita. For this study, however, different variations of the above model will be run in order to consistently examine the impact of ODA on the tax effort in Malawi. These variations are as follows:

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 SIZE + \beta_4 TRADE + \beta_5 ODA + \varepsilon_{i,t} \quad \text{…….……...(5)}$$

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 TRADE + \beta_4 SIZE + \beta_5 F + \beta_6 L + \varepsilon_{i,t} \quad \text{……...…(6)}$$

Where **LnTGDP** is the natural log of tax revenue as a share of GDP, Imports **(IMP)** and exports **(EXP)** are disaggregated from TRADE and represent openness of the economy, Official Development Aid (**ODA)** is comprised of both grants and loans.

3.2 METHODOLOGY

3.2.1 FUNGIBILITY TESTS

The main issue being investigated here is aid fungibility. More specifically, I want to find out if the Malawi Government takes advantage of aid inflows to reduce the amount of domestic resources that are allocated to each of the Ministries under review. Thus the main hypothesis that is being tested is:

- Government contribution increases in response to a reduction in aid inflows in a particular sector
- Government contribution decreases in response to a reduction in aid inflows in a particular sector

In order to examine the response, data on expenditure, domestic revenue and donor support (aid) spanning from 2000 to 2010 was collected for three key ministries that receive a lion's share of aid in Malawi namely: Ministries of Agriculture, Health and Education. From the data, the percentage composition of government revenue and aid in the total budget of each ministry was calculated. Thereafter, percentage changes were calculated in each subsequent year and the results were plotted in a graph to more visually expose the pattern that each of the variables follows after each subsequent round of funding and expenditure. In addition, the results were then subjected to a correlation test to see how domestic revenue was related to aid in each of the years under review. The data that used to calculate the percentage changes can be found in Appendix 3.

3.2.2 IMPACT OF ODA ON TAX EFFORT

The main issue being investigated in this section is the impact of aid on the tax effort in Malawi. If aid is fungible, then it may reduce the tax effort because the government may decide to substitute tax revenue with aid resources. Furthermore, it is theorized that given their nature, grants are expected to reduce domestic resource mobilization because they are never repaid. However, loans are expected to stimulate domestic revenue mobilization because the government has to repay the loans and so it needs to generate resources domestically. Thus the hypotheses that will be tested are:

- ODA has a negative impact on tax revenue

- Grants have negative impact on tax revenue
- Loans have a positive impact on tax revenue

To achieve this, various data on tax revenue, Real Per-capita Income, Agriculture and Industrial value added, Import and Exports, ODA, Grant and Loans were collected spanning from 1976 to 2009. The data was subjected to a series of tests in order to ascertain whether or not the data meets the assumptions of OLS regression:

i. Linearity: The relationships between the predictors and the outcome variable should be linear (See Appendix 3.4).

ii. No perfect Collinearity: Collinearity (or multicollinearity) is a situation where the correlations among the independent variables are strong. Multicollinearity deceptively bloats the standard errors thus making some variables statistically insignificant while would otherwise be significant. In order to test for multicollinearity, variance inflation factors (VIF) are used. VIFs measure how much the variance of the estimated coefficients is increased over the case of no correlation among the X variables. If no two X variables are correlated, then all the VIFs will be 1. If VIF for one of the variables is around or greater than 5, there is collinearity associated with that variable. The results of the test indicate that the VIF for all equations ranges from 2.19 to 2.47 indicating marginal levels of multicollinearity (See appendix 3.6).

iii. Homogeneity of variance (Homoscedasticity): The error variance should be constant. If the error terms do not have constant variance, they are said to be heteroscedastic. To test for heteroscedasticity, the Breusch-Pagan / Cook-Weisberg test was done. The Breusch-Pagan / Cook-Weisberg tests the null hypothesis that the error variances are all equal versus the alternative that the error variances are a multiplicative function of one or more variables. A large

chi-square indicates that heteroscedasticity is present. The results of the test indicate that equations (3) and (4) have a considerably large chi-square as opposed to equations (1) and (2) (See appendix 3.5) indicating the presence of heteroscedasticity. Heteroskedasticity causes standard errors to be biased which in turn violates the assumptions of OLS which assume that errors are both independent and identically distributed. To correct for heteroscedasticity, robust standard errors were used in all equations. Robust standard errors relax either or both of the aforementioned OLS assumptions hence when heteroskedasticity is present, robust standard errors tend to be more trustworthy. To attain robust standard errors, robust regressions were run for all the equations.

Analyzing the data to ascertain whether or not the data meet the assumptions of OLS regression is important because if the data do not meet the assumptions then the results may be misleading.

Having done these tests, four regressions were run:

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 SIZE + \beta_4 TRADE + \beta_5 ODA + \varepsilon_{i,t} \quad \text{…….....(5)}$$

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 IMP + \beta_4 EXP + \beta_5 SIZE + \beta_6 ODA + \varepsilon_{i,t} \quad \text{…(6)}$$

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 TRADE + \beta_4 SIZE + \beta_5 F + \beta_6 L + \varepsilon_{i,t} \quad \text{…….(7)}$$

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2\ IND + \beta_3 IMP + \beta_4 EXP + \beta_5 SIZE + \beta_6 F + \beta_7 L + \varepsilon_{i,t}.(8)$$

Because the dependent variable is nonnegative and positively skewed, a log transformation of the dependent variable was estimated in all equations. The data are expressed in percentage of GDP.

CHAPTER 4: RESULTS OF FUNGIBILITY ANALYSIS AND ESTIMATIONS

4.1 FUNGIBILITY ANALYSIS IN THE MINISTRIES OF AGRICULTURE, HEALTH AND EDUCATION

The fungibility analysis used revenue and expenditure data from 2000 to 2010 which was compiled from Malawi Government budget documents and expenditure reports. The choice of the period of study was based on the availability of credible data. The analysis used three main variables namely Government Expenditure (G), Government contribution to a particular sector (R), and Donor contribution to a particular sector.[32]

For the actual analysis, percentage changes in each year were calculated for each of the three variables under investigation in order to establish the magnitude of the changes in the variables. Thereafter, the percentage changes were plotted together in order to establish the pattern for each variable.

4.1.1 Fungibility analysis in the Ministry of Agriculture

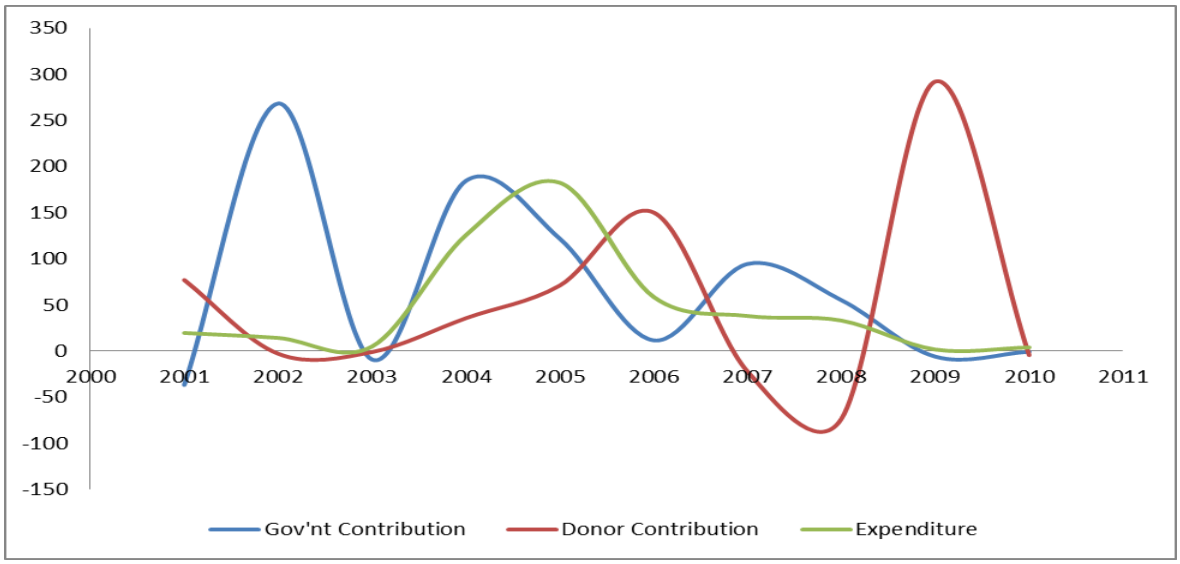
The fungibility analysis for the Ministry of Agriculture is shown in Table 1 and Figure 3.1 below.

[32] The full results of the analysis and the data can be found in Appendix 3.1

Table 1: Table Showing Percentage Changes in Ministry of Agriculture's Resource Inflows and Expenditure

YEAR	% Change in Government Contribution (ΔR)	% Change in Aid or Donor Contribution (ΔA)	% Change in Expenditure (ΔG)
2000	-	-	-
2001	-36.74351585	77.06682136	19.62540717
2002	268.292205	-2.912666385	14.27790946
2003	-9.344503416	-1.033759562	4.959516453
2004	184.5323381	35.66666667	125.6526674
2005	121.8113379	71.06388206	182.444668
2006	11.63373637	150.1872944	58.63757792
2007	94.44556332	-22.21819227	38.02778557
2008	55.14022805	-73.37459156	33.05516752
2009	-6.041931373	292.1753071	1.65350971
2010	-0.669770671	-4.489442012	3.994220235

Figure 3.1: Graph Showing Percentage Changes in Ministry of Agriculture's Resource Inflows and Expenditure



Source: MoF, OECD

The analysis of the composition of funding and expenditure for the Ministry of Agriculture in the period 2000 to 2010 indicates that the correlation between government contribution and donor contribution is -0.71229 (See appendix 3.1). This implies negative relationship between government contribution and donor contribution thus confirming that the Malawi

Government substitutes its funding with donors funding. This relationship is made more apparent in **Table 1** and **figure 3.1** above which shows that the percentage changes in contributions from the Malawi Government, Donor Community and the Expenditure in the Ministry of Agriculture from 2000 to 2010. Malawi Government's contribution to the Ministry of Agriculture's budgets reduces as donor's percentage contribution increases and increases when donors' contribution to the sector decreases. The figures also indicate that expenditure in the Ministry of Agriculture increases significantly when both government contribution and aid or donor contribution increase and decreases when both government contribution and aid or donor contribution decrease.

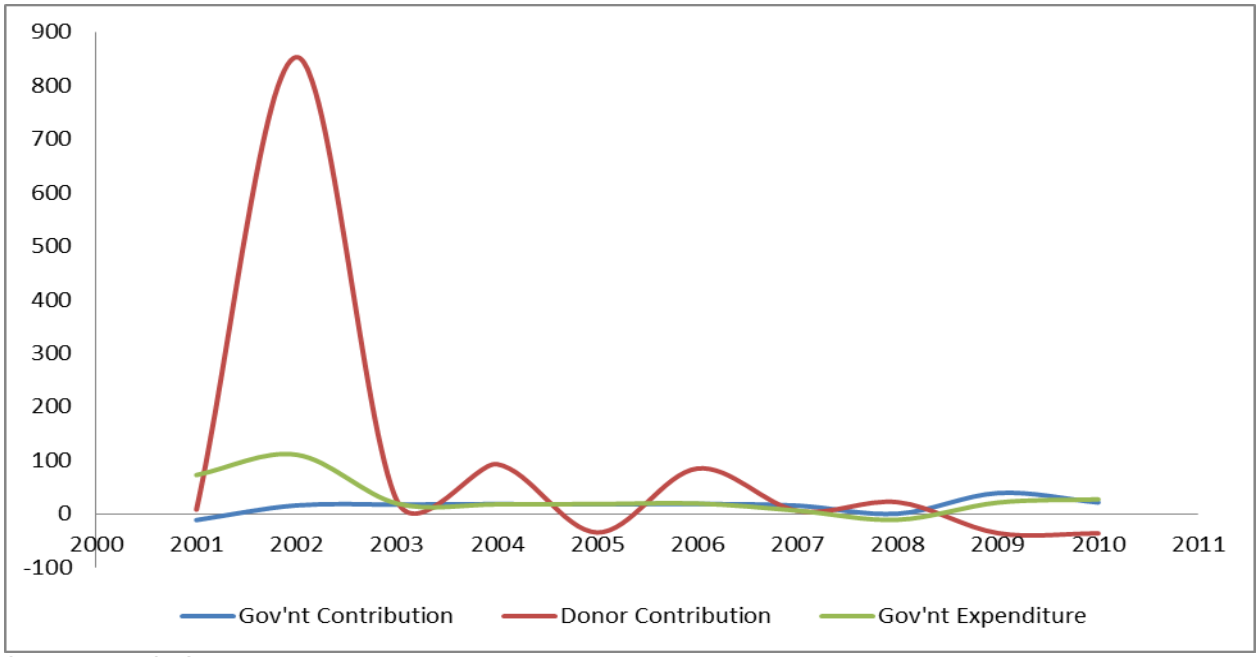
4.1.2 Fungibility analysis in the Ministries of Education

The fungibility analysis for the Ministry of Education is shown in Table 2 and Figure 3.1 below.

Table 2: Table Showing Percentage Changes in Ministry of Education's Resource Inflows and Expenditure

YEAR	% Change in Government Contribution (ΔR)	% Change in Aid or Donor Contribution (ΔA)	% Change in Expenditure (ΔG)
2000	-	-	-
2001	-11.51182528	8.035111411	72.64246816
2002	15.98333724	852.9766438	110.3415166
2003	17.41575693	24.74072768	19.44444444
2004	18.35183506	92.90746583	17.82945736
2005	17.65847976	-34.73385844	18.42105263
2006	18.52310231	84.74284664	19.44444444
2007	15.33840585	5.743309222	5.997888372
2008	0.325292748	21.82928224	-10.9856335
2009	38.88955667	-35.96449974	21.20619325
2010	21.37787407	-36.34054516	27.0694569

Figure 3.2: Graph Showing Percentage Changes in Ministry of Education's Resource Inflows and Expenditure



Source: MoF, OECD

The analysis of the composition of funding for the Ministry of Education in the period 2000 to 2010 indicates that the correlation between government contribution and donor contribution is -0.0137 (See appendix 3.2). This implies that there is a negative relationship between government contribution and donor contribution thus confirming that the Malawi Government substitutes its funding with donor funding but only slightly. This relationship is can be seen in **Table 2** and **figure 3.2** above which show that the percentage changes in contributions from the Malawi Government, Donor Community and the Expenditure in the Ministry of Education from 2000 to 2010. The figures seem to indicate that Malawi Government's contribution to the Ministry of Agriculture's budgets marginally reduces as donor's percentage contribution increases and marginally increases when donors' contribution to the sector decreases. The figures also indicate that expenditure in the Ministry of Education marginally increases when both government contribution and donor contribution increase and marginally decreases when both government contribution and aid

or donor contribution decrease. It should be noted, however, that even though there is a negative relationship between the two financing components, the magnitude is very marginal.

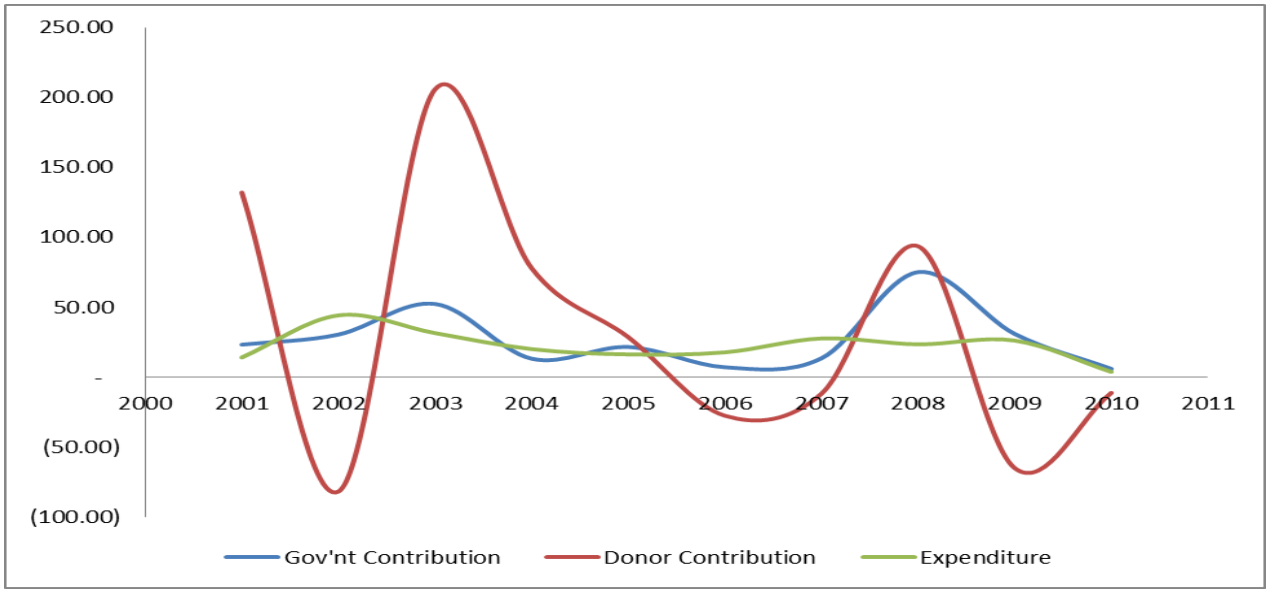
4.1.3 Fungibility analysis in the Ministries of Health

The fungibility analysis for the Ministry of Health is shown in Table 2 and Figure 3.1 below.

Table 3: Table Showing Percentage Changes in Ministry of Health's Resource Inflows and Expenditure

YEAR	% Change in Government Contribution (ΔR)	% Change in Aid or Donor Contribution (ΔA)	% Change in Expenditure (ΔG)
2000			
2001	23.21428571	132.0380444	14.01813986
2002	30.40583245	-81.88479459	44.17510002
2003	52.31022821	205.8221404	31.4560888
2004	13.13222993	77.85717763	19.98013163
2005	21.53648566	28.55197671	16.20733655
2006	7.028869488	-27.64940283	17.69620697
2007	13.43623171	-11.88288378	27.62133935
2008	75.06079479	93.58259299	23.4444115
2009	30.85435121	-65.1393849	26.11617328
2010	5.858204614	-11.28542746	3.734723492

Figure 3.3: Graph Showing Percentage Changes in Ministry of Health's Resource Inflows and Expenditure



Source: MoF, OECD

The analysis of the composition of funding for the Ministry of Health in the period 2000 to 2010 indicates that the correlation between government contribution and donor contribution is 0.4625 (See appendix 3.2). This implies that there is a positive relationship between government contribution and donor contribution. This relationship is made more apparent in **Table 3.3** and **figure 3.3** above which show the percentage changes in contributions from the Malawi Government, Donor Community and the Expenditure in the Ministry of Health from 2000 to 2010. The figures seem to indicate that Malawi Government's contribution to the Ministry of Health's budgets reduces as donor's percentage contribution reduces and increases when donors' contribution to the sector increases.

4.2 Regression Results on Impact of ODA on Tax Effort

The following of regression were run to ascertain the impact of ODA on tax revenue in Malawi (Where **LnTGDP** is the natural log of tax revenue as a share of GDP, Imports **(IMP)** and exports **(EXP)** are disaggregated from TRADE and represent openness of the economy, Official Development Aid (**ODA)** is comprised of both grants and loans, ***(AGR)*** is agricultural value added, ***(IND)*** is industry value added, the level of economic development ***(SIZE)*** expressed as real income per capita, ***F*** is share of grants flows as a share of GDP, and ***L*** is for loans flows expressed as share of GDP.

. $$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2\ IND + \beta_3 SIZE + \beta_4\ TRADE + \beta_5 ODA + \varepsilon_{i,t}$$

…….....(5)

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2\ IND + \beta_3 IMP + \beta_4 EXP + \beta_5 SIZE + \beta_6 ODA + \varepsilon_{i,t}$$

…(6)

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2\ IND + \beta_3 TRADE + \beta_4 SIZE + \beta_5 F + \beta_6 L + \varepsilon_{i,t}$$

…….(7)

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2\ IND + \beta_3 IMP + \beta_4 EXP + \beta_5 SIZE + \beta_6 F + \beta_7 L\ + \varepsilon_{i,t}.(8)$$

The results of the regression analysis are shown in Table 4 below.

Table 4: Regression Results

DETERMINANTS OF TAX REVENUE				
VARIABLE	**REGR 1**	**REGR 2**	**REGR 3**	**REGR 4**
ODA			0.19065***	0.1864***
			(0.04883)	(0.0450)
GRANTS	0.37936**	0.025175		
	(0.01807)	(0.018753)		
LOANS	0.28229***	0.291787***		
	(0.08166)	(0.078561)		
AGR	-0.04153	-0.032415	-0.09691	-0.0760
	(0.07257)	(0.069873)	(0.07296)	(0.0678)
IND	-0.17151	-0.207904*	-0.38325***	-0.4400***
	(0.12305)	(0.119847)	(0.12543)	(0.1180)
TRADE	0.06135		-0.05255	
	(0.03661)		(0.03646)	
IMP		0.107793**		0.0011
		0.043667		(0.0404)
EXP		-0.059614		-0.2086***
		0.076041		(0.0732)
RGDP	0.01964	0.024708	0.04924	0.0508
	(0.03178)	(0.030641)	(0.03519)	(0.0324)
OBSERVATTIONS	33	33	33	33
P VALUE	0.000	0.000	0.000	0.000
OVERALL R2	0.7228	0.7544	0.6812	0.7391
F	11.3	10.97	11.54	12.28

*****Significant at 1 percent** **** Significant at 5 percent** *** Significant at 10 percent**

As far as the impact of ODA on tax effort is concerned, ODA in general terms seems to have a positive impact on the tax effort in Malawi. This finding is inconsistent with a lot of other

studies that have been conducted [for instance, Gupta et al. (2003) and Morrissey et al. (2006)] which found a negative relationship between ODA and tax effort.

When ODA is disaggregated into grants and loans, the results show that both grants and loans have a positive impact on tax effort. This is contrary to most other studies which found that grants are negatively related to tax effort and loans positively related. The logic behind is that because grants are treated as free resource inflows, the government may use the resources to substitute for taxes. On the other hand, because loans have to be repaid, the government is compelled to collect more taxes to service the loans and so tax effort increases.

CHAPTER 5: DISCUSSION OF RESULTS

5.1 Analysis of Fungibility results for Ministries of Agriculture, Education and Health in Malawi

The results of the of the fungibility analysis of the Ministries of Agriculture, Education and Health seem to indicate that aid fungibility is most prevalent in Ministries of Agriculture and very slightly in Education. The correlation coefficients for the percentages changes in government contribution and donor contribution were found to be negative (-0.71229 for Agriculture and -0.0137 for Education) thus implying an inverse relationship between the two financing components. This fundamentally shows that the Malawi Government reduces its contribution to the Ministry of Agriculture when donors decide to increase their contribution and conversely, the Malawi Government increases its contribution to the Ministry Agriculture of when donors decide to reduce their contribution. However, as for the Ministry of Education, the though the correlation coefficient was found to be slightly negative, the overall effect substitution effect of the two financing components may not have any

significant impact on the sector. In light of this, it may be safe to conclude that aid fungibility may not be an issue for the Education sector.

In the case of the Ministry of Agriculture, an ideal situation ought to be that the Malawi Government contribution and donor contribution should rise simultaneously in order to have meaningful impact in these sectors. However, it is apparent from the analysis that the Government of Malawi substitutes its own contribution with donor contribution thereby reducing the net expenditure in the two sectors. This in turn may adversely affects the impact of aid in the Ministry of Agriculture thereby contributing to aid ineffectiveness in the Agricultural Sector and in Malawi as a whole. It should be noted that the most likely reason why aid fungibility exists in the agricultural sector is because the Malawian economy is heavily reliant on agriculture and therefore the sector enjoys the biggest share of the National Budget.[33] Consequently, the Agricultural sector has always been given the main focus not only for government but also for the ruling political leadership who in most cases divert a very large share of the Ministry of Agricultures resources to finance programs pro-poor such as free inputs, free livestock and universal subsidies for all poor people in order to gain political support to win the next election. Commentators have argued that since these programs target poor people who are mostly subsistence farmers, then the overall impact of these programs on the development of the Agriculture sector is negligible and therefore it would be more prudent to use such resources for initiatives that would have a more significant impact on the development of the sector. In addition, the fact that these programs are used as a political tool by the ruling political leadership makes it easy for the ruling government to easily divert resources (which include aid resources) from the Ministry of

[33] Agriculture accounts for approximately one third of the GDP and 90% of export revenues in Malawi

Agriculture to finance the programs thereby contributing to aid fungibility and consequently aid ineffectiveness in the sector.

On the other hand, the results of the fungibility analysis in the Ministry of Health are quite interesting. The results revealed no evidence of aid fungibility and the correlation coefficient for the percentage changes in government contribution and donor contribution was found to be positive (0.4625) thus implying concurrent relationship between the two financing components. This implies that the Malawi Government reduces its contribution to the Ministry when donors decide to reduce their contribution. Conversely, when donors decide to increase their contribution, the Malawi Government similarly increases its contribution. In an ideal situation, government contribution is expected to increase regardless of changes in donor contribution. The fact that government contribution and donor contributions are positively related implies that the net impact on the sector increases when both government and donors increase their contribution and vice versa. This implies that government contribution decreases in anticipation of aid inflows thus confirming that the Malawi Government substitutes its funding with donors funding.

5.2 Analysis of Regression Results on Impact of ODA on Tax Effort

Regression results indicate that ODA seems to have a positive impact on the tax effort in Malawi. This finding is inconsistent with a lot of other studies that have been conducted [for instance, Gupta et al. (2003) and Morrissey et al. (2006)] which suggest that ODA is negatively related to tax effort. In Malawi's case, the positive relationship between ODA and tax effort is because a large percentage of the ODA that is received such as the International Monetary Fund (IMF) credit facility is conditional aid which requires the country to achieve certain milestones in the area of good economic governance. Good economic governance includes tax administration and this therefore compels the Malawi Government to ensure that

the tax effort remains at a level that is required by the ODA financing institution in order to secure the much needed resources to implement finance government expenditure. In addition to this, since Malawi is a net importer, a considerable percentage of ODA is used to finance imports which attract import duty which directly raises tax revenue. Furthermore, the Malawi Government is the biggest consumer of goods and services in Malawi's small economy and in so doing the Government uses ODA which constitutes about 60% of the Government budget. When procuring those goods and services the government collects value added tax (VAT) which it remits to the Malawi Revenue Authority thereby increasing the tax revenue.

When ODA is disaggregated into grants and loans, the results show that both grants and loans have a positive impact on tax effort. This is contrary to most other studies which found that grants are negatively related to tax effort and loans positively related. The logic behind is that because grants are treated as free resource inflows, the government may use the resources to substitute for taxes. On the other hand, because loans have to be repaid, the government is compelled to collect more taxes to service the loans and so tax effort increases. As for the positive relationship between grants and tax effort, this can be explained by the fact that most of the ODA is conditional and hence the Malawi Government is compelled to ensuring that the tax effort remains at a level that is required by the ODA financing institution in order to secure the much needed resources to implement finance government expenditure. It can also be explained by the fact that since Malawi is a net importer, a considerable percentage of grants is used to finance imports which attract import duty thereby raising tax revenue. In addition to this, according to Fagernäs et. al. (2004) grants are associated with development budget expenditure in Malawi. Consequently, increases in grants lead to higher development budget expenditure which has a positive effect on economic growth in Malawi. In turn, this conomic growth leads to increased business activities which inturn help to increase tax revenue.

As for the positive relationship between loans and tax effort, this is in line with many other studies which found that loans stimulate tax effort. The logic behind is that Governments tend to rely on the primary domestic source of revenue (tax revenue) to service both local and foreign loans hence the tax effort increases.

Fundamentally, the results indicate that the Government of Malawi does not substitute aid resources for tax revenue but instead ODA helps to provide much needed impetous for the Government to increase tax collection efforts in Malawi.

CHAPTER 6: CONCLUSION AND POLICY RECOMMENDATIONS

6.1 Conclusion

The generic purpose of this research study was to produce credible empirical evidence on aid fungibility in Malawi. To this end, the paper looked at two forms of fungibility namely: whether or not aid substitutes for government funding; and whether or not aid is used to reduce taxes effort in Malawi. First and foremost, the paper investigated whether or not aid resources substitute for government funding in three key sectors that traditionally receive the lion's share of ODA in Malawi namely; Agriculture, Education and Health. This was achieved by calculating the percentage composition of government revenue and aid in the total budget of each Ministry. Thereafter, percentage changes were calculated in each subsequent year and the results were plotted in a graph to more visually expose the pattern that each of the variables follows after each subsequent round of funding and expenditure. In addition, the results were then subjected to a correlation test to see how domestic revenue was related to aid in each of the years under review. The paper also investigated whether or not aid resources substitute for government revenue collection efforts by examining the impact of ODA on tax effort in Malawi. To achieve this, the study adopted and utilized a regression

model that was used by Gupta et al. (2003) in an IMF paper that analyzed the effects of foreign aid on revenue response in several countries.

The results of the fungibility analysis of the Ministries of Agriculture, Education and Health seem to indicate that aid fungibility is prevalent in Ministries of Agriculture and Education. The results revealed that aid fungibility is most prevalent in the Ministry of Agriculture and marginally in the Ministry of Education. This fundamentally shows that the Malawi Government reduces its contribution to the Ministry of Agriculture when donors decide to increase their contribution and conversely, the Malawi Government increases its contribution to the Ministry when donors decide to reduce their contribution. This in turn may adversely affect the impact of aid in the Ministry and the sector as a whole. Given the magnitude of resources that are allocated to the Ministry of Agriculture and the overall economic importance of the sector to Malawi's economy, the existence of aid fungibility in the Agriculture sector poses an eminent risk to aid effectiveness in Malawi.

The results of the analysis of the impact of ODA on tax effort in Malawi show that ODA has a positive impact on the tax effort in Malawi. The results also show that when ODA is disaggregated into grants and loans, they both have a positive impact on tax effort. The positive relationship between ODA and tax effort is because a large percentage of the ODA that is received is conditional aid which requires the country to achieve certain milestones in the area of good economic governance. Good economic governance includes tax administration and therefore this compels the Malawi Government to ensure that the tax effort remains at a level that is required by the ODA financing institution in order to secure the much needed resources to finance government expenditure. In addition to this, since Malawi is a net importer, a considerable percentage of ODA is used to finance imports which attract import duty which directly raises tax revenue. Furthermore, the Malawi Government is

the biggest consumer of goods and services in Malawi's small economy and in so doing the Government uses ODA which constitutes about 60% of the Government budget. When procuring those goods and services the government collects value added tax (VAT) which it remits to the Malawi Revenue Authority thereby increasing the tax revenue.

As for the positive relationship between loans and tax effort, the logic behind is that Governments tend to rely on the primary domestic source of revenue (tax revenue) to service both local and foreign loans hence the tax effort increases.

6.2 Policy Recommendations

Having established that aid is fungible especially in the Ministry of Agriculture which is one of the government institutions that receives the lion's share of aid resources in Malawi, it would be in the best interest for the Government to ensure that the fungibility phenomenon is promptly assess whether or not the phenomenon is contributing to aid ineffectiveness in the sector so as to avoid frustrating donor institutions. A number of studies have suggested different ways of dealing with the problem of fungibility. For instance, Stefan Leiderer (2012) advocates for Aid on Delivery (AoD). AoD is a form of aid that is disbursed proportionally to the achievement of pre-defined goals by the recipient country. This is intended to allow donors to fund expenditure on their priorities without having to get involved in implementation.[34] Others like Göran Holmqvist (2000) advocate for donors to simply offer a mix of General Budget Support (GBS) and AoD and decide on a level of indicated government commitment at which they will convert either the entire aid budget or just the GBS tranche to project aid.[35] However, I believe strategies to address fungibility should not be wholesale but should be unique to every aid recipient country depending on the

[34] Leiderer, Stefan. *Fungibility and the Choice of Aid Modalities*, Working Paper No. 2012/68 (2012), online, Internet, 5, Feb. 2013.
[35] Holmqvist, Göran. *Fungibility Parameters: A Comment on their Reliability and Policy Implications from an Aid Practitioner* (2000), online, Stockholm University, Institute of Latin America Studies, internet, 3 Feb. 2013

nature and the circumstances within which the fungibility phenomena occurs. In this regard, I believe the following solutions would be more appropriate for the Malawi Government and Donors to address aid fungibility in Malawi:

(i) Donors should tie aid to particular public expenditure programs so as to ensure that funds are used to finance agreed programmes as opposed to using basket funding or channeling aid money through General Budget Support.

(ii) There is need for comprehensive research in order to ascertain what the fungible resources ultimately end up financing. If the funds are used to finance development initiatives in the country then the country would be better off and the diverted funds would be easier to justify to donors. But if the resources are used for personal gain or used to finance non-essential services then measures should be taken to ensure the funds are not diverted from their targeted activities.

(iii) In addition, there is need to conduct a more comprehensive study to holistic examine the fungibility phenomenon and analyze its impact in all other sectors that receive aid in Malawi. This will help to clarify whether or not fungibility of aid is negatively contributing to aid effectiveness in Malawi.

APPENDICES

APPENDICES

APPENDIX 1: SUMMARY OF EMPIRICAL STUDIES OF AID AND FISCAL BEHAVIOUR ADOPTED FROM PAPER BY BADRI PRASAD BHATTARAI ENTITLED "FOREIGN AID AND GOVERNMENT'S FISCAL BEHAVIOUR IN NEPAL: AN EMPIRICAL ANALYSIS

STUDY	SAMPLE	METHODOLOGY	RESULTS/FINDINGS	COMMENTS
Heller (1975)	11 African countries (1960–1970)	Used cross section time series data, and GLS and 2SLS	Aid increased investment but reduced taxes and borrowings	Seminal work on fiscal response model and used government's utility maximization framework
Pack and Pack (1990)	Indonesia,(1970 –1990)	Time-series data and used SUR	Aid did not lead to a reduction in domestic revenue efforts, but stimulated total public expenditure	Model derived from "median voter model". Focused more on aid fungibility rather than fiscal impact
Khilji and Zampelli (1991)	Pakistan (1960–1986)	Time-series data and used FIML technique	Aid was found to be fully fungible McGuire type model.	Examined only the US aid
Gang and Khan (1991)	India (1961–1984)	Used time series data and estimated full system of simultaneous equation with 3SLS procedure	Grants, loans and multilateral aid had no significant effect on government consumption	Heller type model. Due to misspecification of model there exist problems in the interpretation of results
Khan and Hoshino (1992)	5 South and South East Asian countries (1956–1976)	Pooled time series and cross section data, non-linear 3SLS	Loans were found more positive for investment than grants, and while grants reduced tax burdens, loans increased it	Extension of Heller model. Failed to show total effects (direct and indirect) and thus ignored feedback effects
Pack and Pack (1993)	Dominican Republic (1968–1986)	Time-series data and used SUR	Found a divergence of aid away from its intended purpose	Model derived from "median voter model" The results are different from their findings for Indonesia. Thus, fungibility depends on country specific

				factors
Feyzioglu et al. (1998)	14 and 38 developing countries (1971–1990)	Panel data, OLS and GMM	Aid was not fungible at the aggregate level in a sample of 14 countries but aid was found to be fungible in 38 countries	McGuire (1978) type model. Aid was found to be more fungible in agriculture, education and energy sector
Franco-Rodriguez et al.(1998)	Pakistan (1956–1995)	Time-series data, non-linear 3SLS	Slightly positive impact on public investment and negative impact on tax effort	Extended the Heller model by allowing borrowing on both capital and consumption expenditure and treating aid as an endogenous variable
Swaroop et al. (2000)	India (1970–1995)	Time-series data, and used OLS and 2SLS	Foreign aid did not influence the internally determined pattern of resource allocation	McGuire (1978) type model. Aid fungibility investigated in both federal and state levels
Franco-Rodriguez (2000)	Costa Rica (1971–1994)	Time-series data, non-linear 3SLS	A very small impact of aid inflows on public sector fiscal behavior	Heller type model. Not conclusive result; it could be due to inappropriate target variables and country specific factors
McGillivray (2000)	Pakistan (1956–1995)	Time-series data, non-linear3SLS	Aid associated positively with both public investment and consumption expenditure and aid had no impact on taxation	Heller type model. Disaggregated aid into grants and loan aid, but aid was not endogenised in the model
McGillivray (2002)	Philippines (1960–1997)	Time-series data, non-linear 3SLS	Almost all multilateral aid has been allocated to consumption expenditure and almost 100 per cent domestic borrowing allocated to the consumption budget	Heller type model. Ambiguous results as he found multilateral aid was also allocated to consumption

McGillivray and Ouattara (2003)	Cote d'Ivoire (1975–1999)	Time-series data and applied fiscal response model as a maximizing utility framework, nonlinear 3SLS	Large portion of aid is used for debt servicing and it does not induce a reduction in borrowing; also borrowing is used for both investment and consumption	Heller type model. The findings suggest that borrowing should be allowed for both capital and consumption expenditure in the model

Source: Badri,Prasad,Bhattarai:http://eap-journal.com/archive/v37_i1_3.pdf

APPENDIX 2: ADDITIONAL INFORMATION FOR CHAPTER 4

FIG. 2A: Composition of Aid Donors in current USD (1970-2009)

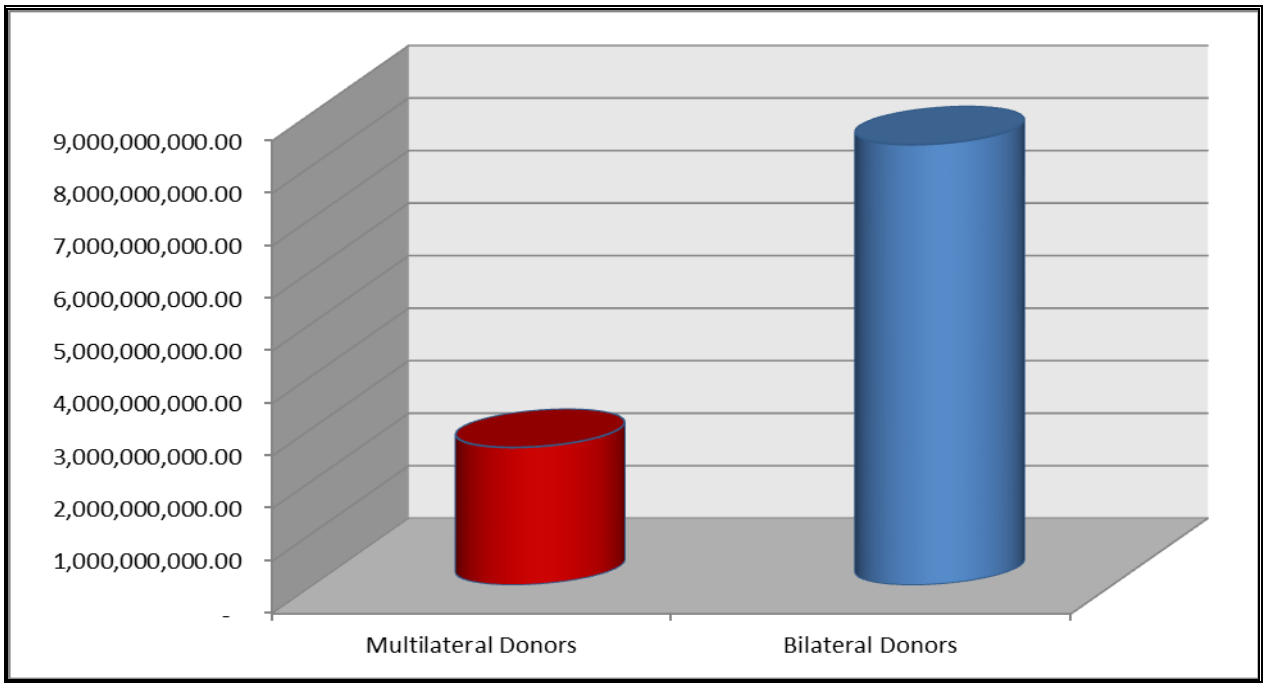


FIG. 2B: Composition by sector

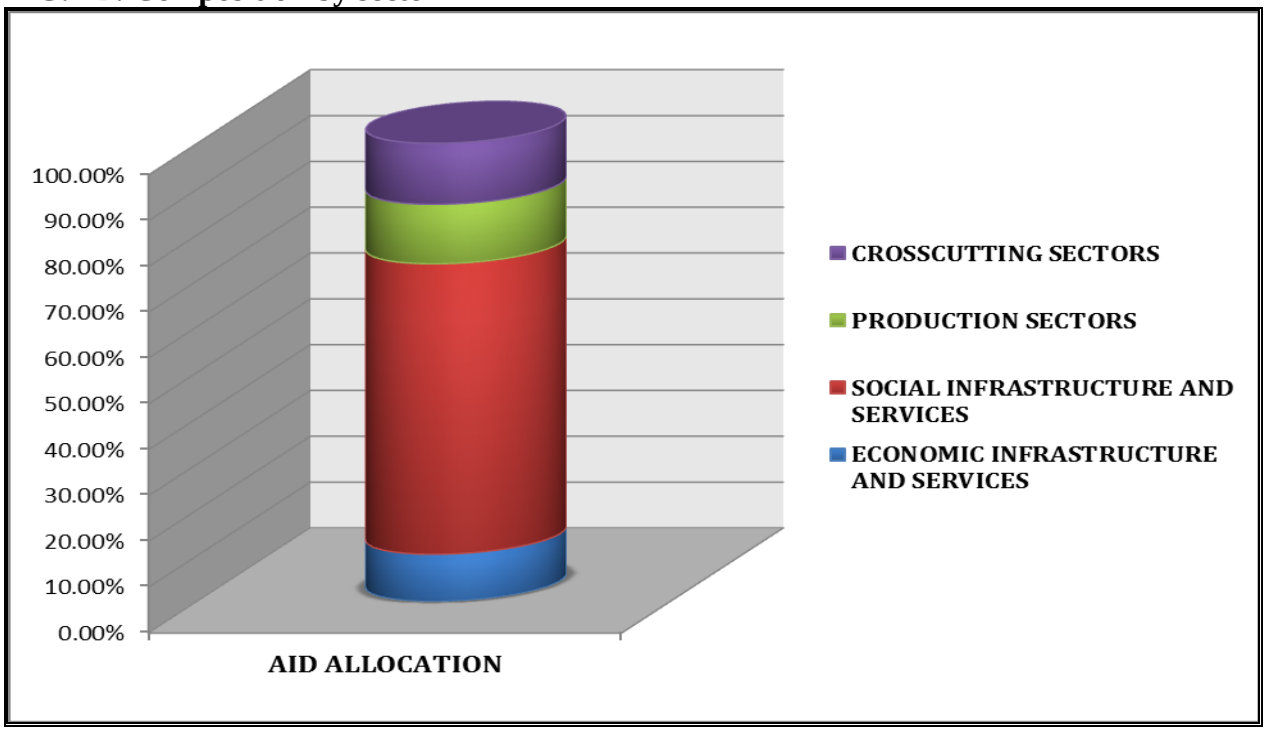


Fig. 2C: Aid Composition Trends (1995-2009)

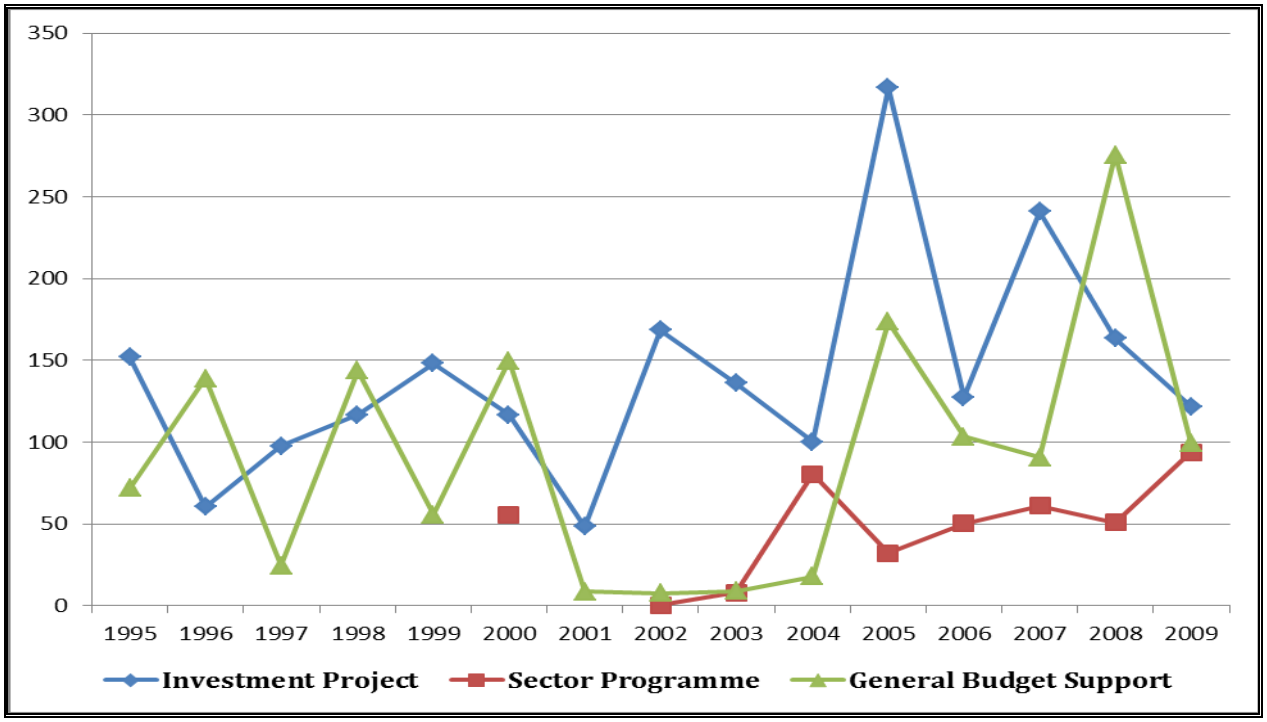
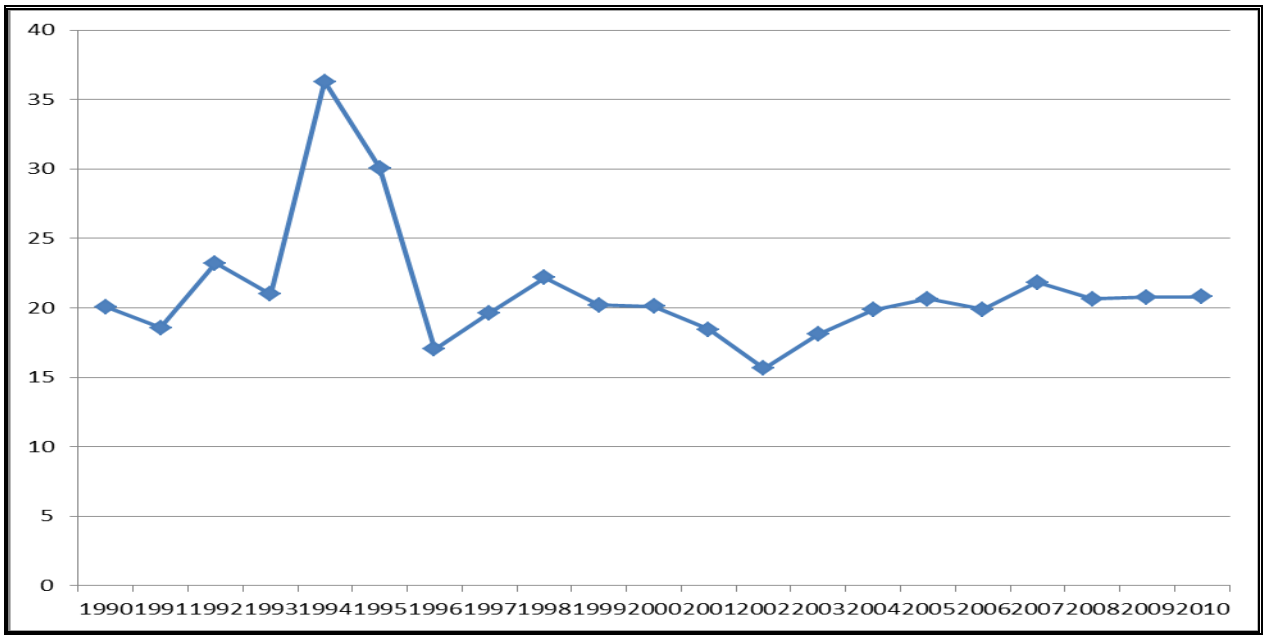
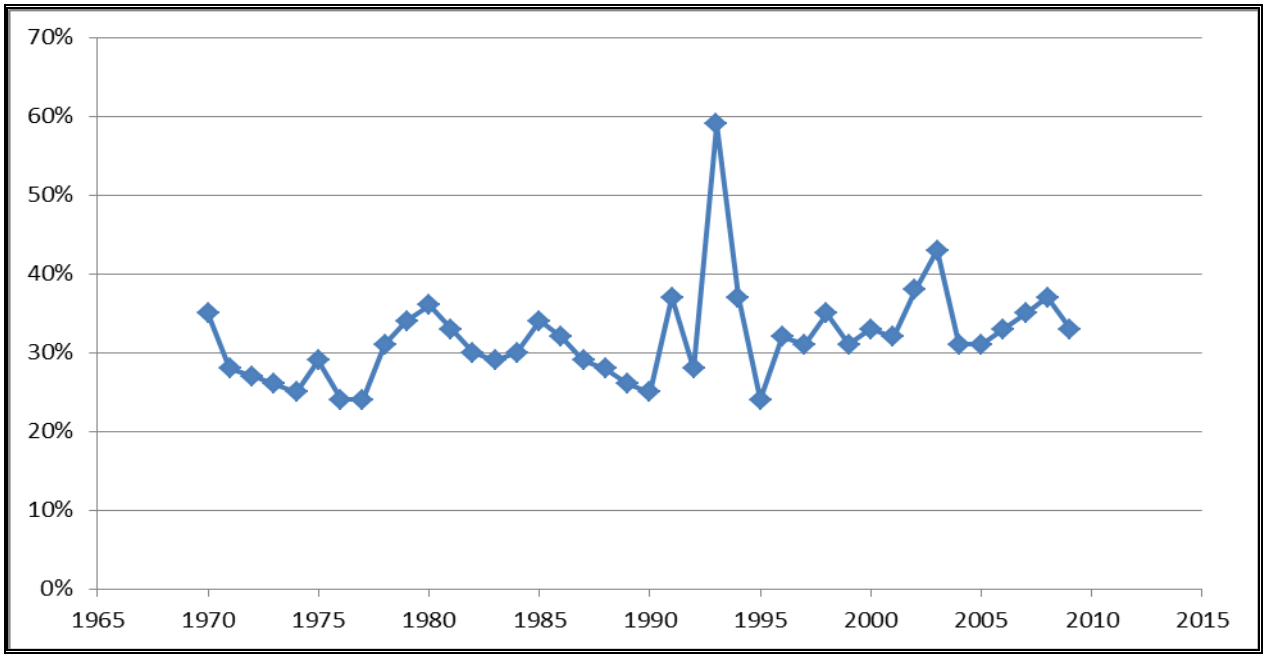


Figure 2D: Total Government Revenue as a percentage of GDP (1990-2010)



Source: IMF, MoF

Figure 2E: Government Expenditure as a percentage of GDP (1970-2009)



Source: IMF, MoF

APPENDIX 3: ANALYSIS RESULTS

Appendix 3.1: Source of funding and expenditure

SECTOR		2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08	2008/09	2009/10	2010/11
EDUCATION	GOV'NT	7,222,660,000	6,391,200,000	7,412,727,050	8,703,709,575	10,301,000,000	12,120,000,000	14,365,000,000	16,568,362,000	16,622,257,680	23,086,580,000	28,022,000,000
	DONOR	148,100,000	160,000,000	1,524,762,630	1,902,000,000	3,669,100,000	2,394,680,000	4,424,000,000	4,678,084,000	5,699,276,160	3,649,560,000	2,323,290,000
	EXPENDITURE	2,974,069,535	5,134,507,050	10,800,000,000	12,900,000,000	15,200,000,000	18,000,000,000	21,500,000,000	22,789,546,000	20,285,970,000	24,587,852,000	31,243,650,000
HEALTH	GOV'NT	2,296,000,000	2,829,000,000	3,689,181,000	5,619,000,000	6,356,900,000	7,725,952,857	8,269,000,000	9,380,042,000	16,420,776,077	21,487,300,000	22,746,070,000
	DONOR	1,863,056,557	4,323,000,000	783,120,330	2,394,955,355	4,259,600,000	5,475,800,000	3,961,774,000	3,491,001,000	6,757,970,257	2,355,870,000	2,090,000,000
	EXPENDITURE	3,726,600,000	4,249,000,000	6,126,000,000	8,053,000,000	9,662,000,000	11,227,952,857	13,214,874,633	16,865,000,000	20,818,900,000	26,256,000,000	27,236,589,000
AGRICULTURE	GOV'NT	694,000,000	439,000,000	1,616,802,780	1,465,720,589	4,170,449,062	9,250,528,860	10,326,711,000	20,079,831,376	31,151,896,189	29,269,720,000	29,073,680,000
	DONOR	529,000,000	936,683,485	909,401,020	900,000,000	1,221,000,000	2,088,690,000	5,225,637,000	4,064,594,924	1,082,215,000	4,244,180,000	4,053,640,000
	EXPENDITURE	1,228,000,000	1,469,000,000	1,678,742,490	1,762,000,000	3,976,000,000	11,230,000,000	17,815,000,000	24,589,650,000	32,717,800,000	33,258,792,000	34,587,221,400

Source: MoF, OECD

Appendix 3.2: Minstry Budget Contribution by Source (as a share of total funding)

As a % share of Total Funding		1999/00	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07
AGRICULTURE	Public Contribution	34.33	24.21	64.16	33.36	45.73	75.48	79.17	73.63
	Donor Aid	65.67	75.79	35.84	66.64	54.27	24.52	20.83	26.37
HEALTH	Public Contribution		56.31	70.65	48.74	16.86	11.98		
	Donor Aid		43.69	29.35	51.26	83.14	88.02		
EDUCATION	Public Contribution		19.21	78.38	59.81	69.55	75.89	76.01	84.00
	Donor Aid		80.79	21.62	40.19	30.45	24.11	23.99	16.00

Appendix 3.3: Correlation Results

Min. of Agriculture		
	Malawi Gov.	*Donors*
Malawi Gov.	1	
Donors	-1	1

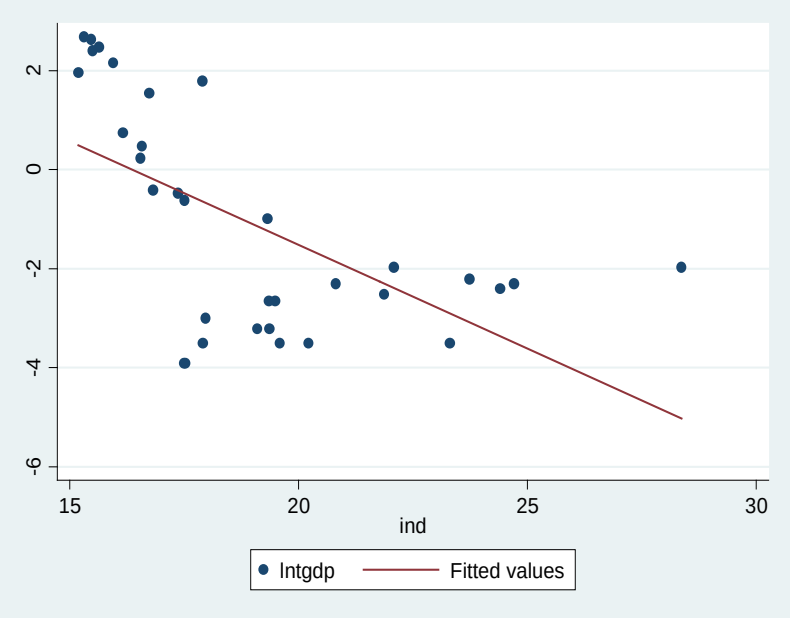
Min of Health		
	Malawi Gov.	*Donors*
Malawi Gov.	1	
Donors	-1	1

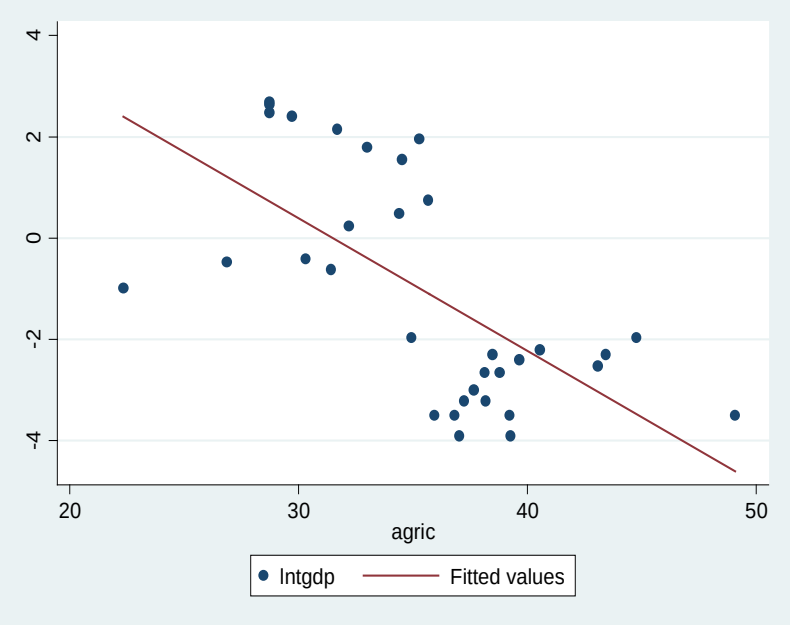
Min. of Education		
	Malawi Gov.	*Donors*
Malawi Gov.	1	
Donors	-1	1

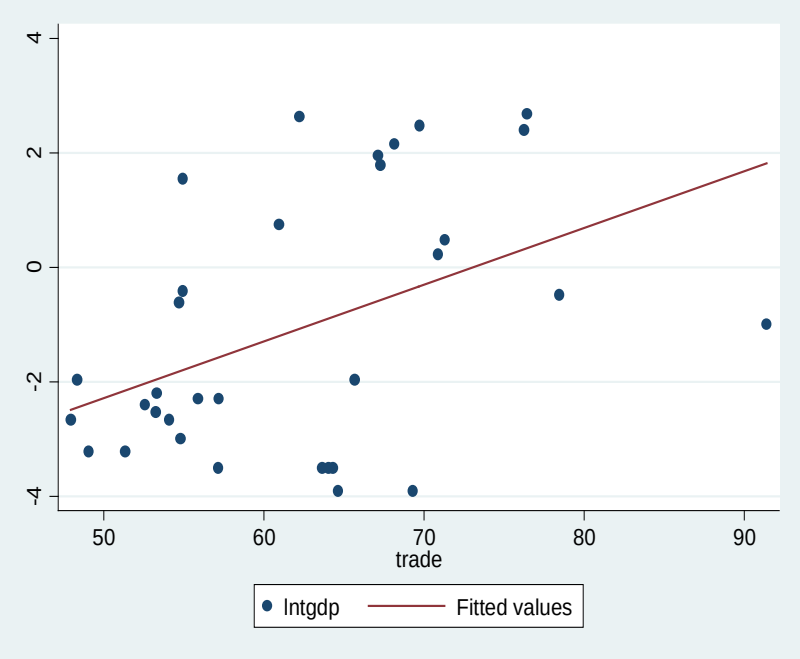
Appendix 3.4: Data

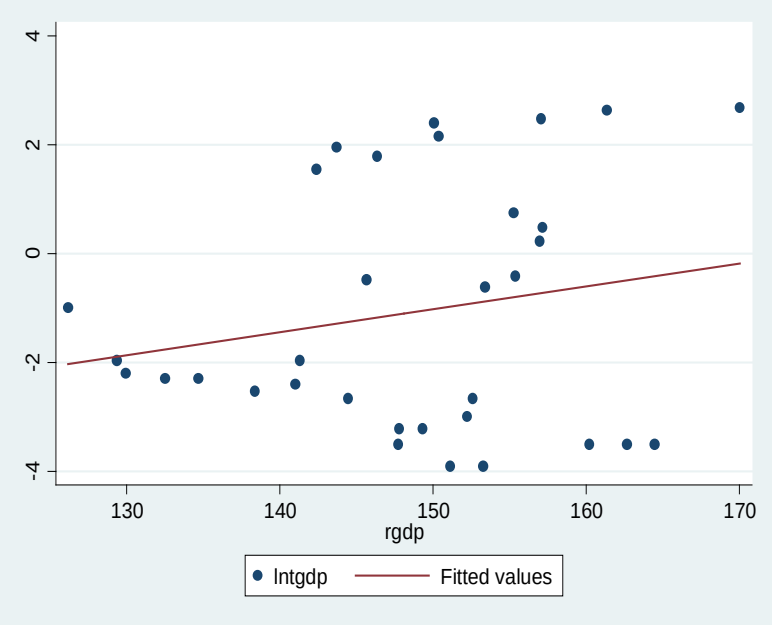
YEARS	TAX REVENUE	ODA	GDP	RGDP	AGRICULTURE	INDUSTRY	TRADE	IMPORTS	EXPORTS	GRANTS	LOANS
1976	73,060,000	10,235,560,000	111,271,508,382.62	1,265.38	52,543,163,790.73	23,458,739,327.14	10,790,000,000.00	43,254,071,640.89	33,872,356,228.24	2,435,220,000.00	8,354,780,000.00
1977	89,950,000	13,099,060,000	133,839,829,389.97	1,283.33	58,019,188,728.77	28,193,115,445.35	17,314,796,000.00	46,347,556,303.86	40,151,948,816.99	2,108,200,000.00	15,206,596,000.00
1978	121,960,000	16,302,860,000	157,531,252,193.10	1,361.86	86,244,926,573.52	40,952,868,777.59	30,412,528,000.00	64,767,436,180.10	36,534,972,353.11	11,389,260,000.00	19,023,268,000.00
1979	143,800,000	23,475,720,000	175,676,962,155.88	1,376.86	80,597,980,467.60	41,546,813,123.16	46,247,766,000.00	71,733,915,484.69	40,744,051,146.40	17,886,500,000.00	28,361,266,000.00
1980	166,870,000	23,435,880,000	205,450,814,804.98	1,341.51	73,863,122,089.10	40,258,090,645.94	33,655,670,000.00	79,719,247,062.91	51,040,758,952.84	8,047,680,000.00	25,607,990,000.00
1981	179,050,000	22,682,240,000	205,455,825,561.18	1,236.99	72,930,353,379.81	37,410,957,840.53	18,902,918,000.00	64,709,038,165.81	52,731,376,660.05	10,921,140,000.00	7,981,778,000.00
1982	207,680,000	19,958,180,000	195,895,435,724.36	1,237.42	77,543,824,270.00	39,320,254,190.20	20,811,918,000.00	56,507,088,997.88	44,067,036,841.66	8,125,700,000.00	12,686,218,000.00
1983	238,860,000	19,171,340,000	203,055,937,060.81	1,250.32	75,515,457,917.10	36,045,387,160.82	15,441,154,000.00	57,511,322,243.89	42,137,288,189.51	6,517,160,000.00	8,923,994,000.00
1984	296,180,000	30,099,120,000	200,532,329,591.66	1,274.58	71,617,471,121.68	36,599,318,503.78	15,522,494,000.00	52,992,966,207.86	56,892,271,345.50	5,838,220,000.00	9,684,274,000.00
1985	373,510,000	18,668,360,000	187,803,731,588.95	1,277.67	76,199,927,347.78	38,013,901,666.11	17,073,930,000.00	56,150,896,048.91	45,432,493,787.05	6,261,520,000.00	10,812,410,000.00
1986	391,070,000	32,285,340,000	196,489,861,982.55	1,209.57	84,581,997,275.38	42,954,117,209.67	18,687,284,000.00	49,218,351,907.47	45,017,220,383.65	9,956,680,000.00	8,730,604,000.00
1987	450,150,000	45,789,440,000	196,390,071,310.39	1,158.55	99,483,187,566.93	47,674,851,882.56	30,646,588,000.00	54,615,846,832.51	49,986,238,993.33	22,903,020,000.00	7,743,568,000.00
1988	653,730,000	62,349,600,000	229,067,423,183.39	1,127.63	107,027,373,245.76	62,636,438,923.50	33,872,466,000.00	74,545,429,155.12	53,423,575,220.75	28,349,480,000.00	5,522,986,000.00
1989	844,550,000	69,271,800,000	263,973,870,512.78	1,087.91	120,146,687,087.67	77,134,575,897.90	47,259,536,000.00	91,117,368,384.39	49,574,053,465.01	31,614,700,000.00	15,644,836,000.00
1990	887,960,000	83,059,760,000	312,210,374,937.45	1,109.43	145,026,663,800.99	89,251,660,772.35	52,221,276,000.00	104,343,101,250.06	74,250,101,113.38	37,632,200,000.00	14,589,076,000.00
1991	921,710,000	91,228,620,000	365,787,319,791.16	1,180.76	104,351,072,028.31	84,752,049,709.15	56,274,000,000.00	107,202,424,294.70	85,124,501,690.87	40,241,720,000.00	16,032,280,000.00
1992	1,150,000,000	95,788,640,000	298,721,489,650.84	1,083.10	153,930,720,402.09	75,890,788,937.47	73,219,944,000.00	126,824,696,402.85	69,321,981,997.70	55,641,540,000.00	17,578,404,000.00
1993	1,317,440,000	82,392,440,000	343,727,289,092.65	1,183.20	43,828,762,296.24	37,910,433,588.05	51,332,346,000.00	110,755,706,532.17	55,444,249,947.34	33,616,660,000.00	17,715,686,000.00
1994	2,131,000,000	78,043,240,000	196,179,002,462.17	1,056.54	62,319,221,664.50	40,281,056,913.59	53,486,528,000.00	121,130,990,137.32	58,133,374,820.52	38,286,240,000.00	15,200,288,000.00
1995	3,965,770,000	72,067,240,000	231,978,017,011.97	1,219.41	118,964,413,590.24	66,316,932,576.12	74,003,132,000.00	111,554,556,727.99	70,448,200,951.37	43,558,400,000.00	30,444,732,000.00
1996	5,807,320,000	81,595,640,000	378,651,658,722.31	1,284.30	134,007,458,743.76	74,355,610,794.32	63,216,618,000.00	120,701,540,441.88	86,430,091,762.25	33,163,480,000.00	30,053,138,000.00
1997	8,146,960,000	57,079,100,000	442,115,804,870.18	1,300.90	93,544,648,515.35	48,062,619,681.56	27,620,574,000.00	148,486,381,871.83	94,420,503,534.09	19,632,820,000.00	7,987,754,000.00
1998	10,432,850,000	72,130,320,000	290,597,179,637.53	1,314.23	101,412,459,340.75	48,865,353,564.89	53,687,554,000.00	110,732,099,325.51	95,229,166,683.50	35,492,460,000.00	18,195,094,000.00
1999	13,448,820,000	74,138,920,000	294,803,002,202.39	1,315.79	103,210,369,265.64	46,766,910,598.32	62,844,114,000.00	127,631,105,300.96	82,610,524,431.42	42,325,020,000.00	20,519,094,000.00
2000	17,309,000,000	74,054,260,000	289,422,082,368.00	1,300.05	100,534,260,174.99	43,259,233,252.81	51,588,318,000.00	102,267,243,805.42	74,102,624,194.35	37,753,380,000.00	13,834,938,000.00
2001	20,786,651,331	67,965,380,000	284,939,460,171.50	1,203.16	152,684,127,878.98	74,013,436,765.70	49,777,922,000.00	111,488,767,827.65	79,758,049,248.09	38,722,820,000.00	11,055,102,000.00
2002	24,145,762,095	62,771,240,000	442,416,434,146.42	1,192.21	132,787,899,677.08	72,004,803,348.30	62,202,026,000.00	151,103,280,632.86	92,034,402,682.04	37,686,980,000.00	24,515,046,000.00
2003	37,563,843,257	86,009,580,000	402,492,891,945.91	1,225.48	138,081,912,516.94	69,504,146,501.87	56,483,824,000.00	163,396,334,397.85	107,452,380,929.09	56,733,820,000.00	(249,996,000.00)
2004	50,743,032,551	83,931,260,000	435,781,149,390.59	1,258.90	135,913,208,706.40	70,893,683,670.39	72,655,544,000.00	188,233,441,681.32	108,770,361,955.42	66,776,820,000.00	5,878,724,000.00
2005	61,865,951,701	95,176,100,000	457,401,348,611.71	1,256.40	148,616,882,892.68	80,849,229,483.20	83,359,224,000.00	238,703,554,133.23	109,990,669,188.95	75,842,080,000.00	7,517,144,000.00
2006	79,668,664,860	115,906,180,000	517,412,490,052.07	1,314.92	164,894,495,396.72	88,807,386,569.86	471,264,538,000.00	243,740,817,037.53	117,030,707,455.97	452,726,820,000.00	18,537,718,000.00
2007	98,945,281,851	123,502,340,000	574,083,306,004.37	1,350.84	194,256,542,903.49	103,574,723,336.10	133,720,304,000.00	201,734,378,168.26	155,404,028,109.98	134,463,320,000.00	(743,016,000.00)
2008	122,981,226,772	153,330,880,000	676,307,830,014.05	1,423.47	225,408,132,253.60	118,982,448,369.82	140,881,876,000.00	317,247,318,291.22	199,673,646,088.02	116,683,060,000.00	24,198,816,000.00
2009	147,447,826,996	128,218,400,000	784,762,677,814.62	1,485.28	243,468,347,545.83	127,230,438,422.59	21,188,738,000.00	295,949,826,048.90	235,801,692,238.88	163,356,284,000.00	21,188,738,000.00

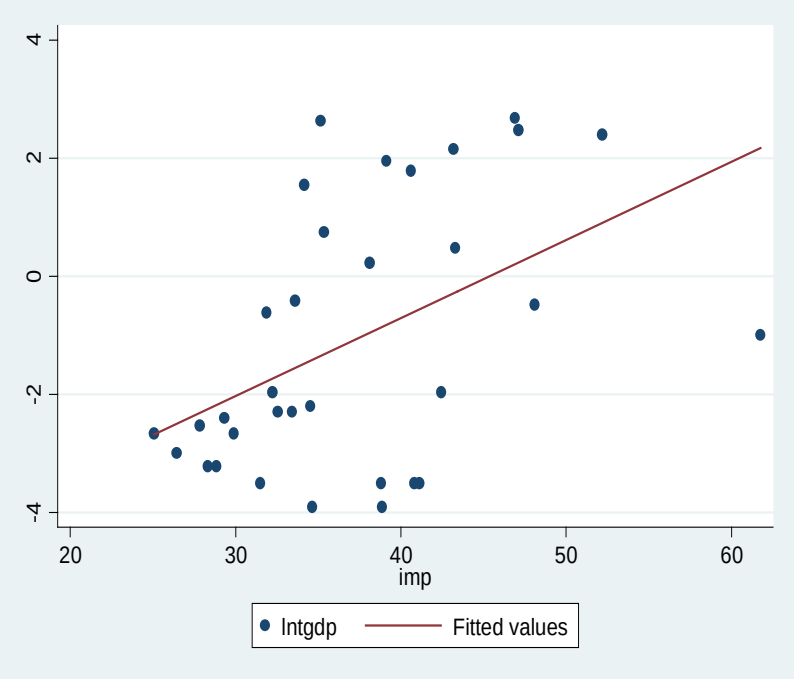
Appendix 3.5: Scatter Plots (Linearity Test)

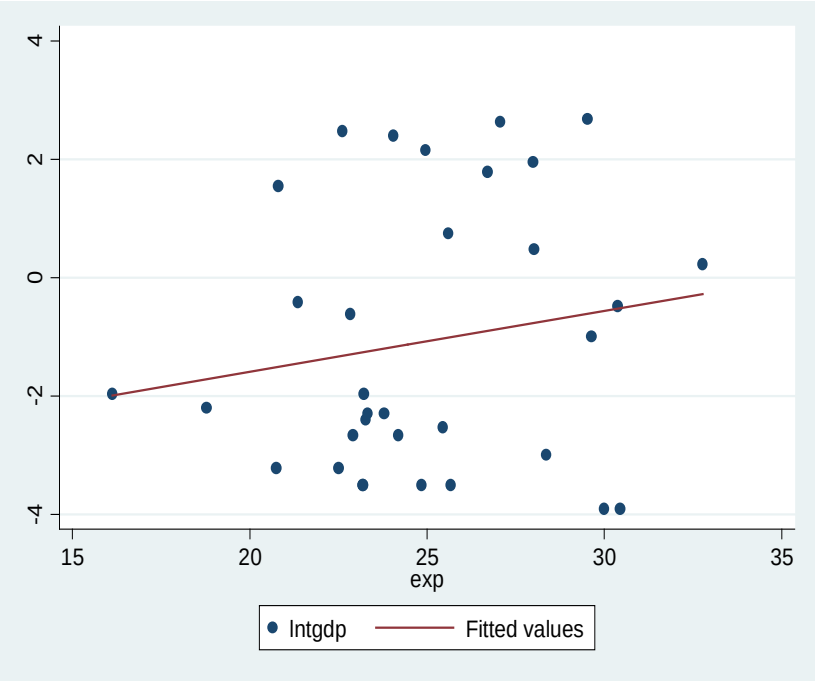


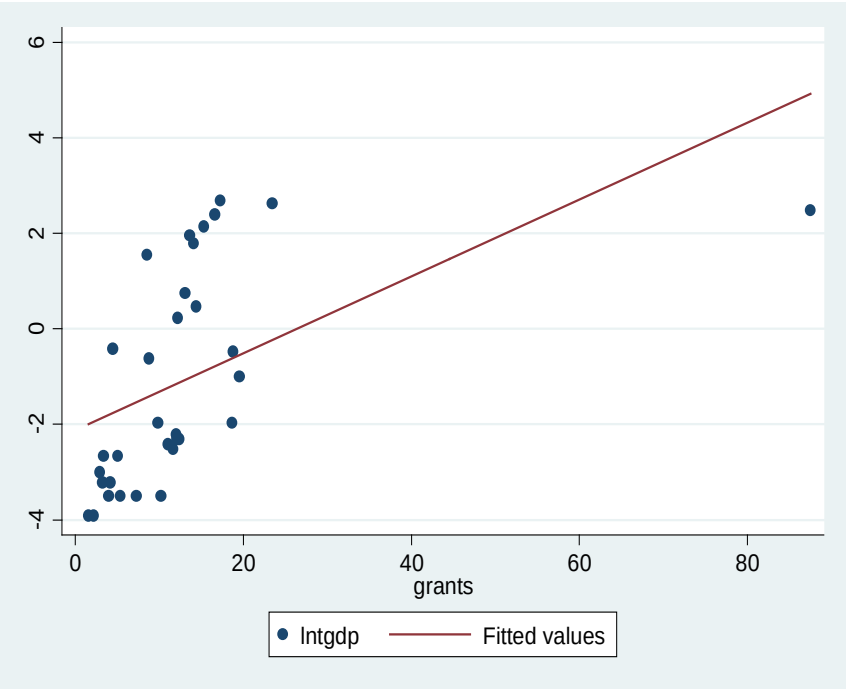


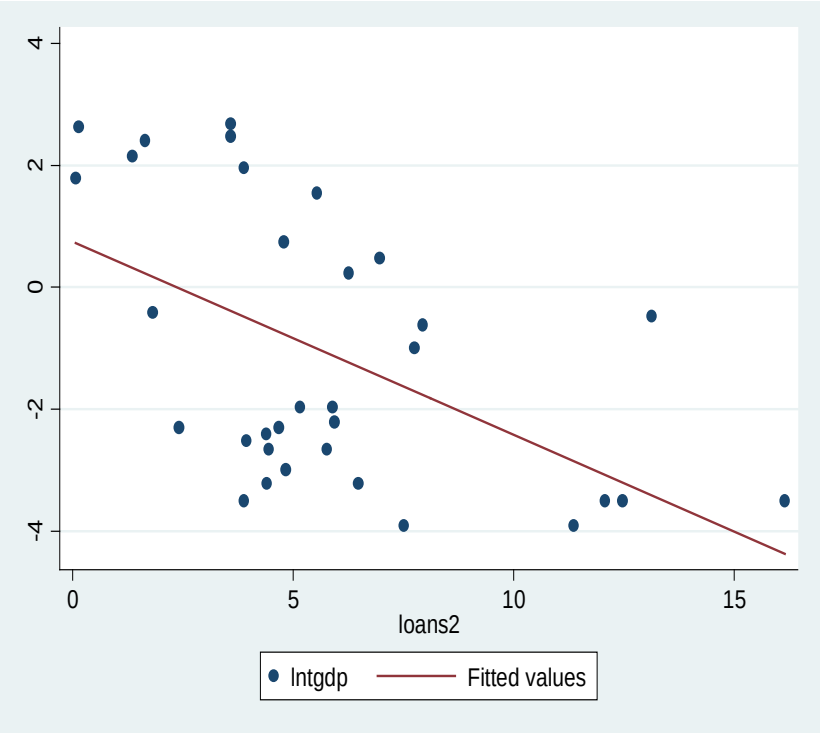

4
2
0
-2
-4
50
60
70
80
90
trade
lntgdp
Fitted values


4
2
0
-2
-4
130
140
150
160
170
rgdp
lntgdp
Fitted values


4
2
0
-2
-4
20
30
40
50
60
imp
lntgdp
Fitted values


4
2
0
-2
-4
15
20
25
30
35
exp
lntgdp
Fitted values


6
4
2
0
-2
-4
0
20
40
60
80
grants
lntgdp
Fitted values


4
2
0
-2
-4
0
5
10
15
loans2
lntgdp
Fitted values

Appendix 3.6: Heteroscedasticity Test

i. $lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 TRADE + \beta_4 SIZE + \beta_5 F + \beta_6 L + \varepsilon_{i,t}$……..…(1)

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of lntgdp

chi2(1) = 0.02

Prob > chi2 = 0.8965

ii. $lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 IMP + \beta_4 EXP + \beta_5 SIZE + \beta_6 F + \beta_7 L + \varepsilon_{i,t}$ ……..…(2)

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of lntgdp

chi2(1) = 0.13

Prob > chi2 = 0.7191

iii. $lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 SIZE + \beta_4 TRADE + \beta_5 ODA + \varepsilon_{i,t}$ ….……...(3)

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of lntgdp

chi2(1) = 1.54

Prob > chi2 = 0.2144

iv. $lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 IMP + \beta_4 EXP + \beta_5 SIZE + \beta_6 ODA + \varepsilon_{i,t}$ ……...(4)

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of lntgdp

chi2(1) = 1.83

Prob > chi2 = 0.1760

Appendix 3.7: Multicollinearity Test

i. $lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 TRADE + \beta_4 SIZE + \beta_5 F + \beta_6 L + \varepsilon_{i,t}$ ……..…(1)

Variable	VIF	1/VIF
agric	3.04	0.328899
ind	2.87	0.347961
trade	2.47	0.404888
rgdp	2.08	0.481189
loans2	1.72	0.581688
grants	1.28	0.783344
Mean VIF	2.24	

ii. $lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 IMP + \beta_4 EXP + \beta_5 SIZE + \beta_6 F + \beta_7 L + \varepsilon_{i,t}$ ……..…(2)

Variable	VIF	1/VIF
agric	3.06	0.326983
ind	2.96	0.338045
imp	2.46	0.406040
rgdp	2.10	0.477091
loans2	1.73	0.579150
exp	1.55	0.645885
grants	1.49	0.670484
Mean VIF	2.19	

iii. $lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 SIZE + \beta_4 TRADE + \beta_5 ODA + \varepsilon_{i,t}$ ……..(3)

Variable	VIF	1/VIF
agric	2.77	0.360405
ind	2.70	0.370891
oda	2.36	0.424334
rgdp	2.30	0.434737
trade	2.21	0.452154
Mean VIF	2.47	

iv. $lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 IMP + \beta_4 EXP + \beta_5 SIZE + \beta_6 ODA + \varepsilon_{i,t}$ ……...(4)

Variable	VIF	1/VIF
agric	2.82	0.354259
ind	2.81	0.355986
oda	2.36	0.423772
rgdp	2.30	0.434605
imp	2.06	0.485489
exp	1.40	0.712725
Mean VIF	2.29	

Appendix 3.8: Regression Results

$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 TRADE + \beta_4 SIZE + \beta_5 F + \beta_6 L + \varepsilon_{i,t}$ ……..…(1)

$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 IMP + \beta_4 EXP + \beta_5 SIZE + \beta_6 F + \beta_7 L + \varepsilon_{i,t}$ …….…(2)

$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 SIZE + \beta_4 TRADE + \beta_5 ODA + \varepsilon_{i,t}$ ….……...(3)

$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 IMP + \beta_4 EXP + \beta_5 SIZE + \beta_6 ODA + \varepsilon_{i,t}$ ……...(4)

RESULTS:

DETERMINANTS OF TAX REVENUE				
VARIABLE	**REGR 1**	**REGR 2**	**REGR 3**	**REGR 4**
ODA			0.19065***	0.1864***
			(0.04883)	(0.0450)
GRANTS	0.37936**	0.025175		
	(0.01807)	(0.018753)		
LOANS	0.28229***	0.291787***		
	(0.08166)	(0.078561)		
AGR	-0.04153	-0.032415	-0.09691	-0.0760
	(0.07257)	(0.069873)	(0.07296)	(0.0678)
IND	-0.17151	-0.207904*	-0.38325***	-0.4400***
	(0.12305)	(0.119847)	(0.12543)	(0.1180)
TRADE	0.06135		-0.05255	
	(0.03661)		(0.03646)	
IMP		0.107793**		0.0011
		0.043667		(0.0404)
EXP		-0.059614		-0.2086***
		0.076041		(0.0732)
RGDP	0.01964	0.024708	0.04924	0.0508
	(0.03178)	(0.030641)	(0.03519)	(0.0324)
OBSERVATTIONS	33	33	33	33
P VALUE	0.000	0.000	0.000	0.000
OVERALL R2	0.7228	0.7544	0.6812	0.7391
F	11.3	10.97	11.54	12.28

*****Significant at 1 percent, ** Significant at 5 percent, * Significant at 10 percent**

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 TRADE + \beta_4 SIZE + \beta_5 F + \beta_6 L + \varepsilon_{i,t}$$

……(1)

```
. reg lntgdp agri ind trade rgdp grants loans2
```

Source	SS	df	MS	Number of obs =	33
Model	117.955666	6	19.6592777	F(6, 26) =	11.30
Residual	45.2259172	26	1.73945836	Prob > F =	0.0000
				R-squared =	0.7228
				Adj R-squared =	0.6589
Total	163.181583	32	5.09942448	Root MSE =	1.3189

lntgdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
agric	-.0415337	.0725745	-0.57	0.572	-.1907127	.1076453
ind	-.1715134	.1230535	-1.39	0.175	-.4244535	.0814268
trade	.0613541	.0366134	1.68	0.106	-.0139057	.136614
rgdp	.0196382	.0317829	0.62	0.542	-.0456924	.0849688
grants	.0379361	.0180733	2.10	0.046	.0007859	.0750863
loans2	.2822863	.0816586	-3.46	0.002	-.4501379	-.1144346
_cons	-1.945409	7.116842	-0.27	0.787	-16.57429	12.68347

```
. reg lntgdp agri ind trade rgdp grants loans2, r
```

Linear regression — Number of obs = 33; F(6, 26) = 18.09; Prob > F = 0.0000; R-squared = 0.7228; Root MSE = 1.3189

lntgdp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
agric	-.0415337	.0709953	-0.59	0.564	-.1874665	.1043992
ind	-.1715134	.1335581	-1.28	0.210	-.446046	.1030192
trade	.0613541	.0411284	1.49	0.148	-.0231865	.1458948
rgdp	.0196382	.0354449	0.55	0.584	-.0532198	.0924963
grants	.0379361	.0209784	1.81	0.082	-.0051857	.0810579
loans2	.2822863	.0743217	-3.80	0.001	-.4350568	-.1295157
_cons	-1.945409	9.052307	-0.21	0.832	-20.55269	16.66187

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2\ IND + \beta_3 IMP + \beta_4 EXP + \beta_5 SIZE + \beta_6 F + \beta_7 L + \varepsilon_{i,t}$$

……(2)

```
.  reg lntgdp agri ind imp exp rgdp grants loans2
```

Source	SS	df	MS	Number of obs =	33
Model	123.107291	7	17.5867558	F(7, 25) =	10.97
Residual	40.0742925	25	1.6029717	Prob > F =	0.0000
				R-squared =	0.7544
				Adj R-squared =	0.6857
Total	163.181583	32	5.09942448	Root MSE =	1.2661

lntgdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
agric	-.0324148	.0698728	-0.46	0.647	-.1763206	.111491
ind	-.2079039	.1198472	-1.73	0.095	-.4547338	.038926
imp	.1077925	.0436667	2.47	0.021	.0178592	.1977259
exp	-.0596137	.0760412	-0.78	0.440	-.2162234	.096996
rgdp	.0247076	.0306412	0.81	0.428	-.0383992	.0878144
grants	.0251745	.0187532	1.34	0.192	-.0134484	.0637974
loans2	.2917872	.0785611	-3.71	0.001	-.4535867	-.1299876
_cons	-.8206946	6.860887	-0.12	0.906	-14.95096	13.30957

```
. reg lntgdp agri ind imp exp rgdp grants loans2, r

Linear regression                               Number of obs =        33
                                                F(  7,    25) =     22.09
                                                Prob > F      =    0.0000
                                                R-squared     =    0.7544
                                                Root MSE      =    1.2661
```

lntgdp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
agric	-.0324148	.0689081	-0.47	0.642	-.1743336	.1095041
ind	-.2079039	.1319346	-1.58	0.128	-.4796282	.0638205
imp	.1077925	.0369463	2.92	0.007	.0317002	.1838849
exp	-.0596137	.084211	-0.71	0.486	-.2330494	.1138221
rgdp	.0247076	.0347124	0.71	0.483	-.0467839	.0961991
grants	.0251745	.0204681	1.23	0.230	-.0169804	.0673293
loans2	.2917872	.075036	-3.89	0.001	-.4463267	-.1372476
_cons	-.8206946	8.406183	-0.10	0.923	-18.13355	16.49216

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 SIZE + \beta_4 TRADE + \beta_5 ODA + \varepsilon_{i,t}$$

……..(3)

```
. reg lntgdp agri ind trade rgdp oda

      Source |       SS       df       MS              Number of obs =      33
-------------+------------------------------           F(  5,    27) =   11.54
       Model |  111.16614      5  22.233228             Prob > F      =  0.0000
    Residual |  52.0154436     27 1.92649791            R-squared     =  0.6812
-------------+------------------------------           Adj R-squared =  0.6222
       Total |  163.181583     32 5.09942448            Root MSE      =   1.388
```

lntgdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
agric	-.0969096	.0729621	-1.33	0.195	-.2466155	.0527963
ind	-.3832498	.1254335	-3.06	0.005	-.6406181	-.1258816
trade	-.0525482	.0364621	-1.44	0.161	-.1273622	.0222658
rgdp	.0492446	.0351896	1.40	0.173	-.0229586	.1214477
oda	.1906516	.0488265	3.90	0.001	.0904679	.2908353
_cons	1.782574	6.777143	0.26	0.795	-12.12297	15.68812

```
. reg lntgdp agri ind trade rgdp oda, r

Linear regression                               Number of obs =        33
                                                F(  5,    27) =     16.35
                                                Prob > F      =    0.0000
                                                R-squared     =    0.6812
                                                Root MSE      =     1.388
```

lntgdp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
agric	-.0969096	.0578368	-1.68	0.105	-.2155808	.0217617
ind	-.3832498	.1280483	-2.99	0.006	-.6459833	-.1205164
trade	-.0525482	.0380261	-1.38	0.178	-.1305713	.0254749
rgdp	.0492446	.0390583	1.26	0.218	-.0308965	.1293856
oda	.1906516	.0378842	5.03	0.000	.1129197	.2683835
_cons	1.782574	7.557764	0.24	0.815	-13.72468	17.28983

$$lnTGDP_{i,t} = \beta_0 + \beta_1 AGRIC + \beta_2 IND + \beta_3 IMP + \beta_4 EXP + \beta_5 SIZE + \beta_6 ODA + \varepsilon_{i,t}$$

……..(4)

```
. reg lntgdp agri ind imp exp rgdp oda
```

Source	SS	df	MS
Model	120.610936	6	20.1018226
Residual	42.5706478	26	1.63733261
Total	163.181583	32	5.09942448

Number of obs	33
F(6, 26)	12.28
Prob > F	0.0000
R-squared	0.7391
Adj R-squared	0.6789
Root MSE	1.2796

lntgdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
agric	-.0759608	.0678448	-1.12	0.273	-.2154178	.0634961
ind	-.4400442	.1180332	-3.73	0.001	-.6826649	-.1974234
imp	.0010979	.04036	0.03	0.979	-.0818632	.0840591
exp	-.2086215	.0731595	-2.85	0.008	-.359003	-.0582399
rgdp	.0507693	.0324463	1.56	0.130	-.015925	.1174636
oda	.1863785	.045043	4.14	0.000	.0937913	.2789658
_cons	3.874487	6.30854	0.61	0.544	-9.092902	16.84188

```
. reg lntgdp agri ind imp exp rgdp oda, r
```

Linear regression

Number of obs	33
F(6, 26)	21.11
Prob > F	0.0000
R-squared	0.7391
Root MSE	1.2796

lntgdp	Coef.	Robust Std. Err.	t	P>|t|	[95% Conf.	Interval]
agric	-.0759608	.0595988	-1.27	0.214	-.198468	.0465463
ind	-.4400442	.1336524	-3.29	0.003	-.7147707	-.1653176
imp	.0010979	.0429747	0.03	0.980	-.0872378	.0894337
exp	-.2086215	.0598103	-3.49	0.002	-.3315633	-.0856797
rgdp	.0507693	.0367285	1.38	0.179	-.0247273	.1262659
oda	.1863785	.0349355	5.33	0.000	.1145676	.2581895
_cons	3.874487	6.541745	0.59	0.559	-9.572262	17.32124

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