ADDIS ABABA UNIVERSITY
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THE IMPACT OF FOREIGN AID ON GOVERNMEMT EXPENDITURE THE CASE OF ETHIOPIA: VECTOR ERROR CORRECTION MODEL

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This is to Certify That The Project Prepared By: Abas Mohammed Ali. Entitled: "The Impact of Foreign Aid on Government Expenditure in Ethiopia: An Application of Vector Error Correction Model" Submitted in Partial Fulfillment of the Requirements for the Degree of Master of Arts in Applied Economic Modeling and Forecasting (Fiscal Policy Analysis and Management) Complies with the Regulation of the University and meets the accepted Standards with Respect to the originality and quality.

Approved by:	Signature	Date
Tadele Ferede (PhD)	_____	_____

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ABSTRACT

The Impact of Foreign Aid on Government Expenditure: The Case of Ethiopia: Vector Error Correction Model

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Foreign aid represents an important source of finance in most countries in sub-Saharan Africa (SSA), where it increases government's expenditure, supplements low savings, narrow export earnings and thin tax bases. In this paper, a welfare utility maximization function is used and the necessary diagnostic tests undertaken to determine how government spending respond to aid flows. It employs a co-integrated error correction model to account for potential endogeneity and non-Stationarity problems. The empirical results indicate that the flow of foreign aid does influence government spending patterns. It supports the hypothesis that in Ethiopia, during 1966 – 2013, foreign Aid has a positive effect on total government expenditure.

Foreign aid is fungible in Ethiopia, it flows to unintended purpose. Disaggregating the data into capital and non- development expenditures, like general service expenditure and defense expenditure, the relationship has been examined. Capital expenditure is positively and significantly affected by foreign Aid and also Foreign Aid finances Non- developmental Expenditures. The study also provides evidence that policy change increases total and capital expenditures significantly. Taking into account Foreign aid influences government expenditures positively the government has to design effective strategy that enhances flow of foreign aid to the capital expenditure and protecting from non-developmental sectors.

LIST OF ACRONYMS

DCs	Developed Countries
E.C	Ethiopian Calendar
EPRDF	Ethiopian Peoples Republic Democratic Front
FRM	Fiscal Response Model
GDP	Gross Domestic Product
GTP	Growth and Transformation Plan
HDI	Human Development Index
IMF	International Monetary Fund
LDCs	Least Developing Countries
MDGs	Millennium Development Goals
MoFED	Ministry of Finance and Economic Development
NGOs	Non Governmental Organization
OECD	organization for Economic Development and Cooperation
PASDEP	Plan for Accelerated and Sustainable Development to Eradicate Poverty
PBS	Protection of Basic Service
USD	United states Dollar
VAR	Vector Autoregressive
VEC	Vector error correction
SSA	sub- Saharan countries

CHAPTER ONE

1 Introduction

1.1 Background of the study

Foreign aid has been an identified issue among researchers for the last seven decades through various debatable questions in different period. Given, absence of common consensus among researchers regarding the issues raised, foreign aid continued to play an important role in developing countries, especially in sub Saharan African countries. Foreign aid or official development assistance (ODA) is, as defined by organization for economic cooperation and development (OECD), includes transfers of concessional resources from one government either to another government or to an international aid agency or non-governmental organization which in turn transfers the resources to a least developing countries. ODA consists of grants, concessional loans (defined as loans that provide a grant element of at least 25 percent via the grace period, interest rate and repayment terms), other commodities provided on concessional terms, and debt relief.

The history of foreign aid was dated back to the 1940s started with the aim of reconstructing the war torn economy of Western Europe (Todaro 1989). Progressively more countries began receiving foreign aid which mainly had two objectives. The first objective was to promote long term growth and poverty reduction in developing countries and the second, to promote short term political and strategic interests of the donor countries in the recipient's country (World Bank 1998). Though foreign aid has a paramount importance in developing countries and several externally financed programmes and projects were initiated, especially in sub Sahara Africa, it is interesting to note that after half a century of channeling resources to Third World, little development has taken place. In almost all of sub Saharan Africa countries, there is a high degree of indebtedness, high unemployment, absolute poverty and poor economic performance. These scenarios have prompted aid donor agencies and experts to revisit the earlier discussions on the effectiveness of foreign aid (Lancaster, 1999).

In the beginning of development assistance to the least developing countries, domestic capital markets were thought unavailable and unable to serve as engine for growth and development in LDCs. So in many least developing countries government was taken as a positive agent for

economic, social and political changes. Government to government aid was believed as an optimal way in achieving economic growth and poverty reduction rates. Government can focus on investing on growth enhancing pro poor sectors and utilizes the available resources effectively and efficiently. Unfortunately, the optimisms of aid-financed government led projects were not as effective as expected and aggravated by dismantling of central planned economies in the late 1980s. In contrast, rapid economic growth in the market based East Asian countries attracted the attention of donor agencies and become an effective strategy for development. The different views about choosing the right agent in utilizing foreign aid which has an ultimate impact of the perceived output, i.e. economic growth and reduction in poverty, has directed to the third view of both government and market based system initiated(World Bank, 1998).

Noting the above development strategy, African economies have received large inflow of foreign aid after 1950s. In Africa, the share of Official Development Assistance (ODA) to GDP has significantly increased over the years. It drastically increased from 1.9 percent in 1960-61 periods to 2.9 percent in 1970-71 and to 5 percent in 1983-84 and reached 9.6 percent in 1990-91 periods (World Bank, 1992). Finally, the share of foreign aid to GDP in the post reform period also increased to 18 percent during 2000-01 fiscal years.

In Ethiopian case, an inflow of external loans and grants started around 1950's. During the third five-year plan period (1957-1973), 25 percent of the required total investment was covered by external public capital. During that period, what, Ethiopia has been receiving was not small. It was often argued that the direction of foreign aid was characterized by negligible long run objectives, in favor of infrastructure services compared to direct investment activities for agriculture and industry sectors. Similarly, during the post revolution period, 37 percent of the total annual campaign of 1979-83 was financed by foreign aid (Tolessa, 2001).

In recent years, Ethiopia has been receiving $3.5 billion on average from international donors, which represents between 50 to 60 percent of its national budget. The entities that have provided the most substantial development aid for the last decade are the US (through USAID and the State Department), the World Bank Group, and the UK. The government controlled by the Ethiopian People's Revolutionary Democratic Front (EPRDF) has developed strong

development rhetoric in recent years going as far as describing Ethiopia as a "developmental state." In 2006, it enacted the Accelerated and Sustained Development to End Poverty (PASDEP) program, which began a restructuring of agricultural arrangements to increase exports with the stated purpose of improving food security. Proving effective at attracting large sums of foreign assistance, the Ethiopian government recently built on past efforts with the 2010-2015 Growth and Transformation Plan (GTP). Through this plan for economic development, the government aims to reach middle-income nation status. But with $3.5 billion in donor money on the books, the "developmental state" is highly dependent on the flow of foreign aid (Oakland Institute, 2013).

1.2 Statement of the problem

Since 1960 nearly $1.7 trillion (measured in 1995 dollars) has flown from rich to poor countries as foreign aid. In the 1990s, however, aid fatigue has been setting in. With the end of the Cold War and many rich countries facing their own fiscal problems, foreign-aid budgets are being squeezed. Donor governments and aid agencies are asking new questions about whether the assistance they provide is as effective as possible in promoting economic growth and reducing poverty, two oft-stated development policy objectives. Much of this attention is focused on the impact of foreign aid on public expenditures in recipient countries. Public expenditures have long been considered one of the main channels through which foreign aid influences development outcomes. The donor community has been increasingly concerned that aid development assistance earmarked for critical social and economic sectors is being used directly or indirectly to fund unproductive expenditures including those on defense.(Devarajan et.al, 1998)

The link between foreign aid and public spending is not straightforward because some aid may be "fungible". An aid recipient country could render earmarked aid fungible by reducing its own resources from the sector which receives aid and transferring it to other sectors of the budget. Foreign aid induces changes in the recipient country's budgetary allocation, although the magnitude of change depends, among other things, upon the size of the aid relative to the recipient's own resources. Increasingly the donor agencies are giving much attention that development assistance of earmarked for critical social and economic sectors might be used directly or indirectly to fund unproductive military expenditures. Given that a significant portion of aid is provided for specific projects or sectors (e.g., projects in agriculture, health, transport

etc.), donor agencies would therefore like to know whether aid is indeed effective in increasing net expenditures in that sector or whether specific purpose aid merely substitutes for expenditures that governments would otherwise have undertaken. In this context, it is very important to analyze how fungible is foreign aid across public expenditure categories. (Feyzioglu, et. al, 1996).

Ethiopia, like any other developing country is not in a position to mobilize enough domestic resources to finance government spending on different sectors of the economy. To finance the gap it resorts to external assistance. During the year 2011/12, fiscal deficit was targeted to be 1.7 percent of GDP, while, the actual gap has been 1.2 percent of GDP, making the deficit lower by 0.5 percentage points against the target. The level of budget deficit amounted to birr 8.8 billion in 2011/12. About 75 % of the deficit was financed by foreign borrowing, while the remaining has been covered by domestic debt and income from privatization. The total disbursement from all sources in 2011/12 was 2617.9 million USD which falls short of the disbursements in 2010/11 by about 3.1 percent. In 2011/12 fiscal year, a total of 1,141.3 million USD has been disbursed from bilateral sources, of which, 690.5 million USD was disbursed from 15 countries as grants, while, the remaining 450.8 million USD came in the form of loan (MoFED, 2013).

Earlier the aid-savings debate focused on the two-gap model developed by Chenery and Strout (1966) that set foreign aid as an engine of growth. Critics of this model have argued that foreign aid substitutes domestic resources through declined savings, reduced government tax revenue and increased government consumption. With the renewal of the debate, the question remains as to whether external assistance complements or substitutes available domestic resources. At this point, it is important to note that, if aid is not supporting productive investment in recipient countries then it must be financing either unproductive investment or consumption.

In the context of the above explanation, this paper tries to examine, what does aid ultimately finance or what form of expenditure is supported by donor funds in Ethiopia? This is very important because some public spending have direct link with some macro economic variables like productivity and growth than others.

1.3 Significance of the study

Previous similar studies on aid fungibility were conducted in cross-country basis. The study of foreign aid on a sectoral basis by cross-country analysis doesn't allow us to clearly examine the sectoral impact of aid on a country's sector spending. In this respect, different countries have different result for the impact of aid on sectors spending. Hence, such work can usually be conducted in the context of country specific, to capture the different impact of earmarked aid on the sectors. Several literatures has been conducted on aid effectiveness on public spending and contributed a lot in sub Saharan African countries, for instance, African Economic Research Consortium, Nairobi, analyzes the impact of foreign aid on public spending in Kenya in aggregate level and other similar studies has been undertaken in other sub Saharan countries. In Ethiopia case the number of studies undertaken on the fungibility of foreign aid is very limited in number and scope, Jifar (2002) has analyzed the fungibility of foreign aid across different sectors in Ethiopia, Henok (2010) conducted the same issue in aggregate level and disaggregating the expenditure into recurrent and capital expenditure but it is promising if we take some selected non developmental expenditure and look the impact of foreign aid on the variables selected, to have a clear cut view of the perceived impact of foreign aid, to promote economic growth in the recipient country. Despite the former studies in Ethiopia, the area is not researched intensively in which further study still required and this study uses latest and more detailed data and tries to look impact of foreign aid on some selected non developmental sectors. Consequently, the result expected from this study could also be useful in improving policy design, institutional set up, implementation, monitoring and evaluation in the area of foreign aid allocation to public spending.

1.4 Objectives of the study

The general objective of the study is to analyze the impact of foreign aid on government expenditure.

Specifically, the paper objective is,

1. To identify the relationship of foreign aid and government expenditure in the case Ethiopia

2. To investigate the relationships of domestic revenue and various categories' of government expenditure.

3. To examine foreign aid fungibility and whether foreign aid has any effect in stimulating expenditure in non-developmental activities.

1.5 Scope and limitation of the study

The study has conducted based on the availability of the data. The study covers the time in between 1958 – 2005 E.C. Significant discrepancy among different international and local data sources on the foreign aid was a great challenge in the process.

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CHAPTER TWO

Literature Review

2.1 Theoretical literature

2.1.1 Aid fungibility: A definition

Fungibility is the property of a good or a commodity whose individual units are capable of mutual substitution. A good or asset's interchangeability with other individual goods/assets of the same type. Aid fungibility is basically concerned with how an aid inflow affects government expenditure and financing patterns in the recipient country. Aid fungibility can be defined in two contexts. Fungibility in the development/foreign aid context refers to the ability of an aid recipient to avoid donor-imposed restrictions and spend some amount of targeted aid on non targeted aid programmes. This amount is defined as the fungible component of targeted aid (McGillivray & Morissey, 2000). Fungibility in the public finance context refers to the recipient's ability to transform some portion of targeted aid into pure income or income-generating resources that can be spent effectively in any way the recipient chooses. Here, the "fungible component" refers to the pure income supplement. Some of it can be spent on the targeted good depending on whether this good is normal or inferior (Feyzioglu et al 1998).

The approach used to address fungibility can be divided into two. The first one is concerned with the fungibility of aid as regards government spending patterns, while the other one, so called 'fiscal response' literature, adopts a more theoretical approach and attempts to analyze how aid impacts on various categories of expenditures and financing sources including the effect on taxes. (McGillivray and Morrissey 2000).

There are also important qualifications made by World Bank report (1998) for a given aid to be fungible. These qualifications can be summarized as below:

- Full fungibility does not mean that none of the aid is spent on civil goods (e.g. education).

- Fungibility is a problem when donors and recipients have different objectives (e.g. donors want all money spent in education but recipient want to spend some of the money in education and some in military).
- Fungibility requires that the amount of aid in target sector is less than the amount the recipient would have spent from its own resources.
- Fungibility is less likely when a) the amount of aid is large relative to the recipient's budget as in many aid dependent countries and b) the item to which the financing is tied is specific and a small fraction of the recipient's budget.

White et al (1998), further elaborates the definition of fungibility by distinguishing between aggregate and categorical fungibility. The former is where the aggregate category (say, imports or government expenditure) does not rise in a one-for-one manner with an aid flow whose intended purpose is to increase the aggregate figure. Categorical fungibility occurs if the inflow increases any expenditure item within the aggregate other than those intended by the donors.

2.1.1.1 A Graphical Analysis of Aid Fungibility Among public Spending Categories

Suppose an aid donor gives money to build a primary school in a poor country. If the recipient government would have built the school anyway, then the consequence of the aid is to release resources for the government to spend on other items. Thus, while the primary school may still get built, the aid is financing some other expenditure (or tax reduction) by the government. In such a case, donor assistance is said to be fungible. This concept of fungibility could be illustrated a bit more rigorously. Suppose a country spends its total resources on a single private good, Cp, and two public goods, G1 and G2. All three goods are normal (non-inferior). It pays for these goods by means of domestically generated resources. In addition to its own resources, the country receives earmarked assistance towards the purchase of good G2 from a donor agency. For simplicity, we assume that there is no impact of aid on the relative price of the two goods. Below figure 1 captures this scenario. *BB`* represents allocation choices that can be financed from domestic resources, and given the preferences of the recipient country, point *A* represents the preferred resource allocation. An amount *F* of earmarked foreign aid is given for G2. The donor agency and the recipient country are assumed to have different preferences

regarding how aid should be spent, (If they have identical preferences, then the distinction between earmarked aid or pure budgetary support has no meaning). While the donor agency would like the aid funds to be spent on G2 at the margin, for a variety of reasons, it is unable to monitor the intended pattern of public spending.

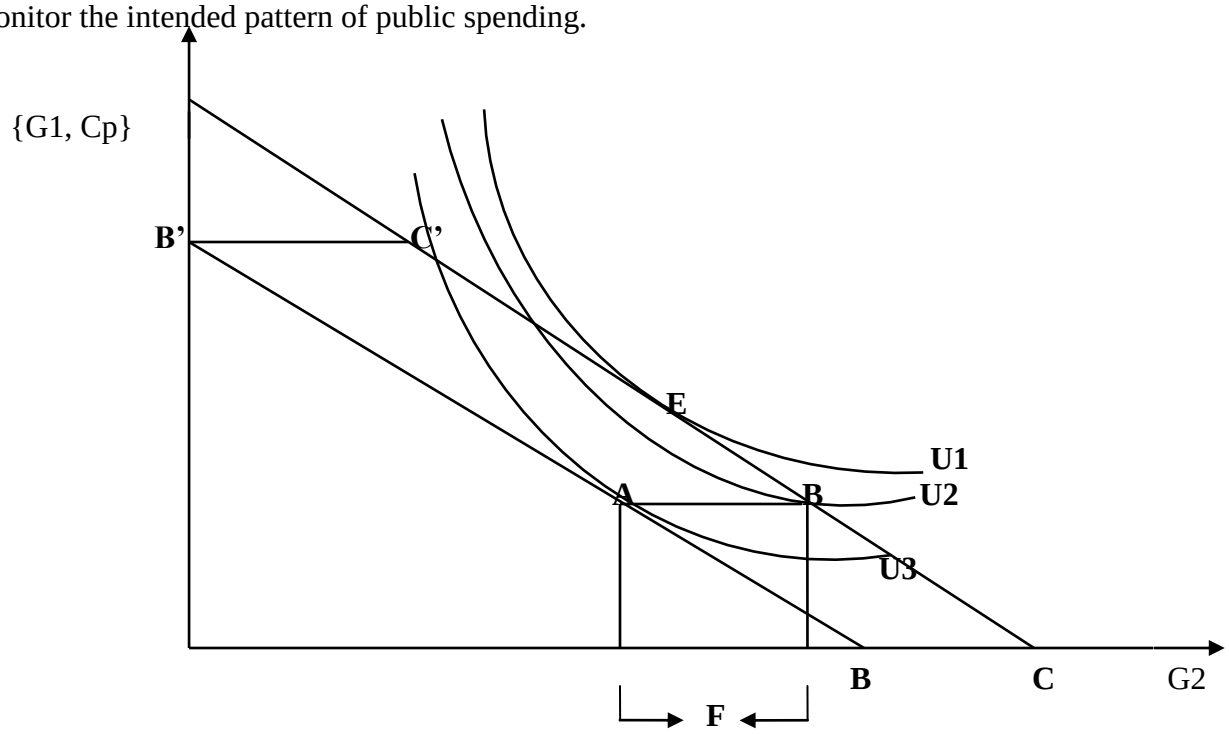


Figure 2.1: Impacts of foreign aid on country's budget allocations

Upon receiving aid, therefore, the recipient country is able to make it fungible by changing both the level and composition of its public expenditure program. If the recipient country can treat the entire aid amount as a pure supplement to its domestic resources, then aid is fully fungible. As illustrated in Figure 1, the post-aid resource constraint is *B`C`C* ; the horizontal segment, *B`C`*, indicates that at least the aid amount has to be spent on G_2. The new optimal resource allocation is given by the point *E*. The latter indicates that in spending the acquired aid resources on good G_2, the country diverts some of its own resources from G_2 to C_p and G_1. Suppose, on the other hand, the recipient country does not divert any of its resources away from the aided good while spending the earmarked aid on it. This could be due to the donor Agency's effective public expenditure monitoring process. In such a case, aid is fully non-fungible.

The optimal allocation mix of the country's *own* resources is not influenced by the aid amount and point *A* (in Figure 1) continues to be the country's preferred mix. Aid to G_2, however, increases overall utility. The post-aid consumption point, *D*, is on a higher indifference curve U_2. This indicates that even if the aid was fully non fungible, the recipient country would still benefit. Finally, if the country can treat a portion, f ($0<f<1$), of the aid as a resource supplement, then aid is said to be partially fungible and the fungible portion of the aid is given by f . In such a case, the post-aid resource line (not drawn in Figure 1) moves out by the fungible amount. In choosing the optimal resource mix, the country includes the fungible amount as an additional resource supplement to be spent but disregards the non-fungible portion, 1-f. Depending on the value of f, the final consumption point lies between points *E* (f =1) and *D* (f =0) in Figure 1. This is the basic model that has been applied to data, when the fungibility coefficient f is estimated (see Feyzioglu *et al*., 1998, for an application).

We now define aid fungibility: Given the pre-aid budget constraint, if the recipient country could treat a portion, f ($0 < f< 1$), of the earmarked aid as if it was revenue supplement then aid is said to be fungible. The different degrees of aid fungibility are defined as follows: let the horizontal axis of the graph represents defense expenditure and any private good (Cp, G1) and the vertical axis educational expenditure (G2).

Case 1. Aid is fully-fungible if f = 1 and the post-aid optimal mix of the two goods, chosen by the country, is an interior solution. The latter requires that the country spend at least some of its own resources besides the aid in the targeted sector. f = 1 implies that the budget constraint shifts outward by the full amount of aid with a kink indicating the aid conditionality, and if the solution is interior, the country moves to a new optimal point associated with a higher level of utility. In Figure 1 this is indicated by a move from point A to point E.

Case 2. Full non-fungibility occurs when f = 0. In this case the country is not able to manipulate its resources and is forced by the donor agency to spend all the aid money in the targeted sector. Given the preferences of the country, such a move is sub-optimal as shown by a move from point *A* to point D in Figure 1.

Case 3. Aid is partially-fungible if $0 < f < 1$, in this case the country's budget constraint shifts outward by the fungible amount of aid. A kink in the new budget line (not shown in Figure 1) indicates that the education expenditure chosen by the country plus the non-fungible part of the aid, has to be greater (or equal to) the aid amount. The country then chooses an optimal point (if the solution is interior) on its new budget line and then adds the non-fungible part of the aid to its education expenditure. Partial fungibility implies that the country is not able to transfer resources from education expenditure to defense as much as it would like to. This case would be given by a point that lies between E and D on the post-aid budget line in Figure 1, and would be sub-optimal (though it would be associated with a higher level of utility than the case with full non-fungibility).

Aid fungibility at the margin

In the definition o f fungibility given above, we do not treat aid as a marginal dollar after taking into account the recipient's pre-aid spending composition. In reality, however, when targeting aid to particular sectors, donor agencies take some proxy of what the recipient country would have spent in the absence of aid. To ensure that the recipient country spends aid funds in the targeted sector and to preclude any switching of funds at the margin, they often impose carefully chosen conditions. Restricting the switching of funds, at least on paper, seems simple; all what donor agencies need to do is to figure out the pre-aid levels of spending of the recipient country from its previous years' budget documents. Using this as an indicator, though not perfect, of what the country would have spent in the absence of aid, donor agencies can compel the recipient country to spend the aid funds at the margin in the targeted sector. For example, in Figure 1, if the pre-aid composition of education and defense spending is known to be at point A. the recipient country could be asked to spend in addition the aid resources, F, on education. The post-aid composition would then be at point D and aid will be completely non-fungible at the margin. In practice, however, there are at least three reasons why such monitoring is difficult, if not impossible. First, domestic resources in developing countries fluctuate by significant amounts from year to year. Treating past years' composition of spending as the pre-aid composition may not be very meaningful if the change in domestic resources is large relative to foreign aid. In such situations, recipient countries can easily switch aid funds among expenditure categories. Second, when there are several sources of aid in a country and donor coordination is not good, aid monitoring

becomes extremely difficult. Finally, not all aid goes through the recipient country's budget. In many developing countries, particularly in Sub-Saharan Africa, a portion of foreign aid bypasses the government budget. In such cases it might be difficult to pinpoint the spending requirement for the government. All in all, monitoring foreign aid is difficult in practice and so aid fungibility is essentially an empirical issue.

2.1.2 Consequences of aid fungibility

The preceding section shows that if donor and recipient preferences differ, it is possible that the latter could convert aid into fungible resources. In granting aid, donors often require that proceeds be used for the purposes for which they are granted. The recipient could fulfill that conditionality by spending aid money for the purposes for which it was given. Yet, the earmarked funds may be releasing resource that is already available to the recipient for some other purpose. Is this a bad outcome? Not necessarily. Proponents of foreign aid argue that notwithstanding the diversion of local spending, aid money is intrinsically more effective than local spending as it comes packaged with technical assistance and superior management skills of donor agencies. Indeed, it is quite likely that donor involvement may increase the rate of return on the project. It may also lead to changes in policy, institutions, and project design. Yet, if aid funds crowd-out domestic resources from that activity, they may end up financing, at the margin, very different and perhaps undesirable activities. In such a case, the developmental impact of external assistance may be quite different from that perceived from traditional measures of project success including the economic rate of return.

Precluding aid fungibility appears to be simple, at least on paper. All that is needed is conditionality on incremental spending. In practice, however, it is difficult to figure out what the recipient government would have done in the absence of that donor financing. Estimating the counterfactual is problematic. In most cases when they target aid to particular sectors, donor agencies use a proxy (e.g., the previous year's spending) of what the recipient government would have spent in the absence of aid. Treating past year's composition of spending as the pre-aid composition may not be very meaningful if the change in domestic resources is large relative to foreign aid. Moreover, the multiplicity of donors further complicates the analysis. The bottom

line is that in most cases it is difficult to preclude switching of donor funds at the margin. Even if nonfungibility can be established, the recipient may not feel ownership for the project if it was not planning to include in its expenditure program. The win-win situation results only if there is preference matching between the donor and the recipient and they both want to undertake the project which would not have been feasible in the absence of donor financing.

2.1.3 Government Spending and Foreign Aid

The concept was first described by Gramelich (1979), in the literature published on "The Stimulative Effect of Government Grants". Gramelich, together with Courant and Rubinfeld, sought an explanation for the phenomenon that non-matching grants stimulate much more local spending per dollar of grant than does income going to private citizens within the community. In other words, an increase in $ 1 aid leads to more than a dollar increases in government spending. Thus, instead of providing tax relief by substituting for domestic mobilization, aid may increase taxation by "crowding in" government spending. This "Crowding in" is possible if aid helps government mobilize other resources through improved tax collection or better access to commercial funds or if aid relieves constraints that were limiting government spending (WB 1998). In this case, aid can be fungible if the government uses the increased resource to finance spending, tax cuts or reduce fiscal deficit. The flypaper effect in this paper is defined as: "bureaucrats and politicians find it easier to avoid cutting taxes when the government receives revenue-sharing monies than they do to raise taxes when some exogenous event raises the income of the community. Despite the above arguments, however, it is not generally evident that flypaper effect hold.

2.1.4. Consumption, Investment and Foreign Aid

In the absence of foreign aid, every economy faces a choice to consume now or in future, i.e. investment. The more investment undertaken by a given economy, the less it consumes now, in order to release more resources in future times. Hence, foreign aid, just like any other domestic resources, could be allocated for investment and/or for consumption (Weissen kopf 1972) as cited in Teressa (1997). In LDC, foreign aid can effectively transform into income augmenting fund and thus purely fungible resources (Khiliji and Zampelli 1991, Pack and Pack 1993). This directly influences how these countries governments allocate foreign aid for the expansion of

productive expenditures, expansion of consumption expenditures, tax reduction or other objectives of government policy (Mosley et al 1987). To grasp this interplay between capital formation and consumption spending requires an understanding of a country's response to price and income movements, plus some knowledge on the effective mechanism of foreign aid, and the responsiveness of aid donors to recipient country's needs, must be known (McGuire 1987; White 1992)

2.1.5 Development Spending and Foreign Aid

In practice, it is difficult to find the link between aid and development financing. In general, development financing is aimed at particular project or specific expenditures, such as investment in infrastructure or social services. Since many developing countries have weak data on how development expenditures and non- developmental expenditures like defense, debt servicing and others are allocated, it is difficult to split between development expenditure, non-development expenditure and aid. However, a general idea can be gained by examining the aid impact on various sectors of the economy in which aid is frequently given (WB 1998). There are two ways of addressing sectoral fungibility i.e., if aid to a particular sector raises expenditure along that sector by comparison of cross sectional data and time-series analysis. The net effect of an aid dollar on spending in specific sector depends not only on the composition of the aid received, but also on how the government responds to aid flows (WB 1998). In this case, the recipient government has several options to spend when they receive aid. They can increase spending or reduce taxes one to one to inflow of foreign aid. Another option can be the reduction of fiscal deficit and/or increase spending in non-developmental activities.

2.2 Empirical Literature

2.2.1 Aid Effectiveness

The aid effectiveness literature has shown that aid to developing countries tends, on balance, to have a positive effect on growth, though results are sensitive to the econometric method adopted. Much of the literature on foreign aid and its impact on development in the recipient countries focuses on the relationship between aid and economic growth and uses international cross section statistical investigations rather than individual country case studies. The results of cross-

section studies depend on the countries and periods of study chosen. Such studies face numerous problems of measurement and interpretation and often ignore the stylized structural features of individual countries. For example, though foreign aid was once associated with reduced domestic savings, comprehensive surveys on individual recipient countries have proved otherwise. Foreign aid can influence, either positively or negatively, the expenditure patterns of recipient countries.

In recent years, the literature has concentrated on the relative importance of policy and other variables for aid effectiveness, and has less to say about how aid itself affects policy and specifically about the effects of aid on fiscal policy. Aid can affect economic growth, for instance, via its impact on government behavior, investment and savings. Government consumption or current expenditure can also raise growth, by increasing the general level of economic activity. As much of aid is usually given to the government, its effects on growth and poverty are likely to be primarily mediated by government fiscal policy.

Aid can be less effective if it is fungible or is used for purposes other than what it was intended for. For example, aid may be used to invest in low productive sectors or to increase unproductive government consumption or to fund tax reduction or reduce borrowing. These can reduce domestic savings and investments through upward pressure on prices and interest rates (McGillivray and Morissey, 2001). The empirical literatures on impacts of foreign aid on fiscal aggregates can be divided into two categories. The fungibility literature concentrates on whether aid is spent on those sectors where it was intended, such as health and education. The fiscal response literature goes beyond issues of fungibility by analyzing the impact of aid on fiscal aggregates such as tax revenue, total spending, public investment (development expenditure), public consumption (recurrent expenditure) and domestic borrowing.

The evidence from the two types of literature suggests that aid can have significant impacts on fiscal aggregates and budgetary planning, but it is difficult to generalize and the actual effects remain rather country-specific. A number of previous econometric studies have analyzed LDC's public sector fiscal behavior in the presence of aid flows. This includes seminal work of Heller (1975), White (1993 and 1994) McGuire (1987), Cashel-cordo and Craig (1991) and Gang and Khan (1991). These studies have used key macroeconomic variables such as, public investment,

taxation and various categories of recurrent consumption to examine the possibilities that aid reduces taxation effort and is substituted between public investment and public consumption, which is the case of "fungibility". Fungibility of foreign aid among public expenditures categories in Ethiopian case have not been analyzed intensively only Jifar (2002) in sectoral wise such as, agriculture, health, education, transport and communication and Henok (2010) in aggregate level i.e. dividing public expenditure into recurrent and capital expenditure have been analyzed. These phenomena or "fungibility" have been more closely examined by Pack and Pack (1990), Mosley et al (1987), Feyzioglu et al (1998), Khilji and Zampelli (1991),Swaroop and Jha (1999) and Devarjan et al (1999) at international cross country and Njeru(2003), Akmal shahzad et. al (2011) at country specific level. The literature the on two categories has been reviewed in two different parts to have a clear cut view between the literatures.

2.2.1.1. Aid Fungibility literatures

Pack and Pack (1990), used three types of equations: non-developmental current expenditure, developmental expenditures and revenues for Indonesia during the period 1966-1986 across five sectors namely, agriculture, industry, transport and tourism, social sectors and others. These types of equations were also used to allow the cross sectional error correlation implied by the relation of the dependant variables through the budget constraint. The coefficient estimates are then used to stimulate the effects of a rupiah increase in aid per capita, which is spread over the sectors in proportion to their average share in project aid during the 1966-1986 period of the study. They used systems estimation procedure, in the case of seemingly unrelated regressions, SUR employed in Zeller (1962). The result for Indonesia, as Pack and Pack (1990) put it, shows that a one rupiah increase in categorical aid apportioned according to average categorical aid values, stimulates an increase in total expenditure of 1.58 rupiah. Half of the increase is financed by an increase in revenue raised by Indonesia from its own sources and suggested that the other half increase may come from a reduction in expenditures in the residual expenditure category namely to manpower and regional development.

The finding that aid increases revenue collection is not in line with the fiscal response literature that taxes fall as aid rises. Taxes are raised rather than reduced in response to inflow of aid and

hence, the author concluded that, as Pack and Pack (1990) put it, foreign aid didn't displace development expenditure and it rather stimulates total public expenditure. Moreover, most categorical aid was spent on the purposes for which donors intended it. No diversion of aid to other categories of development expenditure occurred. They also found no support either for diversion of developmental aid to current expenditures or foreign aid leads to a reduction in domestic revenue-raising effort.

However, Pack and Pack (1993), in the Dominic Republic case study, find that, there is clearly substantial diversion of foreign aid away from its intended purposes. Contrary to donor objectives, an additional dollar of aid stimulates no net development expenditures but decreases them by 5 cents per dollar of aid. Total expenditures (recurrent and capital expenditure), taking into account the decrease in the indirect investment, actually decrease by about 27 cents per dollar of foreign aid. Thus aid is employed largely for debt repayment and deficit reduction about 88 cents per dollar.

Jifar (2002) has criticized the value of R^2 reported on the Pack & Pack (1990) study is 0.99, which may show a higher probability that the estimate regression is spurious. According to him time series property of the data and the diagnostic tests are not incorporated to the model. Moreover, to capture the full range of aid fungibility, they didn't estimated the impact of foreign aid on non developmental expenditure by disaggregating into various types such as defense spending, debt servicing and other types of general expenditures.

Devarjan et al (1999), focused on Sub-Saharan Africa with the largest GDP share of aid. He used a panel data which has annual observation on 18 Sub-Saharan African countries from 1971-1995 by using two stage least square method. Ethiopia was also included in the analysis to examine the impact of sector specific concessional loan on sectoral spending. In this study, fungibility of concessionary loan intended for particular sector in Africa has different outcomes. According to them, aid given to energy and transport & telecommunication sectors leads to some increase in public spending in those sectors, but the increase is not one to one. However, aid to education sector has an almost one-to-one effect on the sector's spending in Africa. They also indicated that in partial fungible sectors, governments pull more out of aid resources than they do out of

their own at the margin. All in all, aid to Africa is partially fungible which means that government do not spend all sectoral aid in that sector, nor do they use such aid for budgetary support.

Njeru (2003) has conducted the impact of foreign aid on public expenditure in Kenya and has found that the flow of foreign aid does influence government spending patterns. There is a positive and statistically significant relationship between the share of government expenditure in gross domestic product (GDP) and the share of net disbursement of overseas development assistance (ODA). While the study finds relatively little evidence that aid leads to tax relief, there are strong indications that the government renders aid fungible by financing recurrent expenditures.

Akmal Shahzad et al (2011) conducted the impact of foreign aid on public expenditure in Pakistan. The study uses time series data for the period 1990 to 2010 and the result reveals that there is positive relationship between both program & project aid and government expenditure.

Feyzioglu et al (1998) using cross country data from 14 developing countries found that aid is not fungible at aggregate levels in smaller samples, but that increasing the number of countries makes aid fungible. At sectoral levels, the study found that aid is fungible on ear marked concessional loans for agriculture, education and energy, but not for transport and communication sectors. Aid money increased government expenditures on a roughly one to one basis for the smaller samples. Increasing the sample to 37 countries changed the result. The evidence that aid money increases government expenditures means that recipient governments do use the increased resources as they choose to increase spending, cut taxes, or reduce fiscal deficits.

Swaroop et al (1999), uses Indian data to examine the fiscal effects of foreign aid from 1970-1995 by using OLS techniques. They disaggregated expenditure into non-developmental and developmental for agricultural, irrigation, energy, transport and manufacturing sectors. They model two dimensions of foreign aid fungibility at a federal level and inter-governmental (state) level. Their empirical findings suggests that the central government convert most foreign funds

including those earmarked for state governments into fungible monies and spend on activities that would have been undertaken anyway.

Devarjan et al (1999) employed similar methodology but finds that aid to education is non-fungible and partial fungible in transport and communication and energy sectors. The result obtained from different studies indicates mixed result even if the sample countries differ. A more careful reading of empirical evidence reveals that degree of fungibility differs between sectors and countries with the lack of empirically supported explanations.

Jifar (2002) try to examine the impact of foreign aid on public spending in Ethiopia using time series data at sectoral level and found that education and agriculture sectors were marked by non-fungibility in which case the sectoral aid impact on sectoral spending have crowding in effect. However, for transport & communication and construction sector, aid fungibility seems to exist which means that there is crowding out effect. Another study was undertaken by Henok (2010) by employing a vector autoregressive approach using time series data on the same topic but by looking at aggregate public expenditure and the effect of policy change on development expenditure, he found that total aid has positive effect on recurrent expenditure where as program aid has negative effect on development expenditure and policy change has a positive effect on development expenditure.

To summarize, in all studies reviewed above the results found are far from consistent, this is due the different methodology the studies adopted to undertake the research, the sample, the data and the target population the study depend on, like international cross-country and country specific. Which one is an optimal method and others questions remain the controversy in this area. Furthermore, the fungibility issue is depends on the country specific government expenditure framework which is another cause for different results in different country studies with the same issue.

2.2.1.2 Fiscal response model literatures

Heller's (1975) influential contribution to the fiscal response modelled, the impact of foreign capital inflow (loan and grants) on government expenditure and taxation assuming that

government maximizes a utility function. The econometric result obtained by using two stage least square method indicate that foreign loan not only increases investment, but also facilitates a reduction in taxes and the resource made available by aid reduces domestic borrowing. The reduction in tax was, however, considerably smaller than the reduction in borrowing. One of the criticisms of Heller´s model, to which White (1993 and 1994) attempted, is the so called 'feedback effect' i.e., failure to incorporate indirect positive impact of aid on taxes through its positive impact on output (Income). By reformulating Heller's model, in a demand driven oriented framework, White (1993) argued that even though aid reduces taxes in the current period, the result no longer needs to hold if the indirect effects of aid take into account. The indirect effect of aid on taxes is considered in the upcoming model of Mosley (1987) to reflect its full effect.

Mosley et al (1987) contrast results from estimating OLS regression with the result from estimating the simultaneous system of equation using three stage least squares method based on the data averaged over the period 1970-80 for 63 countries. Neither of the method yielded a statistically significant correlation between aid and growth suggest a possible linkage of aid to non-productive expenditure which in turn has a negative price effects to the private sector. A distinguishing feature of the analytical framework used by the authors is the incorporation of indirect effect of aid on growth through two channels: the spending pattern of public sector (fungibility), and change in relative prices (hence influence private sector behaviors). They recommended that donor's concentrate on aid on countries that meet certain criteria for high effectiveness of aid such as estimated rate of return; proportion of aid allocated to "nonproductive" recurrent expenditure, and estimated impact of aid on the private sector.

Gang and kahn (1991) looked at the relationship between foreign aid and fiscal response of the Indian government. Using time series data they claim that aid did not increase government consumption; they also argue that it draws additional government resources into investment. Their results also reveal that grants, loans and multilateral aid were found to have no significant impact on government consumption. Bilateral aid induced a transfer of domestic resources from non-investment to investment for development purpose. An increase in taxes led to increase in

government consumption and the propensity to consume out of taxes was found to be higher when there was an inflow of foreign finance.

Alemayehu (1996) examines the fiscal response to external assistance in Africa by using a time-series data from 21 countries with the time series data for the period 1971 up to 1990. His study is different from the others since it disaggregates taxes as indirect and direct in order to analyze their separate effect. The employed model is departed from the assumption of utility maximization. The result obtained by OLS regression of fiscal response model indicates that the impact of capital flows on taxes varies across the type of inflows, nature of taxes and by regions. Aid from bilateral sources has negative impact on direct taxes and it has significant impact on direct taxes. In the expenditure side, it is found that a capital inflow has strong positive impact on current government spending. However, in his analysis the data on capital inflows and current expenditure is obtained from different sources which might have certain discrepancy. The data for capital inflows is obtained from IMF publication and the expenditure data is obtained from GFS (Government Financial Statistics) in which government expenditure data is obtained from recipient country. There may be discrepancy in the foreign inflow data reported in IMF publication and recipient country financial tables. Also the fact that His study is different from the others in using standard econometric technique (stationary and co integration test) were used to analyze the fiscal response to external assistance, made this work different from the others.

Martins (2007) by applying Fiscal Response Model for the period 1964 – 2005 in Ethiopia, finds that foreign aid has a positive effect on government investment while its effect on recurrent expenditure is less than the counter. In addition, by disaggregating aid inflows into grants and loans analyzed the effects on domestic borrowing. The study finds that aid inflows has a positive effect on investment while loans have stronger impact than grants and both have a strong negative effect on domestic borrowing.

Generally, the common feature of all the empirical literatures reviewed above is the availability of adequate data to analyze the fungibility issue is the critical challenge on this regard. Different sources have different data for the same period and a comprehensive data is not available from one resources. Alemayehu Geda and Kibrom (2011) have examined the cause for such

substantial difference in the amount of ODA flows reported by the government of Ethiopia and OECD among others;

- MoFED does not consider administration expenses that are not directly related to ODA financed projects, such as routine administration costs of donor agencies, as ODA.
- MoFED reports only ODA channeled through it. ODA channeled through other agencies such as NGOs are not reported as ODA.
- Occasionally donors provide support to sectors without prior commitments. Yet MoFED's report captures only those disbursements that have commitments in place.

Therefore using different sources for the same issue with the same method may end up in different findings. In addition, data collected from mixed sources may not be justifiable. A problem that several of these studies have confronted the fact that data on aid is collected from donor agencies while data on public expenditures is collected from recipient countries expenditures.

Regardless of fungibility issue, it is known that how much grant donors claimed to have provided from the OECD´s international development table and it is known that how much the recipient government receives aid as a budgetary revenue record from IFS (international financial statistics). It is expected to have one to one relation from the two sources. However, IMF (1998) made detailed case studies in some countries and finds that OECD flows and the respective inflow to the country budgetary revenue considerably differs. For example, Feyzioglu et al (1998) and Devarjan et al (1999) used different sources. Selection of countries also may lead to sample bias.

CHAPTER THREE

MACRO ECONOMIC PERFORMANCE OF ETHIOPIA

3.1 Economic Growth

The GDP growth rate of Ethiopia is rising with the average growth rate of 10.4% for the last 6 years in the successive manner. The agriculture and service sector accounts a major contributor for the growth.

The 'Imperial Regime' refers to the reign of emperor Haile-Sellase I (1930-1974) in particular, and to its predecessors in general. The landed aristocracy and the majority of peasants (tenants) constitute the major socio-economic agents during this period. Land was the critical resource, the control of which was invaluable for any economic agent that aspires for power. In this period an attempt was made to modernize the country through the expansion of modern schools and health facilities, the promulgation of a constitution, the development of infrastructure, and the beginning of medium-term planning. The Imperial Regime pursued a market-based economic policy. GDP growth averaged 3 percent over the final phase (1960-1973).

The Derg (meaning 'the committee' in Amharic) took the power after collapsing the imperial regime in the 1974 popular revolution. In terms of ideology and general policy, the Derg opted for a socialist economic system where market forces were deliberately repressed and socialization of the production and distribution process pursued vigorously. By all measures they adopted a "hard control" regime. Following the fall of imperial regime, there was a fundamental shift from market oriented structure towards of a tight command economic. Plenty of production and distribution systems were confiscated and nationalized by the state. Economic growth registered during derge period much less than that's of monarchy system. From 1974- 1991, the economy was growing at average 2% which was lower than the imperial era and also in 1984 the country had -10.4% economic growth which is the lowest record with in fourteen years and attributed to the persistence drought which killed thousands in northern part of the country. Various factors such as internal instability, war with Somalia, drought and inefficient and illogical policy can be cited as causes of this poor performance

This period begins following the accession to power of the Ethiopian People Revolutionarily Democratic Front (EPRDF) in May 1991/90, following the downfall of the Derg. The EPRDF adopted the typical structural adjustment policies of market liberalization, with the support of the Bretton Woods institutions.

Table 3.1: Summary of Real GDP Growth of Ethiopia (1960-2013)

	Period		
	Imperial (1961-1974)	Derg (1974-1991)	EPRDF (1991-2013)
Average GDP growth	3%	2%	7%

Source: Author's compilation based on MOFED (2013/14)

The growth performance of post Derg regimes seems logical and it has show a profound improvement through time. The real GDP has grown 7% per year and shows a significant upward trend till now. The adopted economic policy and a relative existence peace and security in the country have accredited the economic growth.

3.2 Fiscal Policy and Public Finance Performance

The objective of a fiscal policy is to enhance the capacity of revenue through different earnings to finance the country's expenditure needs, and ensure a stable macroeconomic environment by maintaining the budget deficit.

3.2.1 The Level and Trends of Government Revenue and Expenditure in Ethiopia

3.2.1.1 Total revenue

The capacity of absorbing revenue from different sources has shown an increasing trend in Ethiopia in the different regimes. The total revenue of Ethiopia has two components the domestic revenue collected through the direct, indirect and foreign trade taxes and special contributions. The other source is external assistance which is in the form of grants and loans.

Table 3.2: Total, Domestic and External Revenue among different Regimes (in million of Birr)

Revenue	Period		
	1962 – 1965**	Derg	EPDRF
Total Domestic Revenue	1946.0	33953.2	581149.7
Percentage Share	76.6	76.5	83
Growth rate (%)	22.9	423.9	4484.4
Average growth (%)	5.7	24.9	203.8
Total External Assistance	595.2	10415.9	119391.2
Percentage Share	23.4	23.5	17
Growth rate (%)	8.8	493.3	2730.8
Average growth (%)	2.2	29.0	124.1
Total Revenue	2541.2	44369.1	700540.9
Growth rate (%)	19.9	438.2	4228.1
Average growth (%)	5.0	25.8	192.2

Source: MoFED and own computation

** The data for imperial regime did not cover all the period because of unavailability of data before 1962 E.C

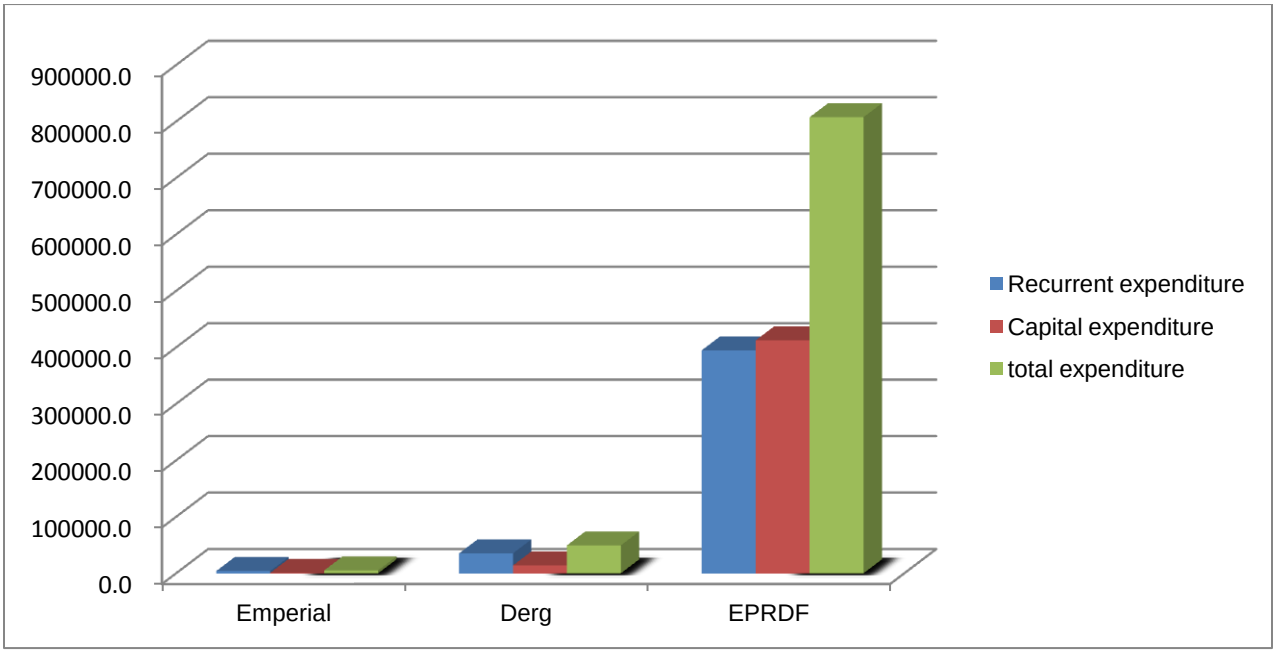
The above table shows total, domestic and external revenue of the country among different regimes. The total revenue has the trend of growing up with in the regime period as well as among the different regimes in Ethiopia. The total revenue increased by the growth rate and average growth rate of 438.2% and 25.8% respectively in the Derg regime. It also increased by 4228.1% and 192.2% respectively in the EPRDF regime. The total revenue has changed noticeably in the EPRDF than other period which is the result introduction of new broad base tax system, increment in tax rate and tight administration of tax revenue in the period among others.

The total revenue is composed of the contribution from domestic revenue and external assistance. The domestic revenue as well as the external assistance shows a growing figure with in the regime period as well as among the different regimes in Ethiopia. This shows the paramount importance of the external assistance for the Ethiopian economy.

3.2.1.2 Total expenditure

Total government expenditures among different regimes in Ethiopia has experienced diverse patterns of spending in terms of the amount, as well as the share of expenditures at the aggregate level between recurrent and capital expenditures and at the sectoral level various sectors have been treated differently in expenditures among regimes.

Figure 3.1: The total expenditure and share of recurrent and capital expenditures among different regimes



The above graph shows the share of recurrent and capital expenditures from total expenditures among different regimes. Total expenditure is dramatically increased from its low level in the imperial regime to the EPRDF regime. The total expenditure has a tendency of growth within the regimes as well, for instance in the imperial regime the average growth was about 7.2 %, Derg regime 24.2% and 137.9% in the EPRDF regime. The growth in total expenditure can be accounted for the population growth, the cost of living and increase in demand for the public

goods and services. The imperial and Derg regime devoted more on recurrent expenditure in absolute amount but the average growth was less than the capital expenditure in these regimes. EPRDF regime gives more attention for capital expenditure in which both the amount as well as average growth (336.8%) is greater than recurrent expenditure (72.6%).

Table 3.3: Total, Recurrent and Capital Expenditures among different Regimes (in million of Birr)

Expenditures	Regime		
	Imperial**	Derg	EPRDF
Recurrent expenditure	4370.7	35513.2	395168.7
Growth rate (%)	53.4	384.4	1596.3
Average growth rate (%)	5.9	22.6	72.6
Capital expenditure	1049.0	14208.1	412785.5
Growth rate (%)	122.5	505.8	7410.3
Average growth rate (%)	13.6	29.8	336.8
Total expenditure	5419.7	49721.3	807954.2
Growth rate (%)	65.2	411.9	3033.1
Average growth rate (%)	7.2	24.2	137.9

Source: MoFED and own computation

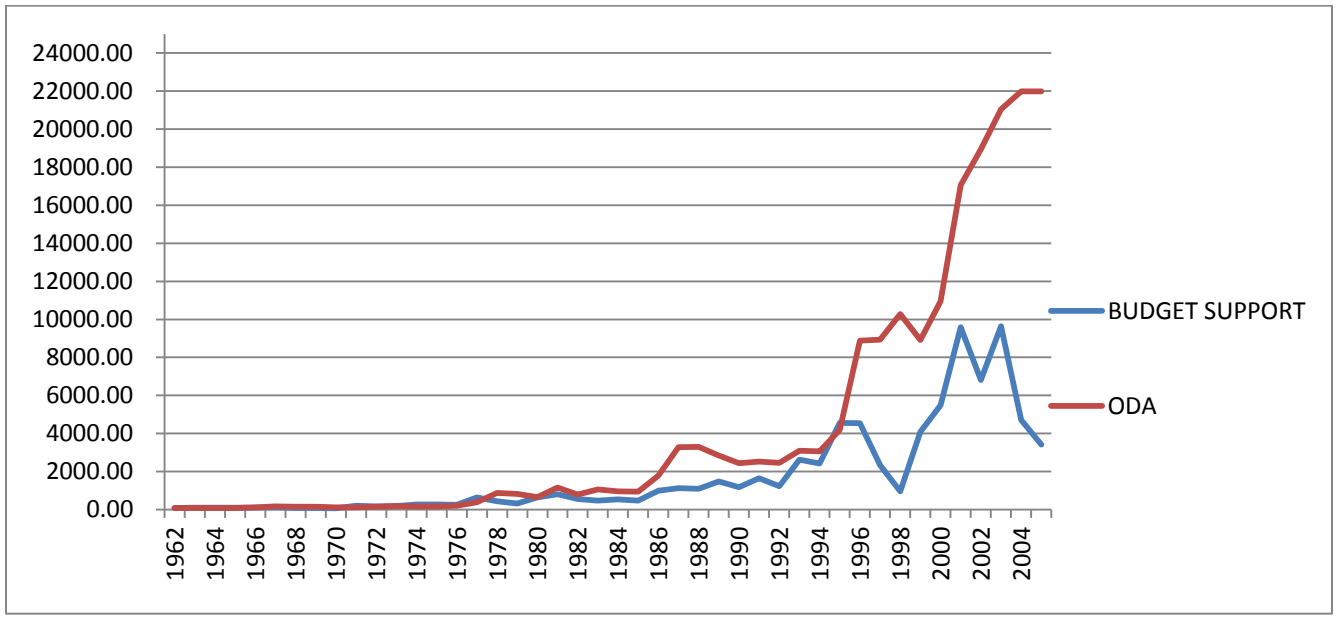
** The data for imperial did not cover all the period because of unavailability of data before 1958 E.C.

3.3 The Level and Trends of Foreign Aid in Ethiopia

Foreign aid in the form of direct budget support (grant) and official development assistance has been transferred from the rich countries for the last 50 years mainly by the objective of breaking the vicious circle of poverty in the country. The Graph 3.2 below show as the flow of foreign aid for the last successive 50 years in the country. The official development assistance consists of mainly ear marked project aid which was not mostly included on the government budget accounts. The program aid primarily consist the direct budget support and balance of payments

which is explicitly shown on government budget. The flow of ODA is noticeably increased from equal amounts at the beginning with the direct budget support. This is due to the increased lesser trust on the part of the donor agencies and international communities on the governments in appropriate utilization of the foreign aid. This occurrence has changed the direction of the external assistance from the direct budget support and balance of payments to the ear marked project aid that tied with many conditions to protect from expending on non- developmental sectors.

Figure 3.2: The flow of external sources, direct budget support and official development assistance.



Source: MOFED

3.4 Foreign aid performance of Ethiopia

Development aid is a means of resource transfer to poor countries in the form of technical assistance, total grant and loans with concessional terms. There are a number of reasons to highlight the importance of development aid to Ethiopia. Among other uses, development assistance is instrumental in financing deficit, bridging the gap between import and export, and expanding the level of investment beyond domestic capacity. Ethiopia is one of the poorest nations in the world experiences a budget deficit and balance of payment gap; Thus, it needs external assistance for the purposes explained above.

Table 3.4 performance of Aid in Ethiopia

Variables	Period				
	1965/66-1973/4*	1974/5-1990/1	1991/2-2012/13	1962/3-2012/13	Average Growth
Growth of ODA (%)	150.5	1432.7	773.7	675.2	15.3
Share of ODA to GDP	2.3	7.13	12.42	7.28	7.3
Share of ODA to Total Expenditure	0.051	0.058	0.039	0.048	

Source: MoFED and own computation

Official development assistant has been increasing over time. During the nine year considered in the imperial period, foreign assistance grow slowly with an average annual rate of 16.72 percent however it started to grow sharply since 1978/9. In 1970/71, foreign aid receipts were about 1.95 percent of GDP and after a decade this share increased to 4.5 percent.

Generally, the share official development assistance to GDP has been increasing for the period considered with an average growth rate of 7.3 percent. In terms of composition, official development assistance to Ethiopia has two components: foreign grants and loans. During the period 1974/75-1990/91, the volume of aid was 11,185 million Birr from which grants constituted 48.1 percent (5375.5 million Birr) and loans amounted to 5,809.6 million Birr (51.9 percent). Thus, grants and loans had almost equal share during the Derg regime. The volume of aid has increased to 20,182.9 million Birr during the period 1991/92-1999/00. In this period, more than fifty percent of the total aid flows is contributed by grant. The composition of ODA in terms of sources reveals that about 70 percent of aggregate foreign aid flows were from bilateral. Since 1991/92, the share of bilateral sources declined. For instance, in 1995/96 from the total aid comes to the country 99.8 percent was from multilateral agencies and only 0.2 percent comes from bilateral sources (MoFED).

CHAPTER FOUR

MODEL SPECIFICATION AND DIAGONISTIC TESTS

4.1 Model Specification

To analyze government's response to aid flow Heller's (1975) Utility Model is adopted which assumes that the recipient country has an objective of maximizing the social welfare of its citizens under budgetary constraints. Consider an economy with a central government and a number of sectors, which spends its total resources on a single private good Cp and two public goods G1 and G2 at both central and sectoral levels. Spending on these goods can be characterized as non-development (consumption type) G1 and development (investment type) G2 at both central and sectoral levels. In addition to its own resources, the country receives direct budget support like grant, loan and earmarked assistance towards the purchase of good G2 from the donor countries. The earmarked assistance, direct budget support and funds earmarked aid, however, goes through the central government. Hence, funds received for by the central government are expected to be passed on to the respective sectors. Let's suppose that the central government buys two public goods-non-development (G1) and development (G2)-at prices P1 and P2, respectively, and provides them to all of its citizens. In addition, it transfers to sector s {s=1,2,....,S} an amount P2G2 s is earmarked for the purchase of G2. This constitutes the total spending of the central government. In making these resource allocation decisions, it takes the prices, P1 and P2, as given (Feyzioglu et al 1998). Earmarked for development spending, let **C** be the amounts of foreign aid given to the central government. The central government can make foreign aid fungible by treating a portion φc (0< φc < 1) of **C** as its own revenue supplement and spend the remaining proportion accordingly Thus, the central government finances its total purchases by the fungible portion of foreign aid as well as its own domestically generated revenue, R (Swaroop et al 1999).

The welfare utility function is specified as:

Maximize U (G1, G2) = $G_1^{\alpha}\ G_2^{1-\alpha}$ ……4.1.1

Where α's are the respective elasticities

The budget constraint faced by the central government can be written as

G1 + G2= R+ GRA + LO + φ (ODA) …….. 4.1.2

Where: Gt is the total government expenditure

G_1 is the actual government's expenditure on non- development activities

G_2 is the actual government's expenditure on developmental activities

R is total domestic revenue from both taxation and domestic borrowing

GRA is the grant of on budget

LO is the loan of on budget

ODA is the project aid and φ is the portion of aid that is fungible

Grant and Loan covers the range of external sources which did not include off budget sources. Similarly project aid is defined as aid earmarked for specific investment projects.

Maximizing equation 4.1.1 subject to the constraint in equation 4.1.2 generates a system of linear expenditure equations that can be estimated linking foreign aid and government expenditure as follows:

$$\mathbf{Gt} = \delta_0 + \delta_1 \mathbf{R_t} + \delta_2 \mathbf{GRA_t} + \delta_2 \mathbf{LO_t} + [\delta_2 \varphi + \mathbf{(1 - \varphi)}]\, \mathbf{ODA} + \varepsilon_t \quad \text{..... 4.1.3}$$

Where: Gt is Total Expenditure (TE)

$$\mathbf{G_{Et\,j}} = \delta_0 + \delta_1 \mathbf{R_t} + \delta_2 \mathbf{GRA_t} + \delta_2 \mathbf{LO_t} + [\delta_2 \varphi + \mathbf{(1 - \varphi)}]\, \mathbf{ODA} + \xi_t \quad \text{..... 4.1.4}$$

Where j= 1, 2, 3

j=1 for Capital expenditure (CE), j=2 for Defense expenditure (DE) and j=3 for General Service expenditure (GSE)

The portion of which is fungible, φ, can be calculated from the coefficients of project aid. Let β be the coefficients of ear marked aid, then $\beta = \delta_2 \varphi + \mathbf{(1 - \varphi).}$ Then the portion of aid which is fungible is $\varphi = \beta - \mathbf{1} / \delta_2 - \mathbf{1}$

From the discussion in Chapter three we have noticed that there has been a marked increase in domestic resources as well as expenditure of the government since 1983 E.C. after the demise of the Derg regime the Ethiopian economic system has been changed from command economy to market based economy. To capture the effects of policy change on public expenditure, an interactive term introduced to measure the effects of policy change on public expenditure. Thus, PCDUMMY (1 for post 1983 period, 0 otherwise). This term captures the expenditure increase because of policy change and may have a positive effect on government expenditure.

The estimable equation becomes:

$$\mathbf{G_t} = \delta_0 + \delta_1 \mathbf{R_t} + \delta_2 \mathbf{GRA_t} + \delta_2 \mathbf{LO_t} + [\delta_2 \varphi + \mathbf{(1 - \varphi)}] \mathbf{ODA} + \delta_3 \mathbf{PCDUMMY} + \varepsilon_t \ldots 4.1.3$$

$$\mathbf{G_{Et\,j}} = \delta_0 + \delta_1 \mathbf{R_t} + \delta_2 \mathbf{GRA_t} + \delta_2 \mathbf{LO_t} + [\delta_2 \varphi + \mathbf{(1 - \varphi)}] \mathbf{ODA} + \delta_3 \mathbf{PCDUMMY} + \xi_t \ldots 4.1.4$$

Where j=1, 2, 3

j=1 for Capital expenditure (CE), j=2 for Defense expenditure (DE) and j=3 for General Service expenditure (GSE)

4.2 Diagnostic Tests

4.2.1 Unit Roots Test

The standard classical methods of estimation are based on the assumption that all variables are stationary[1] However; most economic variables are not stationary. Models containing non-stationary variables will often lead to a problem of spurious regression, whereby the results obtained suggest that there are statistically significant relationships between the variables in the regression model when in fact all that is obtained is evidence of contemporaneous correlations rather than meaningful causal relations. Furthermore, inferences based on the standard statistical tests (i.e. t and F tests) will be invalid.

Therefore, it is necessary to test for stationary of time series variables before running any sort of regression analysis. Often, non-stationary variables become stationary after differencing. Such a variable is said to have difference stationary process (DSP). Thus, it is possible to estimate using difference of variables if the differences are stationary. But such a procedure gives only the short run dynamics. And there would be a loss of considerable long run information.

Among the methods of testing the presence of unit roots in the variables, Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) test are used in this study. Based on DF test, the series Y is stationary if the absolute value of 'δ' in the equation

$Yt = \delta Yt\text{-}1 + Ut$…… 4.1 is less than unity.

However, it is not stationary if the absolute value of 'δ' in the above regression is greater than or

[1] A given variable (a stochastic) process is said to be stationary if it has a constant mean, constant variance over time, and if the covariance between observations in two time periods depends only on the distance of the lag between the two period rather than the actual time that the covariance is computed. [See Gujarati, 1995]

equal to unity. But testing a null that the absolute value of δ is equal to one is statistically problematic. [See Harris, 1995] Hence, equation (4.1) can be rewritten as:

$\Delta Yt = \alpha Y\ t\text{-}1 + Ut$ …… 4.2

Where, $\alpha = (1-\delta)$ Hence, the null that $\delta=1$ is equivalent to H0: $\alpha=0$. However, DF test assumes that the data generating process follows the Auto Regressive of order one [AR(1)] which biases the test in the presence of serial correlation. The ADF test is used to overcome this limitation of DF test. That is why the ADF test is sometimes viewed as a means of conducting a DF test in the presence of auto-correlated errors. The ADF test is identical to the standard DF test but it is constructed within the regression model of the form:

$\Delta Yt = \alpha Yt\text{-}1 + \sum \gamma j\ \Delta Yt\text{-}j + Ut$……4.3

It follows the DF test explanation for tests of unit root.

4.2.2 Co-integration

Time series variables may be non-stationary but their linear combination is stationary. In such cases, we say there is co-integration (long run relationship) between the variables. Thus, testing for co-integration is almost mandatory. So far, there are two major methods of testing co-integration: the Engel-Granger two-step procedure (EG) and the Johansen Maximum Likelihood procedure.

In the Engle-Granger two-step procedure, variables entering the co-integrating vector are tested for integration of the same order, order one I (1). Thus, the first step in this procedure is pre-testing the variables for their order of integration. The second step is estimating the long-run equation relationship and obtains the residual. And then test whether the residual is stationary. If it is stationary, then the variables are said to be co integrated, that is, they do have long run relationship. The last step in Engle-Granger procedure is estimate the error correction model (ECM) including the lagged value of the residual as the explanatory variable. The ECM model is estimated to see the short run relationship between the variables.

We can detect two major defects of the EG procedure. First, it assumes that there is one co-integrating vector even when more than two variables are involved in the analysis. Thus, this procedure will not be applicable in the case where more than one co-integration relationship exists. Second, EG procedure a priori categorizes variables as exogenous and endogenous with an implication of simultaneity problem. The Johansen Maximum Likelihood procedure attempted to avoid the above two defects of EG method. Thus the study follows the Johansen procedure.

4.2.3 Vector Error Correction

The Johansen method is nothing but a multivariate generalization of the Dickey-Fuller test. [Harris, 1995] Hence, given n potentially endogenous variables it is possible to model Xt as unrestricted vector auto regression (VAR) with p lags of Xt as:

$Xt = A1Xt\text{-}1 + A2Xt\text{-}2 + \ldots + ApXt\text{-}p + Ut$; ……..…….. .4.5

$Ut \sim IN(0,\Omega)$

Where; Xt= (n x 1) matrix,

Ai = (n x n) matrix of parameters and

Ut = independently and identically distributed n dimensional vector with

Vector mean 0 and variance Ω.

The Vector Error Correction (VECM) can be specified as:

$\Delta Xt = \sum \prod i \, \Delta Xtt\text{-}I + \gamma t \, Dt + \prod Xt\text{-}p + \square t$ …….4.6

Where $\prod = -(I - \sum Ai)$,

$\prod i = -(I - \sum Aj)$ and

D = vector of dummies, intercepts and predetermined exogenous variables.

The number of co-integrating vectors can be obtained by checking the significance of the characteristic roots of ∏. It is believed that the rank of a matrix (r) is equal to the number of its characteristic roots that differ from zero. Thus, if ∏ has a full rank (i.e., there are r = n linearly independent columns), then all the variables in Xt are I(0). While if the rank of ∏ is zero, then there are no Co-integration relationships. If there is reduced rank (that is, there are $r \leq (n\text{-}1)$ co-integration vectors), it is possible to represent ∏ as αβ' where β is (n x r) vector of long run parameters and (n x r) α matrix represents speed of adjustment to disequilibrium. [Harris, 1995]

The test for the number of characteristic roots that are significantly different from unity can be conducted using the following two test statistics:

$\lambda trace(r) = -T \sum \ln(1 - \lambda i)$ …….4.7

$\lambda max(r,r+1) = -T \ln(1 - \lambda r+1)$ ……...4.8

Where; λi = the estimated values of the characteristic roots (also called Eigen values)

Obtained from the estimated ∏ matrix and

T= the number of usable observations.

The null hypothesis is that the number of distinct co-integration vector is less than or equal to r against a general alternative. Johansen and Juselius (1990) provide the critical values of λmax and λtrace statistics obtained using simulation studies. [Harris, 1995].

CHAPTER FIVE

EMPIRICAL ANALYSIS AND INTERPRETATION

5.1. MODEL DESCRIPTION

In this section the empirical models developed earlier are confirmed with data and parameter estimates are estimated and interpreted. Therefore, to estimate the effect of aid on public expenditure four models are estimated. To recapitulate, the models are total expenditure, capital expenditure, defense expenditure and general service expenditure as dependent variables explained by total domestic revenue, grant, loan and ODA. But before model estimation, the first step is to determine whether the variables are stationary or non-stationary.

5.1.1 UNIT ROOT TEST

Non-Stationarity of time series data has often been regarded as a problem in empirical analysis. Working with non-stationary variables lead to spurious regression results, from which further inference is meaningless. Hence, the first step in time series econometric analysis is to carry out unit root test on the variables of interest. The test examines whether the data series is stationary or not. To conduct the test, the conventional Augmented Dickey – Fuller (ADF) test is used with and without a trend at both level and first difference. The null hypothesis in these tests claims that the series under investigation has unit root. On the other hand, the alternative hypothesis claims that the series is stationary. The results of the test for the variables at first difference are presented by table 5.1 below.

Table 5.1: Unit Root Tests of the Variables at first difference

Variable	Augmented Dickey Fuller (ADF)			
	Intercept		Trend and intercept	
	Critical value	P value	Critical value	P value
DLTE	-3.571*	0.000	-4.170*	0.000
DLCE	-3.581*	0.000	-4.171*	0.000
DLDE	-3.581*	0.000	-4.171*	0.002
DLGSE	-3.581*	0.000	-4.180*	0.000
DLODA	-3.581*	0.000	-4.170*	0.000
DLLO	-3.585*	0.000	-4.176*	0.000
DLR	-3.581*	0.000	-3.185*	0.000
DLGRA	-3.597*	0.000	-4.192*	0.000

Note: *** imply the rejection of null hypothesis at 5%, ** means the rejection of null hypothesis at 1% and 5% and * denotes rejection of the null hypothesis at 1%, 5% and 10% significance level.

The ADF test statistics as depicted in Table 5.1 illustrate ADF test applied and at first difference become stationary at the conventional 1%, 5% and 10% level of significance. The variables are,

therefore, integrated of order one (I ~I(1)). That is, it is possible to reject the null hypothesis of unit root both with and without trend in the auxiliary regression of unit root

5.2 Model 1: Effect of Aid on Total Expenditure

$$\mathbf{TEt} = \delta_0 + \delta_1 \mathbf{R_t} + \delta_2 \mathbf{GRA_t} + \delta_2 \mathbf{LO_t} + [\delta_2 \varphi + \mathbf{(1 - \varphi)}] \mathbf{ODA} + \delta_3 \mathbf{PCDUMMY} + \varepsilon_t \quad ...5.2.1$$

The first model to be estimated uses the following variables total government expenditure, total domestic resource, grant, loan and Project Aid. As all the variables have a unit root, they may be co integrated. The Johannes's trace and maximum Eigen value tests are used to test for the number of co integrating relationships

5.2.1 VAR Lag Length Selection Criteria

The Johansen co-integration test result is very sensitive to the number of lags included for the endogenous variables in the estimation of the VAR. This necessitates the determination of an optimal lag order prior to the test of co-integration. The optimal lag order is determined with the sequential modified Likelihood Ratio test statistics [LR], the Final Prediction Error [FPE], the Akaike Information Criterion [AIC], the Schwarz Information Criterion [SIC], and the Hannan-Quinn Information Criterion [HQ]). As shown in Table 5.2, LR, FPE, AIC, and HQ suggest an optimal lag of three, all at a 5% level of significance.

Table 5.2 VAR lag order selection criterion [Model I]

Lag	Log L	LR	FPE	AIC	SC	HQ
0	51.975	NA	8.13e-08	-2.135217	-1.932469	-2.060028
1	198.695	253.4254*	3.24e-10*	-7.667944*	-6.451451*	-7.216810*
2	220.035	32.01023	4.01e-10	-7.501587	-5.271350	-6.674508
3	235.456	19.62724	6.99e-10	-7.066196	-3.822215	-5.863172
4	248.119	13.23801	1.57e-09	-6.505398	-2.247673	-4.926429

* indicate lag order selected by criterion

From the above table we have 1 selected as optimal lag with the majority of the criterion and it assumed it has the minimum information criterion.

5.2.2 The Johansen Co-integration Test Result

The Stationarity test demonstrated that all variables are not stationary at level and it imply that any estimation using this level data will led to wrong conclusion and policy implication. However, the Granger representation theorem states that it is possible for non-stationary variables to produce a

stationary relationship if they are co-integrated. This would imply that there is a meaningful long run relationship among the variables. Thus, the presence and the number of such co-integrating relationships are checked using the trace and the maximum Eigen value methods.

Table 5.3 Unrestricted co-integration Rank Test (Trace) [Model I]

Hypothesized No. of CE(s)				
	Eigen value	Trace Statistic	0.05 Critical Value	Prob. **
None *	0.693553	102.3818	69.81889	0.0000
At most 1*	0.467135	47.97714	47.85613	0.04870
At most 2	0.232471	19.02072	29.79707	0.49144
At most 3	0.136484	6.850065	15.49471	0.59514
At most 4	0.002169	0.09988	3.841466	0.75196

Trace test indicates 2 co-integrating equation(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values

Table 5.4 Unrestricted Co-integration Rank Test (Maximum Eigen value) [Model I]

Hypothesized No. of CE(s)				
	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.693553	54.40466	33.87687	0.0001
At most 1*	0.467135	28.95641	27.58434	0.0332
At most 2	0.232471	12.17066	21.13162	0.5309
At most 3	0.136484	6.750184	14.2646	0.519099
At most 4	0.002169	0.09988	3.841466	0.751964

Max-Eigen value test indicates 2 co-integrating equation(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values

The study has found number of co-integrated equations using trace statistics and maximum Eigen value statistics. According to probabilities given in tables 5.3 and 5.4, the analysis rejects the null hypothesis that there is no co-integrated vector, there is two co-integrated vector. It shows high association between explanatory and dependent variables used in current study.

The long run relationship found is:

LTE = 0.69261LR+0.09136LGRA+0.14041LLO+0.50973LODA+1.457C

(-2.6826) (-0.7217) (-2.843) (-4.1946)

The co integrating relation shows a long run relationship between variables. It implies that in the long run, ceteris paribus, total government spending is positively influenced by the other variables. While domestic resource has a statistically significant high positive effect on total government spending, that means total domestic revenue increases total government spending by 0.69 units. The project aid, official development assistance and external loan has a positive effect on public spending which is statistically significant where as positive effect of grant is statistically insignificant this is may be due to the grant component is mainly outlays on the part huge investment areas and sensitive development sectors which are not included on the total expenditure account.

5.2.3 Vector Error Correction Model I

5.2.3.2 Short Run Model I

Table 5.5 shows the results for the unrestricted VEC model: there are four endogenous variables. In the VEC representation a D in front of a variable stands for difference. Using the error-correction model, we can analyze the short-run impact of domestic revenue, Official development assistance, grant and loan on government expenditure. The 10% significance level is used to conclude the significance of each coefficient in the VEC model. The adjustment coefficient of error correction term is significant for the total government expenditure. This tells us that there is a reasonable adjustment towards the long run steady state. The error correction term of -0.83 shows that about 83.0 percent of the deviation of the actual total government spending from its equilibrium value is eliminated every year; hence, full adjustment would require a period of less than two years.

The government spending is affected by the lagged variables of domestic revenue and the foreign source component of grant positively and significantly in the short run at 10% significance level.

Table 5.5 Vector Error Correction model I short run relationship

Variable	Coefficient	Standard Error	t-Statistic	Prob.
ECM	-0.82519	0.203437	-4.05626	0.000*
D(LR(-1))	0.849437	0.253487	3.351016	0.001*
D(LODA(-1))	-0.08092	0.161139	-0.5022	0.602
D(LGRA(-1))	0.206598	0.121582	1.699249	0.097*
D(LO(-1))	-0.257	0.19796	-1.29825	0.202
CONSTANT	0.069899	0.02575	2.714502	0.009*
Dummy	0.03548	0.125486	2.026489	0.0452*

R- Squared	0.55	Durbin- Watson stat.	2.15
Adjusted R-squared	0.47	F-statistic	5.65

5.3 Model 2: Effect of Aid on Capital Expenditure

$$\mathbf{CEt} = \delta_0 + \delta_1 \mathbf{R_t} + \delta_2 \mathbf{GRA_t} + \delta_2 \mathbf{LO_t} + \left[\delta_2 \varphi + \mathbf{(1 - \varphi)}\right] \mathbf{ODA} + \delta_3 \mathbf{PCDUMMY} + \varepsilon_{\mathbf{t}} \ldots [5.3.1]$$

The second model is to be estimated uses the same variables as before except the dependent variable will be replaced by capital expenditure to look upon the impact of foreign aid, that is, ear marked project aid, budget support and loan, on the development expenditure rather than looking in the aggregated manner. Furthermore the case of fungibility can be explicitly examined through looking if the entire ear marked project aid expended on the developmental expenditure. As all the variables have unit root the may be co integrated.

Table 5.6 VAR lag order selection criterion [Model II]

Lag	**Log L**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	65.2501521	NA	4.45E-08	-2.738643	-2.535894	-2.663454
1	233.326316	290.3134*	6.72e-11*	-9.242105*	-8.025612*	-8.790971*
2	251.842561	27.77437	9.45E-11	-8.947389	-6.717152	-8.12031
3	270.267765	23.45026	1.44E-10	-8.648535	-5.404554	-7.44551
4	286.354297	16.81774	2.76E-10	-8.243377	-3.985652	-6.664407

Using VAR lag order selection criteria, lag order 1 selected as optimal lag with the majority of the criterion and it assumed it has the minimum information criterion.

Estimating the VAR model using Eviews7 reflects there is one co integrating vector for model by testing trace and maximum Eigen value test. The result in the table below shows the null hypothesis of no co integrating vector is rejected by both trace and max. at 5 % level of significance.

Table 5.7 Unrestricted co-integration Rank Test (Trace) [Model II]

Hypothesized No. of CE(s)				
	Eigen value	Trace Statistic	0.05 Critical Value	Prob. **
None *	0.79614	114.3101	69.81889	0.0000
At most 1	0.343237912	41.15524473	47.85613	0.1837819
At most 2	0.267262108	21.81530629	29.79707	0.30887827
At most 3	0.137598701	7.510814015	15.49471	0.51907375
At most 4	0.015128391	0.70122367	3.841466	0.40237185

Trace test indicates 1 co-integrating equation(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values

Table 5.8 Unrestricted Co-integration Rank Test (Maximum Eigen value) [Model II]

Hypothesized No. of CE(s)				
	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.796140333	73.15487782	33.87686662	0.0000
At most 1	0.343237912	19.33993844	27.58433779	0.38869609
At most 2	0.267262108	14.30449228	21.1316163	0.34055217
At most 3	0.137598701	6.809590345	14.26460015	0.51190696
At most 4	0.015128391	0.70122367	3.841465501	0.40237185

Max-Eigen value test indicates 1 co-integrating equation(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values

Thus the test shows there is a long run relationship between the variables which is a pre requisite for using the error correction model. The co integrating shows one co integrating vector.

The unrestricted co integrating relation found in the long run is:

LCE = 2.1965LR - 0.6960 LGRA + 0.999 LLO + 0.1760 LODA+5.4327C

(-7.402) (4.828) (-11.043) (-1.876)

The numbers in the bracket is t values of the coefficients'.

A long run relationship between variables implies that in the long run, ceteris paribus, capital government spending is positively influenced by domestic resources highly and significantly. It indicates that domestic resource increases the government expenditure by 2.196 units which is more than double effect. Furthermore the external source loan affects capital expenditure positively by almost 1 unit significantly and also the official development assistance affects government expenditure positively but it is insignificant. There is an increasing trend in which off budget official development assistances that are, ear marked projects, disbursed through private institutions and charity associations. The fund is not passing through the government budget account. The capital expenditure account did not take this into consideration that may be the cause for the unexpected insignificance of the official development assistance but the direction of effect is on the expected track. The direct budget support component of grant affects capital government expenditure negatively this is because of the fact that the variable by the nature is allocated for recurrent spending like budget support and balance of payment support. The findings of this model differ from the first in the results that, grant affects capital expenditure negatively. Given the fungibility of foreign aid it is not unnatural to expect different kinds of aid the fiscal variables respond differently.

5.3.1 Vector Error correction model II

5.3.1.1 Short Run Model II

As all variables specified are co integrated it indicates that a VEC model can be specified to assess the inter relationships between variables. The error correction term enable as to assess which variables move to balance in the long run. Table 5.9 shows the results for the unrestricted VEC model: there are four endogenous variables. In the VEC representation a D in front of a variable stands for difference. Using the error-correction model, we can analyze the short-run impact of domestic revenue, Official development assistance, grant and loan on capital government expenditure. The 10% significance level is used to conclude the significance of each coefficient in the VEC model. The adjustment coefficient of error correction term is significant for the capital

government expenditure. This tells us that there is a reasonable adjustment towards the long run steady state.

Table 5.9 Vector Error Correction model II short run relationship

Variable	Coefficient	Standard Error	t-Statistic	Prob.
ECM	-0.539055134	0.066116354	-8.153128592	0.0000*
D(LCE(-1))	-0.258365414	0.138733808	-1.862310405	0.0701*
D(LR(-1))	0.314917225	0.382427429	0.823469244	0.4152
D(LODA(-1))	0.233795243	0.135623335	1.723857049	0.0927*
D(LGRA(-1))	0.281068646	0.085190986	3.299276811	0.0021*
D(LO(-1))	-0.313716203	0.13538085	-2.317286407	0.0258*
CONSTANT	0.052965057	0.017185897	3.08189071	0.0038*
Dummy	0.023585647	0.01254789	0.25419872	0.0491*

R- Squared	0.68	Durbin-Watson stat.	1.67
Adjusted R-squared	0.63	F-statistic	13.98

The dependent variable is affected by its own lagged variables and by other lagged explanatory variables except domestic resource variable at 5% and 10% significance level in the short run.

5.4 Model 3: Effect of Aid on General Service Expenditure

$$\mathbf{GSE_t} = \delta_0 + \delta_1 \mathbf{R_t} + \delta_2 \mathbf{GRA_t} + \delta_2 \mathbf{LO_t} + [\delta_2 \varphi + \mathbf{(1 - \varphi)}]\ \mathbf{ODA} + \delta_3 \mathbf{PCDUMMY} + \varepsilon_t \ldots 5.4.1$$

The general service expenditure is part of the recurrent government expenditure account, which is mainly consists expenditures on regular utilities, like general government, internal order and justice, organ of the state and other related non- developmental expenditures. In this model the effect of foreign aid on non- development aspect of expenditure, general service expenditure, is estimated. This model clearly shows as, how the ear marked official development assistance, grants and loan is utilized and the relationship that exists if any, we try to explore. The difference from the first two models is only the dependent variable is changed leaving the remaining the explanatory variables unchanged. The diagnostic tests for data Stationarity is accepted for all

variables including the dependent variable. The first difference Stationarity leads us to look upon the co integration tests where a test of long run relationships among variables. Johanson maximum likelihood test is used to identify long run relationships. By selecting the optimal VAR lag order, which is used for testing co integration and for others, using various lag length criteria available for VAR order selection, we look the long run and short run relationships among variables.

Table 5.10 VAR lag order selection criterion [Model III]

Lag	Log L	LR	FPE	AIC	SC	HQ
0	77.32434	NA	2.57E-08	-3.28747	-3.08472	-3.21228
1	252.8095	303.1108*	2.77e-11*	-10.12771*	-8.911213*	-9.676571*
2	273.5307	31.08179	3.53E-11	-9.93321	-7.70298	-9.10614
3	291.6865	23.10739	5.43E-11	-9.62211	-6.37813	-8.41909
4	303.4679	12.31687	1.27E-10	-9.02127	-4.76354	-7.4423

VAR order one (1) is selected which an optimal lag length is due to the majority selection criterion has selected lag one. Table 5.10 shows the lag length selection and the selected length is identified by star in each of the selection criterion

Table 5.11 Unrestricted co-integration Rank Test (Trace) [Model III]

Hypothesized No. of CE(s)				
	Eigen value	Trace Statistic	0.05 Critical Value	Prob. **
None *	0.576723	96.73995	69.81889	0.0001
At most 1*	0.417	57.19244	47.85613	0.005217
At most 2*	0.313363	32.37233	29.79707	0.024718
At most 3	0.27919	15.07868	15.49471	0.057677
At most 4	0.000417	0.019197	3.841466	0.889693

Trace test indicates 3 co-integrating equation(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values

Table 5.12 Unrestricted Co-integration Rank Test (Maximum Eigen value) [Model III]

Hypothesized No. of CE(s)				
	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.576723	39.54751	33.87687	0.0095
At most 1	0.417	24.82011	27.58434	0.1085
At most 2	0.313363	17.29365	21.13162	0.1586
At most 3*	0.27919	15.05948	14.2646	0.0374
At most 4	0.000417	0.019197	3.841466	0.8897

Max-Eigen value test indicates 2 co-integrating equation(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values

Using Johansen co integrating test as before the result reflects there is three co integrating vector for model by testing trace and maximum Eigen value test. The result in the table above shows the null hypothesis of no co integrating vector is rejected by both trace and max. at 5 % level of significance. Therefore the long run relationships that exist will be:

LGSE = 3.7143LR - 1.2191 LGRA + 1.4372 LLO - 0.3842 LODA+0.0457C

(-3.5131) (2.4009) (-4.4216) (0.7834)

The domestic revenue has high positive effect statistically significant which shows there is a strong long run relationship between an increase in domestic revenue and general service expenditure of the country. The external loan has also a positive and statistically significant effect on the general service expenditure. This shows there is a direct relationship between non-development expenditure and external loan of the country. The project aid, official development assistance has a negative relationship which is insignificant. This is not unexpected sign because most of the official development assistance is project specific aid entirely related with development sectors.

5.3.1 Vector Error Correction Model III

5.3.1.1 Short run Model III

Table 5.14 Vector Error Correction model III short run relationship

Variable	Coefficient	Standard Error	t-Statistic	Prob.
ECM	-0.42691	0.122965	-3.47184	0.001332*
D(LGSE(-1))	0.15503	0.073841	2.09951	0.042651*
D(LR(-1))	-0.67376	0.334839	-2.01219	0.051523*
D(LODA(-1))	0.278203	0.109024	2.551752	0.014983*
D(LGRA(-1))	0.107661	0.077229	1.394038	0.171622
D(LO(-1))	-9.03E-05	0.111836	-0.00081	0.99936
CONSTANT	0.020579	0.014098	1.459669	0.15282
Dummy	0.0214578	0.014572	1.2458934	0245758

R- Squared	0.75	Durbin-Watson stat.	2.011
Adjusted R-squared	0.69	F-statistic	13.68

The short run error correction model III, demonstrates the dependent variable is affected by its own lagged variable and by other lagged explanatory variables which is statistically significant while the grant and loan variables have a positive and negative effect respectively but insignificant at 5% and 10% significance level in the short run.

5.5 Model 4: Effect of Aid on Defense Expenditure

$$\mathbf{DEt} = \delta_0 + \delta_1 \mathbf{R_t} + \delta_2 \mathbf{GRA_t} + \delta_2 \mathbf{LO_t} + [\delta_2 \varphi + \mathbf{(1 - \varphi)}]\ \mathbf{ODA} + \delta_3 \mathbf{PCDUMMY} + \varepsilon_t \quad .5.5.1$$

The last but the least, model that will be estimated in this paper is the effect of foreign aid on defense expenditure in Ethiopia case. This model tries to examine effects of domestic revenue, grant, external loan and ODA on defense expenditure. The model identifies the relationships that existed among the dependent and explanatory variables. The direction of effect the independent variables have on the defense expenditures. As performed before for the rest of the models first the lag length will be selected for the model using different lag selection criterion. The lag chosen will be used for the co

integration tests and for estimation of error correction model. VAR lag order one is selected as optimal lag order due to majority criterion have chosen the order one lag.

Table 5.15 VAR lag order selection criterion [model IV]

Lag	Log L	LR	FPE	AIC	SC	HQ
0	41.21559	NA	1.33E-07	-1.64616	-1.44341	-1.57097
1	210.2117	291.9023*	1.92e-10*	-8.19144	-6.974947*	-7.740305*
2	234.8571	36.96811	2.04E-10	-8.17532	-5.94509	-7.34824
3	262.8071	35.5728	2.02E-10	-8.309415*	-5.06543	-7.10639
4	283.8998	22.05137	3.08E-10	-8.13181	-3.87408	-6.55284

Table 5.15 show the lag length selection process and as shown clearly all the selection criterion except one (Akaike information criteria) have favored the VAR lag order one as optimal.

The Stationarity of the entire dependent and independent variables (checked in the beginning) inflict us to observe the long run relationship that may be existed among the variables. To detect the co-integration among the variables Johansen maximum likelihood test model will be in effect. Table 5.15 illustrates the result obtained through testing the long run relationship that exists among variables.

Table 5.16 Unrestricted co-integration Rank Test (Trace) [Model IV]

Hypothesized No. of CE(s)				
	Eigen value	Trace Statistic	0.05 Critical Value	Prob. **
None *	0.576723	96.73995	69.81889	0.0001
At most 1*	0.417	57.19244	47.85613	0.005217
At most 2*	0.313363	32.37233	29.79707	0.024718
At most 3	0.27919	15.07868	15.49471	0.057677
At most 4	0.000417	0.019197	3.841466	0.889693

Trace test indicates 1 co-integrating equation(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values

Table 5.17 Unrestricted Co-integration Rank Test (Maximum Eigen value) [Model IV]

Hypothesized No. of CE(s)				
	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.576723	39.54751	33.87687	0.0095
At most 1	0.417	24.82011	27.58434	0.1085
At most 2	0.313363	17.29365	21.13162	0.1586
At most 3	0.27919	15.05948	14.2646	0.0374
At most 4	0.000417	0.019197	3.841466	0.8897

Max-Eigen value test indicates 1 co-integrating equation(s) at the 0.05 level, * denotes rejection of the hypothesis at the 0.05 level, **MacKinnon-Haug-Michelis (1999) p-values

The Johansen co integrating test conclude, there is one co integrating vector for model by testing trace and maximum Eigen value test. The result in the table above shows the null hypothesis of no co integrating vector is rejected by both trace and max. at 5 % level of significance that means there is a long run relationship among the variables. It clarifies that the variables will converge to an equilibrium steady state level in the long run that justifies to the analyses of cause and effect correlation among the dependent and explanatory variables.

Therefore the long run relationships that exist will be:

LDE = 1.4299 LR – 0.6816 LGRA + 2.1392 LLO – 1.0430 LODA+0.0124C

(-3.0458) (2.9690) (-14.469) (4.6684)

The domestic revenue and external loan has a positive impact on defense expenditures statistically significant. The domestic revenue increases the defense expenditure by the 1.4299 units. The grant and ODA linked with the defense expenditure negatively with statistically significant. The result for grant and ODA is not unnatural because ODA is mostly fund projects in the developmental sectors and direct grants are expended on basic service protection areas and on the mega projects undertaken by the state. The model also demonstrates that a strong positive relationship between defense expenditure and external loan that indicates most of the imported defense machineries are funded by the external loan of the country.

5.4.1 Vector Error Correction Model IV

5.4.1.1 Short Run Model IV

Table 5.18 Vector Error Correction model IV short run relationship

Variable	Coefficient	Standard Error	t-Statistic	Prob.
ECM (-1)	-0.11267	0.059239	-1.90198	0.044579*
D(LDE(-1))	0.441607	0.144046	3.065744	0.003931*
D(LR(-1))	0.405426	0.41992	0.965485	0.340251
D(LODA(-1))	-0.10196	0.120745	-0.84445	0.403568
D(LGRA(-1))	0.090918	0.090849	1.000762	0.323111
D(LO(-1))	-0.07997	0.164945	-0.48485	0.630497
CONSTANT	0.017226	0.019843	0.868125	0.390637
Dummy	0.245877	0.024782	0.235874	0.124587

R- Squared	0.41	Durbin-Watson stat.	1.75
Adjusted R-squared	0.33	F-statistic	2.16

The short run error correction model IV, demonstrates the speed of adjustment towards long run relationship is negative as required and statistically significant at 5% significance. The dependent variable is affected by its own lagged variable and by other lagged explanatory variables which is 5% and 10% significance level in the short run.

CHAPTER SIX

CONCLUSION AND POLICY IMPLICATION

This paper has attempted to empirically examine the relationship between foreign aid and public spending in Ethiopia. Heller's (1975) utility maximization model was used for analysis. For the empirical analysis, annual time series data from 1958 to 2005 Ethiopia fiscal year is selected on the basis of availability of all relevant variables data. The total government expenditure and capital expenditures considered as dependent variables in the study to examine the relationships that exists with explanatory variables such as domestic revenue, official development assistance, grant and loan. Moreover, the impact of foreign aid on non-developmental spending such as outlay for general services and defense to inquire whether aid funded these activities.

By considering latest development in time series econometrics analysis, this paper discusses both short and long run impact of foreign aid by using Johansen Maximum Likelihood test which determines the long run relationship and dynamic structure of the aid model. However, before estimation the time series characteristics of data have been tested by using Augmented Dickey Fuller (ADF) test and found that all the variables are integrated order of one, when only constant term added and also both constant term and trend is added to the ADF test. The Co integration test undertaken by using Johansen method, found that there is a co integrating vectors among variables.

The regression results show that external source in general has stimulated government spending in the short run as well as in the long run but through distinct elasticities for the respective external sources. These results do concur with the findings by other studies (see Jifar (2002) and Henok (2010)); foreign aid leads to increased government spending. The ODA has increased the government spending by more units than others. The other variable, domestic revenue also has expected high positive significant sign to government expenditure indicating that part of the increase in country's income is spent on government budget account. . Disaggregating total expenditure into capital expenditure shows that ODA leads to increased government spending for capital expenditure but insignificant. Grant affects capital expenditure negatively and significantly even though all loans and grants to the country come under the heading of the

record on the development expenditure vote. The finding is in line with the study conducted by Henok (2010).

To examine whether foreign aid assist other non-developmental activities, the effect of foreign aid on defense and general service expenditures was also examined. It is found that grant and official development assistance has a negative relationship in both non-developmental expenditures i.e. general service expenditures and defense spending. But external loan has a strong positive correlation with both non-developmental expenditures. In this case, there is a possibility that external loan fund non-developmental activities indicated by its positive significant coefficient, although other unstated non-developmental activities may have got the benefits of external sources. Therefore, fungibility in some case exists, which means that external loans that finance may not be spent for intended purpose. It implies that even when external assistance is earmarked for a specific sector or activity, there is no guarantee that government spending for that purpose will increase by the full amount of aid.

By definition external assistance is intended to finance investment expenditures; however, it results in an increase in routine expenditure as well. This suggests that external assistance is fungible: it creates extra resources to in increase non development expenditure. Thus, the effectiveness of the foreign sources in stimulating economic growth and development through an increase in public investment is jeopardized. Previous researches have also confirmed foreign aid is to be fungible (see pack and pack, 1993 and Devarajan et al 1998, Feyzioglu et al, 1998) found a result that aid finances general government expenditures not the targeted development activities. There is a controversy on the perspectives of the problems attached to the aid fungibility that is bad for the economy in general. But the clear cut view in this respect is spending on non development expenditure results less than if it was spent on development sectors. Moreover, aid fungibility creates aid fatigue between the donor and recipients. Recipients that have allocated aid as wished by the donors will be eligible for the next year aid and the reverse is true.

After the downfall of the Derg regime in 1983 E.C, the EPRDF has institutionalized the market economy policy favoring the liberalization of markets to support economic growth. It also

embarks on spending in different sectors of the economy to sustain economic growth. The increased effect of policy change is evident from the fact that the dummy coefficient is positive for all the four models and significant for total government expenditure and capital expenditure.

Hence, to make open discussion between donors and the government on public investment projects will have a paramount importance in collecting more aid which boosts the total public expenditure. Linking external assistance to overall public investment expenditure program that provides adequate resources to crucial development sector may be better way of transferring resources. Effective way of monitoring purpose oriented external assistance is more needed to make public spending efficient.

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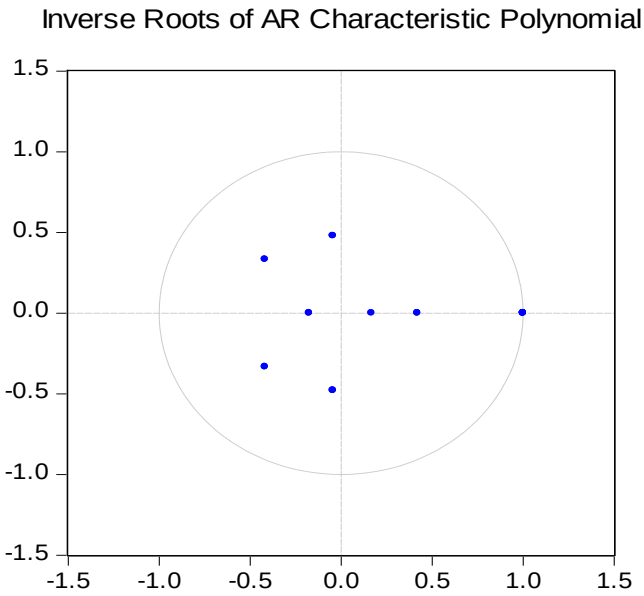
APPENDICES

MODEL I

1) Parameter stability test



2) Test for Residual Autocorrelation

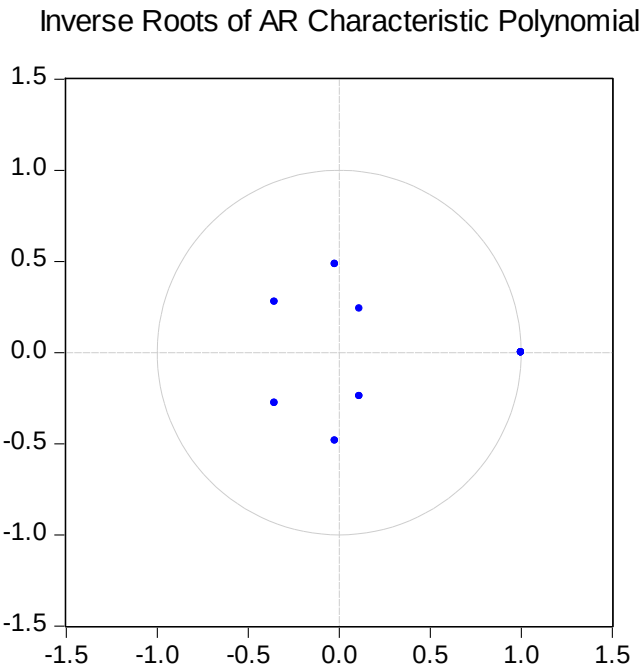
Null Hypothesis: no serial correlation at lag order 1

Lags	LM-Stat	Prob.
1	33.75476	0.1133

Probs. from chi-square with 25 df.

MODEL II

1) Parameter stability test



2) Test for Residual Autocorrelation

Null Hypothesis: no serial correlation at lag order h

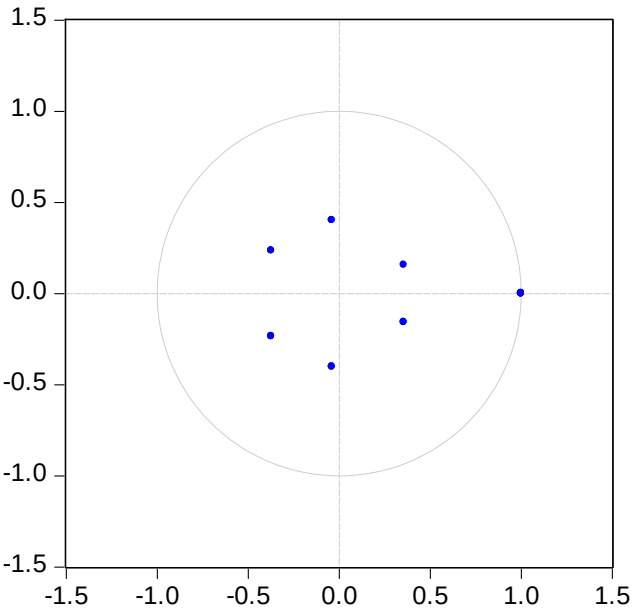
Lags	LM-Stat	Prob
1	33.00702	0.1309

Probs. from chi-square with 25 df.

MODEL III

1) Parameter stability test

Inverse Roots of AR Characteristic Polynomial



2) Test for Residual Autocorrelation

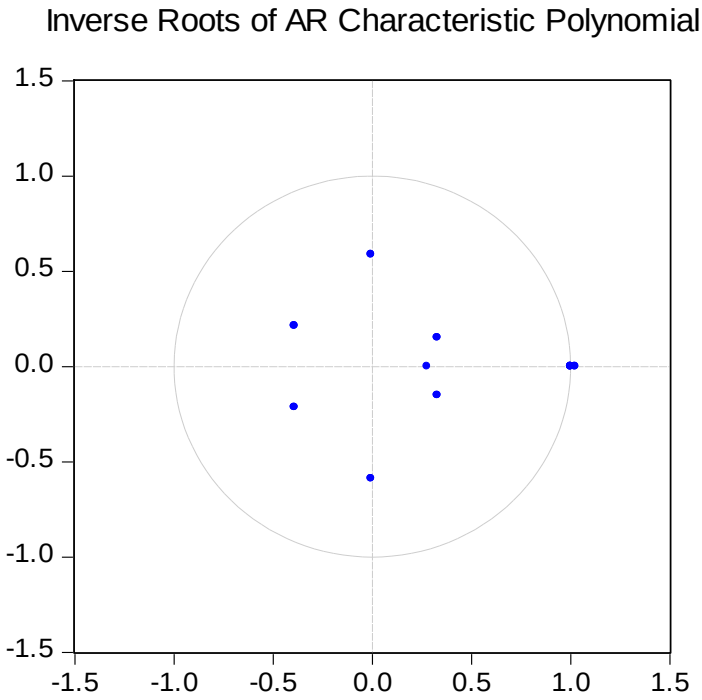
Null Hypothesis: no serial correlation at lag order h

Lags	LM-Stat	Prob
1	30.14848	0.2188

Probs. from chi-square with 25 df.

MODEL IV

1) Parameter stability test



2) Tests for Residual Autocorrelation

Null Hypothesis: no serial correlation at lag order h

Lags	LM-Stat	Prob
1	56.67652	0.1530

Probs. from chi-square with 25 df.

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.100842	Prob. F(1,36)	0.7527
Obs*R-squared	0.128493	Prob. Chi-Square(1)	0.7200

Structural Break Test

Model I

Chow Breakpoint Test: 1983
Null Hypothesis: No breaks at specified breakpoints

Equation Sample: 1960 2005

F-statistic	2.793750	Prob. F(8,30)	0.0194
Log likelihood ratio	25.610715	Prob. Chi-Square(8)	0.0012
Wald Statistic	22.350003	Prob. Chi-Square(8)	0.0043

Model II

Chow Breakpoint Test: 1983
Null Hypothesis: No breaks at specified breakpoints

Equation Sample: 1960 2005

F-statistic	1.24302441 834466	Prob. F(8,30)	0.0750
Log likelihood ratio	13.1691551 73833	Prob. Chi-Square(8)	0.0159
Wald Statistic	9.94419534 6757248	Prob. Chi-Square(8)	0.0422

Model III

Chow Breakpoint Test: 1983
Null Hypothesis: No breaks at specified breakpoints

Equation Sample: 1960 2005

F-statistic	2.920177	Prob. F(9,28)	0.0142
Log likelihood ratio	30.45111	Prob. Chi-Square(9)	0.0003
Wald Statistic	26.28159	Prob. Chi-Square(9)	0.0018

Model IV

Chow Breakpoint Test: 1983
Null Hypothesis: No breaks at specified breakpoints

Equation Sample: 1960 2005

F-statistic	0.54403493 13838366	Prob. F(7,32)	0.7948
Log likelihood ratio	5.17234386 5211147	Prob. Chi-Square(7)	0.6385
Wald Statistic	3.80824451 9686867	Prob. Chi-Square(7)	0.8019

DECLARATION

I, the undersigned, declare that this study is my original work and has not been presented for a degree in any university, and that all source of materials used for the project have been duly acknowledged.

Declared by:

Name: Abas Mohammed Ali

Signature: _____

Date: _____

Confirmed by Advisor:

Name: Tadele Ferede (PhD)

Signature: _____

Date: _____

Place: Addis Ababa University, Addis Ababa