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**AID, PRO-POOR SPENDING AND WELFARE
IN ETHIOPIA**

BY
MEHERET LEMMA

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Aid, Pro-Poor Spending and Welfare in Ethiopia

**By
Meheret Lemma Abebe**

Approved by the Board of Examiners:

Tassew Woldemariam

Advisor

[Signature]

Signature

Dr. M.D. BAUATIAH

Examiner

M.D. Bauatiah

Signature

Teferi Regassa

Examiner

[Signature]

Signature

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Acronyms

2SLS	Two Stage Least Squares
ADF	Augmented Dickey-Fuller
ADI	African Development Indicator
ARCH	Autoregressive Conditional Heteroscedasticity
CRDW	Cointegration Regression Durbin-Watson
CSA	Central Statistical Authority
DF	Dickey-Fuller
EERPI	Ethiopian Economic Policy Research Institute
GDP	Gross Domestic Product
GDS	Gross Domestic Saving
GFCF	Gross Fixed Capital Formation
GNP	Gross National Product
HDI	Human Development Index
HICE	Household Income, Consumption and Expenditure
HPI	Human Poverty Index
ICOR	Incremental Capital Output Ratio
MEDaC	Ministry of Economic Development and Cooperation
MoFED	Ministry of Finance and Economic Development
ODA	Official Development Assistance
OLS	Ordinary Least Squares
PPE	Pro-poor Expenditure
SSA	Sub Saharan Africa
VECM	Vector Error Correction Model
VAR	Vector Autoregressive
WM	Welfare Monitoring

Abstract

The objective of the paper is to test the hypothesis that aid through funding pro-poor public expenditures can improve welfare in Ethiopian. An index of pro-poor expenditures has been constructed to analyze this transmission mechanism. In order to obtain a coefficient on aid variable that includes its indirect effect through public expenditure allocation a regressor is constructed. The estimation is conducted based on the annual data between 1965/66 and 2001/02 using the Johanson Maximum Likelihood Procedure.

The empirical analysis supports the hypothesis regarding aid effectiveness on poverty through funding pro-poor expenditures. On the other hand the result shows though domestic revenue significantly contributes in financing pro-poor public expenditure, non-aid financed pro-poor public spending is rather found to be inefficient in improving welfare. The result further reveals the impact of growth on welfare is insignificant implicating that growth by its own accord is not enough in Ethiopia.

Key Words: *Aid Effectiveness, Poverty, Pro-poor Spending, Ethiopia, Government Expenditure*

1 Introduction

Aid is an important source of finance for the poorer developing countries. Traditionally, the broad aim and economic justification for aid was to promote increased economic growth. It was believed that growth will be an instrument to further alleviate poverty. This has been found behind the ideology of trickle down development concept which was a dominant thinking in the 1950s and 60s. It was believed that attaining economic growth will at first benefit the rich and gradually the poor when the rich start spending their gains (Kakwani and Pernia, 2000). Thus growth is often viewed as a primary driver of poverty reduction. Therefore inferences of the impact of aid on poverty are commonly drawn from the impact of aid on growth.

The theoretical underpinning behind the justification of aid and growth relationship is the Harrod –Domar growth model. It emphasize on investment as a drive to growth. Lack of investment on the other hand was believed to be a bottleneck to development due to low saving. This has been described as a resource gap problem. The role of aid is hence to finance additional investment which would increase growth (Dollar and Easterly 1999, Ali et al., 1999).

The Harrod-Domar model assumes only saving constraint. This was expanded in the sixties in the influential Chenery and Strout (1966) two gap model. The role of aid is then identified as relaxing saving and foreign exchange constraint (Hansen and Trap, 2000b referring Chenery and Eckstein, 1970). Later in Bacha (1990), a third constraint is identified in the form of fiscal constraint; hence foreign aid could also be used in relaxing this constraint. The role of aid is then regarded as a transfer of resources. Further in the 1990s the theory behind growth broadened. Emphasis shifted from investment to incentives. That is from capital to the underlying institution and policies that promote growth by encouraging efficient investment. Hence aid has also come to be used as an instrument to induce policy reform (World Bank, 1998).

Given the abovementioned roles of aid, in the 1970s there has been a shift with regard to the belief in trickle down ideology attached in the process of attaining the ultimate

objective. Attention shifted from the trickle down effect to poverty reduction issues like, growth with equity and basic need, which brought the poverty dilemma more people centered (World Bank, 1990). Accordingly aid policies are nowadays geared towards also addressing poverty directly which is about improving human well being, in particular poor people.

Aid can have impact on poverty through direct financing of projects that enhance the well being of the poor. On the other hand aid can also indirectly benefit the poor through funding the government expenditure that is pro poor. A certain aspect of government spending is considered pro-poor, if it improves the welfare of the poor.

The paper hence, taking the recent issue of concern, it will evaluate the contribution of aid in enhancing the welfare of the poor. Recognizing that most aid passes through government, the study will take the case of aid indirectly benefiting the poor through funding pro-poor government spending. However in examining the aid poverty relationship, one is faced with the multidimensional facet of poverty. The World Bank development report (2000/2001):1 has described the status of the poor as:

Poor people are those who live without fundamental freedom of action and choice that the better off take for granted. They often lack adequate food and shelter, education and health deprivation that keep them from leading the kind of life that every one values. They also face extreme vulnerability to ill health, economic dislocation and natural disaster. And they are often exposed to ill treatment by institutions of the state and society and are powerless to influence the key decisions affecting their lives.

These aspects of poverty make it difficult to experimentally test. In practice it has the income feature (for example people living in less than \$1 a day), non-income feature (for example other criteria like life expectancy at birth, infant mortality rate, gross primary enrollment rate) or both (for example the United Nations Development Index, Human Development Index (HDI) or World Bank Human Poverty Index (HPI). Following Sen's (1987) argument quoted in Anand and Ravallion (1993), that the well being has to do with capability, which in most elementary terms is about being able to live long, being well nourished, being healthy etc., the non-income dimension of poverty will be considered in this study.

The paper will hence assess the contribution of aid on welfare taking Ethiopia as the case in the study. The non-income dimension of poverty taken to represent welfare, aid effectiveness is evaluated through its main transmission, the public sector.

1.1 Statement of the Problem

The extent of poverty in Ethiopia is by far very high. Among the population of 67.2 million (2002 calculation), close to 30 million Ethiopians are estimated to be in absolute poverty. According to UNDP Human Development Report (2003), with respect to HDI, Ethiopia is ranked 169th out of 175 countries (UNDP, 2003). Furthermore with per capita income of US\$ 100 per annum, Ethiopia is categorized as one of the poorest countries in the world. This makes poverty an important issue to be addressed.

Among others, the resource gap problem (i.e. import and export, investment and saving and expenditure and revenue gap) has been one of the obstacles to the growth process and poverty alleviation endeavor in Ethiopia. Based on the analysis of Alemayehu et al (2004), over the past two decades the gap between saving and investment has been on average around 10% of GDP. Looking at the gap through the share of exports in import, there has been deceleration from nearly 85% in the 1960s to 56% in the 1990s. Further it is stated that the finance of government capital expenditure has been largely from external finance. Hence pinpoints Ethiopia's high vulnerability to indebtedness and/or the demand for aid.

On the other hand, Ethiopia has been beneficiary of external assistance for long. Before 1945 and going back as far back as five centuries, the country sought defense related assistance to protect itself from external invasion (Ethiopian Economic Association, 2000/2001 quoting Pankhurst, 1967). During the post World war II period dependence on external assistance has increased in intensity and broadened in coverage to include both defense and socio economic arena (Ethiopian Economic Association, 2000/2001). Over the period 1980-1997 foreign aid inflow into Ethiopia exceeded US\$ 17 million in nominal terms. Looking at the trend of the official development assistance (ODA)¹ as percentage of

¹ ODA fulfills three criteria. One it originates in an official sector of the donor. Second the main objective is promotion of economic development or welfare. Third it is provided on concessional terms with a grant element of at least 25% on loans (Ali, et al., 1999).

Gross Domestic Product (GDP), it rose from 12% in the 1980s to 23% in the 1990s yielding an average of 16% for 1980-1997 (Dawit and Yemesrach, 2002).

As been briefly discussed in the previous section the broad aim and economic justification for aid is to promote growth and/or alleviate poverty. However Ethiopia is receiving a substantial amount of aid while on the other hand is still one of the poorest countries in the world. This leads to the concern about the effectiveness of aid.

Further the current government, following the shift in ideology to issues of growth with equity, poverty reduction has been taken as its core objective. Economic growth is considered as the principal but not the only means. As part and parcel of this objective, priority is given to allocating resources to poverty oriented sectors (i.e. agriculture, water, road, education, health). These sectors are considered as important avenues towards realizing economic growth and poverty reduction through generating income and enhancing capacity among the poor. Alemayehu et al, 2004 have also supported this strategy. Using household survey of Ethiopia, they have come to the conclusion that growth combined with redistribution would be more poverty reducing than growth alone. In this endeavor, however a need for foreign assistance recognizing the limited capacity to mobilize resource is acknowledged (Ministry of finance and economic development (MoFED), 2002b). This points to the fact that Ethiopia is aid dependent.

Therefore, Ethiopia still being poor and a recipient of substantial amount of aid and what is more, that there is still a need for more foreign aid in the endeavor of fighting poverty and promoting growth further confirms the need to address the issue of aid effectiveness. Thus the paper will address the issue of aid effectiveness with this respect. Since most aid passes through government, the issue will be addressed taking into account this major transmission mechanism of aid.

1.2 Objective of the Study

In general the paper will aim to analyze the effectiveness of aid in enhancing the welfare of the poor or alleviating poverty. Given that most aid passes through the government, in part if not all of aid effect on welfare is via funding pro-poor government expenditure.

Accordingly the paper will specifically try to empirically analyze;

- the contribution of aid in funding pro-poor government expenditure and
- the impact of aid on the well being of the society through funding pro-poor expenditure.

1.3 Testable Hypothesis

Given government expenditure is the major transmission mechanism of aid; the testable hypothesis is thus: if aid funds government expenditures which are considered pro-poor (i.e. those that enhance the welfare of the poor), then it can alleviate poverty or improve welfare of the poor.

1.4 Significance of the Study

Ethiopia has received a substantial amount of aid. It is still believed there is a need for more aid in order to tackle the problem of growth and poverty alleviation. This makes studies on the effectiveness of aid vital.

Accordingly various studies are conducted with regard to aid for example by Tefferi (2004), Dawit and Yemisrach (2002), Wondwossen (2003), Jiffar (2002) and Aberra (2004). Though to the best knowledge, research has not considered the indirect impact of aid on poverty i.e. through funding pro-poor government expenditure. This kind of study is important for the government expenditure is the major transmission mechanism of aid. Furthermore this study will implicate to policy makers to reap the benefit from efficient utilization of the fund.

1.5 Organization of the Paper

The paper is organized in six chapters. Following the introduction, chapter two presents review of literature in relation to aid effectiveness. The third chapter gives background information on the Ethiopian economic performance. In chapter four, data source, estimation procedure and model specification are discussed. The fifth chapter deals with estimation result and interpretation. The last chapter then makes a concluding remark and draw policy implication from the analysis.

2 Literature Review

2.1 Theoretical background for Aid

The origins of the current international aid system can be traced to several more or less simultaneous initiatives following the end of World War II and the beginning of the cold war. The largest aid package in history was the Marshall Plan, which helped the Western Europe rebuild their economies after the severe devastation of the World War II. The success of the Marshall Plan in the late 1940s and 1950s led many to believe that similar transfers to developing countries would permit their comparably spectacular transformation. This has been based on two intellectual underpinnings. The first was the Harrod-Domar model, which extended the Keynesian emphasis on investment to include its capacity increasing effects. It was suggested that growth was proportional to investment by constant that was the reciprocal of what economist called incremental capital output ratio (ICOR) (Krueger, 1986 and Ali et al, 1999). Formulating the equation as in (Hansen and Tarp, 2000b) study.

$$G_{yt} = \frac{\dot{Y}_t}{Y_t} = v \frac{\dot{k}_t}{Y_t} \dots\dots\dots(2.1)$$

Where G_{yt} is the growth rate in production, Y_t production in year t, k_t the capital stock and a dot denotes changes over time and v is the ICOR which is constant . Relating changes in the capital stock to gross investment, I_t and allowing for a constant depreciation rate of capital, δ , it follows that;

$$G_{yt} = v \frac{I_t}{Y_t} - \delta = v_{it} - \delta \dots\dots\dots(2.2)$$

Given this relationship the second intellectual underpinning is that it is believed that there is the shortage of capital explanation of underdevelopment. The underlying assumption is that of capital market imperfection, making aid necessary to fulfill the requirement of capital. Hence the role of foreign aid has been justified with the belief that if investment was the bottleneck, the return on additional investment in developing countries would be

higher than in developed countries which would increase growth. The role of aid hence comes to be regarded as a transfer of resources (Krueger, 1986).

The Harrod-Domar model assumes only saving constraint. This was expanded in the sixties in the influential Chenery and Strout (1966) two gap model. In this model foreign exchange constraint is introduced as a separate potential constraint on growth. Hence in the two gap model, the role of aid has come to be relaxing the ‘saving constraint’ and ‘foreign exchange constraint’ thus helping the growth rate of developing countries. Inflows of foreign capital fill both gaps simultaneously, so ex post the two are necessarily equal. If the prospective foreign exchange gap is the larger of two, actual savings are supposed to fall short of potential savings, and if the prospective savings gap is the larger, actual imports will be greater than those needed for growth. Thus the finance of the foreign transfer will differ depending on which gap is binding (Hansen and Tarp, 2000b referring Chenery and Eckstein, 1970). Later a three gap model is developed adding a third constraint in the form of fiscal constraint limiting growth prospect. Hence foreign transfer could also be used to overcome this constraint (see Bacha, 1990).

The empirical works were done using the Harrod-Domar growth model with the causal chain running from aid to growth via savings and investment. Taking I_t in equation (2.2) literature formulate the following relationship.

$$I_t \equiv S_t + F_t = S_t + A_t + F_{pt} + F_{ot} \dots\dots\dots(2.3)$$

Where F_t , is the total inflow of resources, including aid, A_t as well as private and other foreign inflows, F_{pt} and F_{ot} respectively. Expressing domestic savings, S_t , and foreign inflows as a fraction of Y_t , the following identity appears.

$$i_t \equiv s_t + a_t + f_{pt} + f_{ot} \dots\dots\dots(2.4)$$

Assuming that $\partial f_{pt} / \partial a_t = \partial f_{ot} / \partial a_t = 0$, i.e. aid has no impact on private and other foreign inflows, the marginal effect of aid on investment will then be,

$$\frac{\partial i_t}{\partial a_t} = \frac{\partial s_t}{\partial a_t} + 1 \dots\dots\dots(2.5)$$

Based on the above equation early works categorized as first generation studies by Hansen and Tarp (2000b) focus on aid- saving link which in turn affects the investment ratio in order to look at the macroeconomic effectiveness of aid.

In the second generation studies focus turned from aid savings relation to estimating the link between aid and growth. Some estimated the link via investment and some directly in reduced form equations. Insofar as there is an underlying structural model, focus remains on capital accumulation and is consistent with the Harrod-Domar model or a simple Solow growth model (Hansen and Tarp, 2000b).

In the 1990s the focus of theoretical and empirical work on growth broadened. Emphasis shifted from investment to incentives i.e. from capital to the underlying institutions and policies that promote growth by encouraging efficient investment, by supporting human capital development and by facilitating technological advance. Hence aid has also been considered as an instrument to induce policy reforms (World Bank, 1998). Further considering the importance of institution and policy environment; these aspects are included directly in the reduced form growth regressions alongside traditional macroeconomic variables in analyzing aid effectiveness (Hansen and Tarp, 2000b).

Behind these theoretical underpinnings the ultimate objective of aid has been promoting growth. It was then believed economic growth will be an instrument to further alleviate poverty. This was the developmental thinking in the 1950s and 1960s of the trickle down ideology. It implies a vertical flow from the rich to the poor that happens of its own accord. The poor benefit when the rich start spending their gains. Thus the poor benefit from economic growth only indirectly through vertical flow from the rich. However, it is also possible that high economic growth increases poverty. This can happen when inequality increases so much that the beneficial impact of growth is more than offset by adverse impact of rising inequality. This is called “immiserising” growth (Kakawani and Pernia, 2000).

In the 1970s, there has been ideological diversion to addressing both growth and poverty issues side by side (World Bank, 1990). Following the diversion, issues of pro-poor growth which is a major departure from the trickle down developmental concept started to dominate. Donors have also started to consider directly the issue of poverty alleviation.

The background of this concept is that the poor has much lower well-being than the non-poor because they lack the resource to satisfy the minimum basic necessity of life. Hence growth with market forces benefits rich more proportionally because rich have inherent advantages in a market economy. Government thus needs to pursue policies that will reduce the gap in well being between the poor and the rich. Promoting of pro-poor growth requires a strategy that is deliberately biased in favor of the poor so that the poor benefit proportionally more. Direct pro poor policies include adequate public spending for basic education, health and family planning services, improved access to credit and the promotion of small and medium enterprises. This strategy would make poverty reduction to be faster (Kakawani and Pernia, 2000).

Some studies refute this ideology. As been stated in Kakawani (2001), Dollar and Kraay (2000) study based on cross country regression implicates that the income of the poor rise one to one with the overall growth, thus government need not follow pro-poor policies rather should focus on maximizing growth. On the other hand Kakawani (2001) points out cross country regressions can only indicate the average trend and individual country experience could be quite different. Some may benefit by maximizing growth but some may need pro-poor growth with a focus in reducing inequality. By measuring the sensitivity of poverty to economic growth in his sample countries using inequality-growth trade off index, he has supported the argument. In his empirical analysis for Thailand pro-poor policies are believed to have a greater pay off for poverty reduction, while growth-maximizing policies are thought to be more adequate for Korea and Lao, PDR. For the Philippines, a mixture of growth and pro-poor policies are believed to be deemed as adequate. For Ethiopia Alemayehu et al (2004), based on their study have concluded that pro-poor growth strategy is a preferred policy.

Backed by the theoretical underpinning that foreign aid through relaxing the resource constraint helps promote growth and/or alleviate poverty, foreign aid has been flowing to developing countries. The case in the study Ethiopia is also one of the developing countries struggling to fight poverty. As been mentioned in the previous paragraph in this venture of alleviating poverty, pro-poor growth strategy has been implicated as a favored strategy. Addressing poverty is then the heart of any development strategy for Ethiopia. Moreover, given the prevalence of resource constraint, Ethiopia has also been the recipient of substantial inflow of foreign aid. The central concern of the study, aid effectiveness in relation to poverty is hence evaluated under this background.

2.2 Aid effectiveness

The theoretical underpinnings are made with the assumption that aid can actually work in attaining the ultimate objective of promoting growth and/or alleviate poverty. However empirical evidences on whether this objective has been attained have been far from conclusive. The results have been susceptible to variation in sample data and economic approach used. Apart from this, deficiency has also been attributed to lack of recognition that aid is given primarily to government and any impact of aid on economy will be mediated by government behavior. This aspect has been considered as important for most aid goes to the public sector and any impact on growth and poverty reduction will be mediated by how aid influences government behavior. The literatures recognize the importance of policy, but the studies condition aid effectiveness on policy, rather than how aid affects policy. The latter issue has been addressed by two separate strands in the literature; fungibility and fiscal response (McGillary and Morrissey, 2001). These concepts will be discussed consequently.

a. Aid Fungibility

Aid fungibility is concerned with identifying whether aid that is intended (by donors) to be spent on a particular expenditure item, such as health, education, etc is infact allocated to that area. Aid is said to be fungible if the recipient uses (or has the ability to use) aid for the purpose other than those intended by the donors (McGillary and Morrissey, 2001). In

relation to aid effectiveness this could result in allocation of aid into those sectors where the potential effect of aid to growth is lower.

The magnitude of fungibility depends on a country's budgetary structures, the degree to which governments are able to manage their finances and the extent of donor involvement. The level of fungibility could be partial or full. Full fungibility is the case where aid allocated to a certain sector is considered as a general budget support in the government decision of sectoral allocation. On the other hand, if part of the aid is treated as general support then aid is said to be partially fungible (World Bank, 1998).

Studies on fungibility hence try to detect the extent to which aid in practice is used in a fungible manner. That is, they attempt to model the actual extent to which aid, or some portion thereof, is used for purpose other than for which it is intended. The studies can be categorized into two groups. One group starts from the utility maximizing problem of which the utility incorporates the goods to be purchased by the fungible and non-fungible portion of aid and also revenue from other domestic and international sources. The government is thought to maximize utility subject to its budget incorporating revenue and aid flowing to a certain sector. The other group adopts a more ad hoc approach. The studies assume that the government under consideration possess a community indifference curve and is faced by a budget line. Various equation are then posited which represent the demand curve derived from the corresponding optimizing decisions (McGillary and Morrissey, 2001).

b. Fiscal Response

Fiscal response literature models how the impact of aid is mediated by public sector behavior. The models are broader in that not only does categorical allocation is considered but also the effects of aid on tax effort and borrowing. The effectiveness of aid can then be evaluated based on whether aid increase investment. The donors are assumed to constrain the ability of recipients to reallocate aid to unintended consumptions uses or recipients being able to increase borrowing and hence allocating such funds to consumption. With respect to tax effort the logic of fiscal response model is that; rather than aid encouraging tax effort, it should be a net addition to investment (McGillary and Morrissey, 2001).

Most studies adopt Heller (1975) model. The approach is predicted on the observation that the basic task facing the public sector decision maker in all countries is to allocate revenue among various expenditure categories subject to budget constraint. The utility function of the public sector decision maker is represented as a function of public expenditure i.e. recurrent expenditure or government consumption and capital expenditure or public sector investment. Government revenue is obtained from domestic resources in the forms of taxation and other recurrent revenue and borrowing. Here aid is treated as exogenous viz. aid is an external resource of revenue that enters the budget constraint (McGillary and Morrissey, 2001). In some studies for example Franco-Rodriguez et al (1998) aid is endogenized, hence included in the utility function. The argument behind is that governments have target for aid revenue, and this expected revenue is incorporated into their fiscal planning. That is, when determining revenue and expenditure allocation, anticipated aid is taken into account. Making aid endogenous does not require the assumption that recipients have control over the aid they allocated instead it requires that they have effective control over the amount that is actually spent.

These concepts have been empirically analyzed by various studies to show the role of public sector behavior in aid effectiveness. In addition to the difference in sampling and econometric approach used, the public sector behavior has been central to the discussion of aid effectiveness because almost all the external resources are mediated through the government sector and directly affect this sector. Accordingly studies on aid fungibility and fiscal response have also been conducted for Ethiopia (see the discussion in the subsequent section). The study in this paper also further acknowledging the importance of the public sector (i.e. the issues of aid fungibility and fiscal response), the empirical study will incorporate the public sector in analyzing the impact of aid on poverty in Ethiopia.

2.3 Review of Empirical Literature

2.3.1 Aid and Economic Growth

The recent on going debate with regard to the effectiveness of aid on growth circles around whether it depends on the policy of recipient country. The subsequent empirical studies will thus be which revolve around aid – growth relationship and the relevance of policy.

The most influential study with this respect is that of Burnside and Dollar (2000). They used a recent empirical growth literature to develop a model of growth with a ray of institutional and policy distortions. A panel of 56 countries, six four year time periods from 1970-1973 until 1990-1993 is used. They included in their model in addition to aid, aid policy interaction term to capture the impact of policy on the effectiveness of aid. The estimation procedure used are ordinary least squares (OLS) and a two stage least squares (2SLS) to see the difference in considering aid as exogenous and endogenous. Their result shows that aid has a positive effect on growth in good policy environment in both OLS and 2SLS estimation. The result has further been explained through the analysis of aid impact on consumption in especially poor policies, that there is a tendency to divert aid to government consumption spending rather than using it to finance growth promoting investment. However this study has been found to be sensitive to variation in the sample data and estimation technique. Easterly et al (2003), maintaining the methodology used by Burnside and Dollar (2000) but extending the data set to 1997 and adding additional countries found that the conclusion of foreign aid promotes growth in good policy environment does not hold.

Hansen and Trap (2000a) through different model specification, their result disagrees from Burnside and Dollar finding. They formulate their model by comparing recent studies in which the relationship between aid and growth is modeled as non linear. The studies included are Hajimicheal et al. (1995), Durbarry et al. (1998), Lensink and White (1999), and Burnside and Dollar (2000). The studies have in general concluded that aid has positive impact on growth.

However in the studies the empirical foundation for the non-linear relationship differs. While Burnside and Dollar use the interaction term between aid and an index of economic policy, the other three include aid squared as regressor. The theoretical argument put forward to motivate the non-linear specifications of the aid growth relation varies. Hajimicheal et al. (1995) refer to absorptive capacity constraints. Durbarry et al. (1998) discuss Dutch disease problems and capacity constraints, and Lensink and White (1999) consider inappropriate technology and institutional destruction caused by aid inflow (Hansen and Trap, 2000a).

Hansen and Trap (2000a) modeled the aid and growth regression by including both the aid policy interaction term and the aid squared in comparing the empirical results to make an analysis. The estimation is made using OLS as well as generalized method of moments estimator that yield consistent estimates, also in the presence of both endogenous regressors and country specific effects. They have also included investment and human capital in their regression. They found that the interaction term is insignificant while aid is effective and the marginal effect decreases faster. Further shows, with out the interaction term aid is still significant, refuting the conclusion made by Burnside and Dollar (2000) that the impact of aid is conditional on good policy environment. They have also confirmed the hypothesis that aid has impact on growth via investment.

On the other hand Durberry et al (1998), assessing the impact of foreign aid on growth their result strongly support the view that foreign aid does have some positive impact on growth conditional on stable macroeconomic policy environment. They improved their model by examining the growth impact of aid within a model including both policy variables and all the major sources of investment finance; foreign aid, private and other inflows and domestic savings. They used an augmented Fisher-Easterly type model using both cross-section and panel data. The model differs in that it recognizes the non-aid sources of investment finance impact on growth. They have not investigated on the interaction term of aid and policy but their result shows, though aid growth effects are not dependent on it, the inclusion of policy variables rather provides a more fully specified model.

Here as been pointed out previously the aid effectiveness issue is inconclusive. The above studies confirm the variation in results with differing sampling and model specification. The studies have not also considered the role of the public sector.

2.3.2 Aid and Poverty Reduction

Studies of aid growth relationship have been implicitly implying that aid affects poverty through growth. Following the diversion from the trickle down ideology, directly addressing aid effectiveness in terms of its contribution to poverty has gained momentum.

Aid allocation could indicate the caveat with respect to aid effectiveness. The study by Collier and Dollar (2002) derives a poverty efficient allocation of aid and compares it with actual aid allocation. They estimated the impact of aid on growth for a large number of countries as a first step towards estimating the impact of aid on poverty. Mapping aid on growth, they estimated the equation where growth is a function of exogenous conditions, the level of policy, the level of net receipts of aid relative to GDP, the level of aid squared, and the interaction of policy and aid. They have included a much broader range of policies for which comparable quantitative measures were lacking differing from Burnside and Dollar study. In their result, it has been found that aid policy interaction term is significant. This implicates that donors can affect growth through the allocation of aid. The analysis then determines the poverty efficient allocation of aid. The intuition of their approach is aid should be allocated to countries that have large amount of poverty and good policy.

To determine the optimality of donors' behavior, they start by considering a world in which aid is given with the purpose of maximizing the reduction in poverty. This maximization problem is interpreted as to allocate aid so that the marginal aid cost of lifting someone above the poverty line is the same in each aid receiving country. The general point is that the optimal allocation of aid for a country depends on its level of poverty, the elasticity of poverty with respect to income, and the quality of its policies. Their analysis based on their sample concludes that the actual allocation of aid is radically different from the poverty efficient allocation. With present allocation aid lifts 10 million people annually out of poverty. With poverty efficient allocation on the other hand, the productivity of aid could nearly double.

A study on Vietnam by Le and Winters (2001) has been made with regard to aid allocation. Three types of allocation has been identified as necessary for addressing poverty in developing countries i.e. aid promoting sustainable economic development, that directly targets the poor and that provides transfers and safety nets for immediate relief. Maximizing the benefit of aid in terms of poverty reduction requires determining an aid allocation that is balanced between these three variables. The empirical result indicates through examining poverty within Vietnam that the optimality of aid allocation is in doubt. This has been due to disproportionate disbursement across regions with regard to poverty

incidence. It has been observed that there is also overemphasis on aid promoting growth while those that are aimed directly to the poor play a minor role.

Cross-country studies are also conducted which look at the impact of aid financing the government expenditure that improves the welfare of the poor. The indirect part is represented in an index of pro-poor public expenditures. The studies acknowledge and abstract from the issue of fungibility and fiscal response stating that it is immaterial within their study. However the studies try to capture the role of public sector by making an allowance for the sector as a transmission mechanism of aid. Gomanee et al (2003a) used a panel of 38 countries in four year and one three year period over 1980 to 1998. They used a semi-parametric technique of quintile regression analysis to examine the effect of aid and social expenditures at different points of welfare distribution. Their result indicates that where there are differences across quintiles, aid is more effective in countries with lower welfare (i.e. below the median of the welfare distribution). Hence they concluded that aid can make a positive contribution in alleviating poverty. The effect is greater in countries with lower levels of human development indicators. Gomanee and Morrissey (2002) on the other hand using a pooled panel of 57 countries over the period 1980 to 1998, they constructed a residual regressor to obtain a coefficient on aid variable that includes the indirect effect through public expenditure allocation induced by aid. The result shows that public expenditures mediate the positive effects of aid on poverty and aid is associated with increased welfare of the poor. Likewise on another study by Gomanee et al (2003b) using a pooled panel of 39 countries over the period 1980 - 1998, the same conclusion has been arrived applying the same methodology.

Gomanee et al (2004) on the other hand using again the same methodology, their result says otherwise. Their estimation is based on data for 104 countries over the period 1980-2000 and for sub-sample of low income and middle income countries. The fixed effect estimate provide robust evidence that aid is associated with improved values of the welfare indicators, and this effect appears to be greater in low income countries. Aid appears to increase welfare either directly or through the effect on growth, and there is no evidence that aid operates through public spending. They explain the reason behind this different result due to using large sample, distinguishing low-income and middle-income countries

and accounting for unobserved country characteristic in estimation. This shows the empirical evidence of aid poverty relationship has also been susceptible to sampling.

2.3.3 Ethiopian Studies

Studies with regard to aid have been conducted in Ethiopia given the high dependence on aid and the level of poverty. Dawit and Yemisirach (2002) examined the interactions among foreign aid, external debt and economic growth. They used error correction model with time series data spanning from 1970 to 1999. They specified three equations: output equation, investment equation and import equation. Their result reveals that aid has a positive but insignificant effect on economic growth while investment has a positive significant impact. On the other hand given investment and imports as some of the channels through which aid impacts on economic growth, analysis has been made. The result indicates that foreign aid has a positive and significant impact on investment. However the result reveals no evidence of overhang and crowding out effect of debt on investment. The relationship between foreign aid and imports has also been found to be positive and significant implying foreign aid has been feeling the foreign exchange gap. Thus the implication is drawn that foreign aid contributes to growth by facilitating greater investment and imports. This study has been criticized by Wondwosen (2003) on its model specification i.e. the output specified as a function of savings, aid, investment and other variables is likely to be biased. This being due to a problem of double counting since investment captures part of the growth impact of aid and hence putting to question their result. Further points out the impact of aid on the transmission channels do not necessarily mean that it spurs growth since aid may lead to unproductive investment.

Wondwosen (2003) in his study assessed the relationship between aid, policies and economic growth for the period 1962/63 to 2001/02. The analysis is conducted using the Johnson Maximum Likelihood procedure. In the study two equations has been identified: investment and growth equations. He used generated residual regressor to avoid the problem of double counting when aid and investment variables are included together in growth equation. His study shows that foreign aid has a significant positive contribution to investment, whereas uncertainty of aid flow significantly and negatively affects capital

formation activity. The effect of foreign aid on economic growth is found to be negative but insignificant. Aid interacted policy term, on the other hand, produced significantly positive result implying good economic policies increase the level of aid that can be productively consumed. Hence it is suggested for the government to give more attention towards the improvement of the policy environment. Alemayehu and Befekadu (1999) as quoted in Ethiopian Economic Association, 2000/01, using error correction model, they have found a positive long run relationship between aid and growth although the correlation was negative in the short run.

Tefferi (2004) has studied the Dutch disease effect of aid and further studied the link between aid and the export performance. He used a time series data spanning from 1965/66 to 2001/2002. The Johansen Maximum likelihood procedure has been used. The result indicates that aid inflows lead to depreciation of real exchange rate rather than appreciation and hence implicating the absence of Dutch Disease effect. Aid flows have also been found to have positive impact on export performance. Hence implication has been drawn that it is beneficial for new investment drawn financed by external aid inflows to be export oriented as one way of promoting growth.

Taking into consideration the role of public sector behavior, Jiffar (2002) studied the impact of foreign aid on components of public expenditures with particular reference to the case of aid fungibility. He considered four developmental and three non-developmental sectors. For each developmental sector, GDP, sector specific aid variable are considered for explanatory variables and sector specific spending is considered as dependent variable. Moreover the impact of foreign aid on non-developmental spending has also been examined to inquire whether aid funded these activities. The result indicates that education and agriculture sectors to be non-fungible. However transport and communication and construction sector are aid fungible. In the case of non-developmental expenditure, aid is found to be significantly affecting debt-servicing expenditure. Hence implication is drawn, since fungibility exists in some cases, linking to overall public expenditure programme that provides adequate resources to crucial sector may be a better way of transferring resource. Further implied effective way of monitoring purpose-oriented aid is more needed to make spending for the given purpose more efficient.

Aberra (2004) also made a study on fiscal response recognizing the role of public sector on aid effectiveness. The paper examines the impact of aid hypothesizing that different types of aid (grants and loans) and aid from different sources (bilateral and multilateral) have different impact on government revenue collection and expenditure behavior. Two alternative approaches i.e. neoclassical optimization based model of Heller (1975) and non-neoclassical approach model of Alemayehu(2002) have been used. The result from neoclassical approach shows that loans and aid from multilateral sources are pro-investment while grants and aid from bilateral sources are pro-consumption. Although the impact of aid on domestic revenue is found to be zero, in the paper it is argued that aid potentially reduce government revenue collection for government consumption being more than what is domestically generated. The result from non-neoclassical approach reveals that aid positively affects government investment has negative and at most no effect on government consumption. On the other hand the analyses on the impact of aid on domestic revenue reveals that aid enhance direct tax collection and have no effect on indirect taxes.

Based on the aforementioned studies in Ethiopia, one can draw the conclusion that aid has positive impact on growth. On the other hand, one can also draw the conclusion that aid is rather ineffective in Ethiopia unless good economic policies support it. Hence implying the issue in Ethiopia is also far from conclusive. Those studies that consider the public sector behavior implicate the prevalence of sectoral fungibility and the fiscal response study point out aid is pro-investment. However to the knowledge of researches done, there has not been a study with regard to aid impact on poverty through the public sector. This has been considered in cross-country studies. The studies indicate only the average trend and individual country experience has the upper hand for strong policy decision making. Hence, this paper will study aid effectiveness on poverty through the transmission mechanism of the public sector.

3 Aid and Performance of the Ethiopian Economy

3.1 Overview of the Ethiopian Economic Performance

3.1.1 Real GDP and Per Capita Income

Ethiopia is considered as one of the least developed countries and by far one of the poorest countries in the world. Comparing Ethiopia with respect to Sub Saharan African Countries (SSA) and low income countries the growth performance measured in Gross National Product (GNP) per capita and GNP per capita PPP in dollars in the year 2002 is low (see table 3.1).

Table 3.1GNP per Capita and GNP per Capita PPP

	GNP per capita \$2002	GNP per capita PPP \$ 2002
Ethiopia	100	720
SSA	450	1620
Low Income Countries	430	2040

Source: World development report 2004

In Ethiopia on average the annual growth rate of real GDP has been 3.4 and real per capita 1.1 in the era of the imperial regime (1965/66-1972/73). This has declined in the Derg regime (1973/74-1990/91), the growth rate of real GDP being 1.8 and in the case of per capita GDP even decreasing. During the present government (1991/92-2002/03) there seems an improvement in the overall performance with 3.8 growth rate in real GDP and 1.1 growth rate of per capita income (Table 3.2). Given that there are various factors behind the difference in the performance, more is expected to be done to sustainably grow and eradicate poverty. According to Ethiopian Economic Association (1999/00) report, for Ethiopia to reach the level of per capita income achieved by the average SSA country per capita income of 7% is required for about 23 years.

Table 3.2 Average Annual Growth Rate of Real GDP and Real Per Capita GDP

Period	Items	
	Growth Rate of Real GDP	Growth Rate of Real Per Capita GDP
1965/66-1972/73	3.4	1.1
1973/74-1990/91	1.8	-0.9
1991/92-2002/03	3.8	0.8

Source: Computed on the basis of data obtained from EEPRI data base, 2003 and MoFED

Looking at the sectoral contribution to GDP, agriculture GDP shows that agriculture has been the dominant sector for decades. However its contribution has been declining along the three governments. In the case of industry and the distributive sector the contribution has been stable over the decades. A significant change is observed in the category of other service sector which comprises of Banking, Insurance and Real Estate, Public Administration and Defense, Education, Health and Domestic and Other Services. Its contribution has grown over the years (see table 3.3).

Table 3.3 Sectoral Composition of GDP

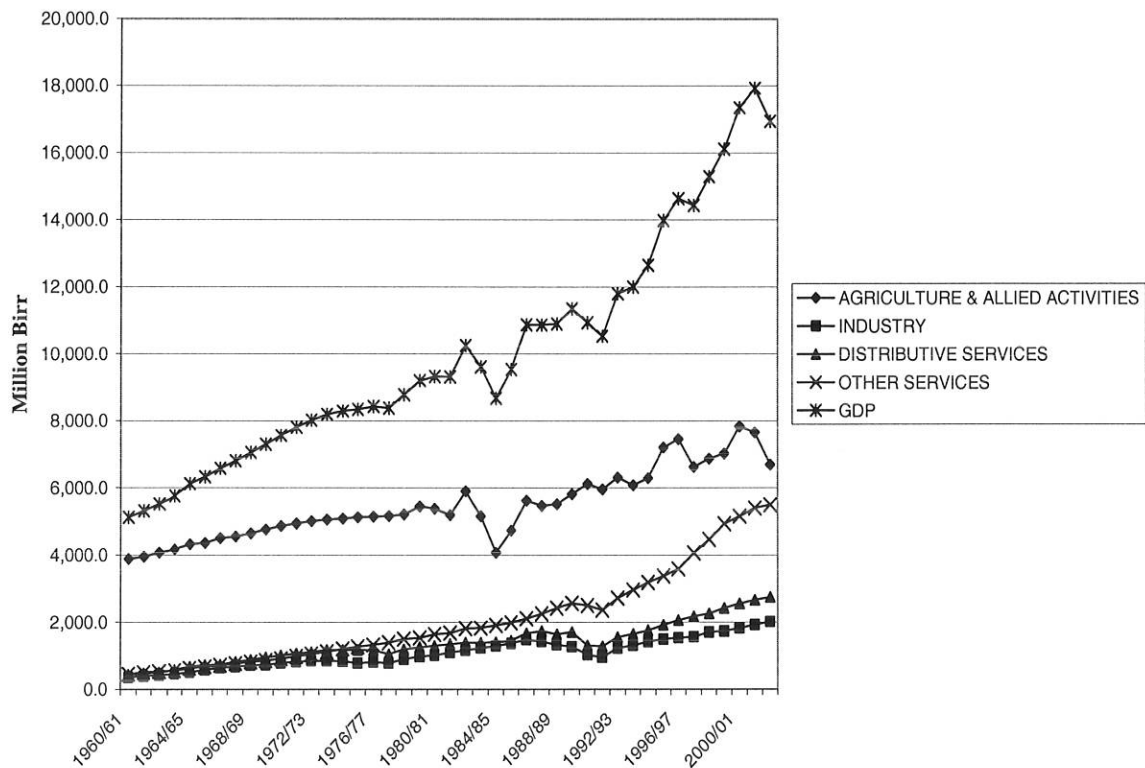
Period	Agriculture & Allied Activities	Industry	Distributive Services	Other Services
1965/66-1972/73	65.5	10.0	12.6	11.7
1973/74-1990/91	55.9	11.4	14.3	18.4
1991/92-2002/03	47.9	10.7	14.3	27.0

Source: Computed on the basis of data obtained from EEPRI data base, 2003 and MoFED

Agriculture being the dominant sector in the economy, the fluctuation in the overall growth of the economy is to a great extent attributable to its performance. Hence as can be seen in Figure 3.1 the performance of the GDP closely follows the agriculture sector trend. On the other hand agriculture is characterized to be highly dependent on rainfall and use predominantly traditional method of farming. This has made it to be susceptible to the vagaries of nature and hence to drought. As can be seen on Figure 3.1 in the major drought years of 1984/85, 1997/98 and 2002/03 there has been a major dip in agriculture production and hence GDP. What is more its growth performance has been slow as compared to the other sectors (See Figure 3.1). Additional factors like diminishing farm size and subsistence farming, soil degradation, tenure insecurity, weak agricultural research base

and extension system, lack of financial services, imperfect agricultural markets and poor infrastructure has also been identified behind this poor performance of the agriculture (Ethiopian Economic Association,1999/00).

Figure 3.1 Trends in the Composition of Gross Domestic Product at 1980/81 Constant Factor Cost



3.1.2 Investment and Saving

Investment which is related to the rate of saving is an important component of growth. The difference between saving and investment is known as investment – saving gap and shows the status of resource gap. In the case of Ethiopia, on average the gross domestic saving (GDS) as percentage of GDP has been below the actual investment which is represented by gross fixed capital formation(GFCF) as a percentage of GDP (see table 3.4).

Table 3.4 Investment-Saving Gap and its percentage Growth rate

Items	Period		
	1965/66- 1972/73	1973/74- 1990/91	1991/92- 2002/03
Average of GFCF as a %age of GDP	16.3	13.2	16.6
Average of GDS as a %age GDP	14.2	7.35	4.1
Average of Investment –Saving Gap	-2.1	-5.7	-12.5
Growth rate of GFCF as a %age of GDP	-1.5	1.1	1.1
Growth rate of GDS as a %age GDP	0.6	-2.9	-2.92
Growth rate of Investment –Saving Gap	7.5	-12.7	-12.7

Source: Computed on the basis of data obtained from EEPRI data base, 2003

The lowest gap has been in the Imperial regime between the years 1965/66 and 1972/73 which is -2.1 as a percentage of GDP. This is also the era where the resource gap has shown a decreasing trend. As can be seen in Table 3.4 this has been achieved though as a result of decrease in the growth rate of investment rather than increase in saving. During the Derg regime (1973/74-1990/91) on average the gross fixed capital formation and the gross domestic saving as a percentage of GDP has been 13.2 and 7.5 respectively resulting in the resource gap level of -5.7. In this regime, though the saving rate has shown an increasing trend, it has not been able to close the resource gap requirement.

In the present government (1991/92-2002/03) the saving level as a percentage of GDP on average has been low, 4.1 as compared to the investment level as a percentage of GDP which is 16.5. Looking at the growth rate of saving on average it has shown a decreasing trend. This has been mainly due to the negative saving level recorded in the year 2002/03 which is most probably related to the drought. It is well known that drought has a major impact on the mainstay of the economy, agriculture, thus decreasing the level of income. However the resource gap has further widened reaching on average to 12.5.

In general, the widening resource gap is an indication that the country is highly dependant on foreign finance by way of grants and loans. This cautions the policy makers in addition to encouraging saving to boost the investment it is important to be efficient in the utilization of the foreign assistance so as to grow out of being dependent on foreign assistance and accumulate debt.

3.1.3 The External Sector

The performance of the external sector also implicates the country's high dependence on foreign assistance. In general the resource gap which is in this case the difference between the imports and exports has rather been negative and more or less increasing (see Table 3.5).

Table 3.5 Import-Export Gap and its Growth Rate

Items	Period		
	1965/66- 1972/73	1973/74- 1990/91	1991/92- 2002/03
Average of Export as a %age of GDP	8.6	9.4	13.2
Average of Import as a %age of GDP	10.7	15.1	25.6
Average of Resource Gap	-2.1	-5.7	-12.6
Growth rate of Export as a %age of GDP	1.9	-2.5	11.3
Growth rate of Import as a %age of GDP	-1.7	2.3	10.9
Growth rate of Resource Gap	1.1	-2.9	12.3

Source: Computed on the basis of data obtained from EEPRI data base, 2003

During the imperial regime (1965/66-1972/73), on average the export level as percentage of GDP has been 8.6 while for import, it has been 10.7, the resource gap being 13.2. In the case of the Derge regime (1973/74-1990/91), the resource gap has further widened. While the import sector has been increasing, the export sector has on average exhibited a decreasing trend (see table 3.5). This could be due to the domestic policy, i.e. the fixed official exchange rate policy and restrictive foreign exchange licensing system for private use leading to the lower competitiveness of the export sector.

On the other hand in the present government, the foreign sector has been liberalized and the exchange rate devalued as a step to boost the export sector by making it competitive in the international market. This could be seen on average with the increase in the growth rate of the export as a percentage of GDP which is 11.3. Since the growth rate of import sector as a percentage of GDP has also increased to 10.9, the resource gap on average has rather widened to 12.6.

3.2 Poverty Profile

Ethiopia is faced with complex poverty, which is broad, deep and structural (MoFED 2002b). Poverty has a very wide dimension including some natural, like shortage of rainfall and drought and also civil wars which governments cannot control at will. The intricacies of poverty are also found in dynamics of demographic factors, terms of trade, technology including know how and people's attitudes and values (Getahun, 1998).

According to UNDP Human Development Report, 2003 with respect to HDI, Ethiopia is ranked 169th out of 175 countries (UNDP, 2003). Further one can make out the status of Ethiopia with respect to poverty through making a comparison with SSA and low income countries. Accordingly the table below assesses the non-income dimension of poverty taking measures like under 5 mortality rate and life expectancy. Under 5 mortality rate has been recorded as 179 which is higher than average SSA countries and low income countries. Life expectancy is also the lowest when compared to SSA and low income countries (see table 3.6). Further Heins et al (2001) estimating infant mortality rate as 110 deaths per 1000 live births in the first year of life has stated that it is one of the highest value in the world. In general these figures show that Ethiopia is indeed one of the poorest countries in the world.

Table 3.6 Under 5 Mortality and Life Expectancy at Birth

	Under 5 Mortality/1000, year 2000	Life Expectancy at Birth, year 2000
Ethiopia	179	42
SSA	162	47
LowIncome Countries	115	59

Source: World development report 2003

Given that Ethiopia is one of the poorest countries in the world, subsequently it will be tried to glimpse the prevalence and severity of poverty within the country. The focus will be on the recent situation arguing that it would serve the aforementioned purpose for poverty is not a new phenomenon in Ethiopia. Here the major source of information will be the report in MoFED (2002a). The report is made based on the 1999/00 Household Income, Consumption and Expenditure (HICE) and Welfare Monitoring (WM) Surveys made on Development and Poverty Profile of Ethiopia and also the 1995/96 HICE and WM surveys. The report encompasses both the income and non-income dimension of poverty.

Looking the income dimension of poverty, the World Bank Development report 2000/01 using the survey in 1995 based on the international poverty lines indicates that the percent of the population living below 1\$ a day and 2\$ a day is 31.3 and 76.4 respectively. Moreover MoFED (2002a) reports, based on the absolute poverty line constructed using both the food and non-food category, in the year 1995 45.5% are absolutely poor i.e. are unable to lead a life fulfilling the minimum livelihood standard. Using again the constructed poverty line in the year 1995/96 44.2% is estimated to be absolutely poor in the year 1999/00. With regard to the intensity of poverty, which is estimated using the measure of poverty gap on average, the poor are 13% short of fulfilling the required minimum expenditure for the year 1995/96 while for the year 1999/00 it is 12%.

In measuring the non-income dimension of the poverty situation child stunting is one of the measures which is an indicator of the long run malnutrition in the country. In Ethiopia it has been recorded as 66.6% in 1995/96 and later in 1999/00 as 56.8%. A small decrease is observed but still it is high relative to the international standard for the prevalence exceeds 40%.

It is well known that development of human capital of the poor i.e. with respect to health and education is a key to reducing poverty. A well developed human capital resource is an asset for it will increase the income earning capacity and enables the society to participate in decision making that determines the well being of the society in which it lives. The present situation in Ethiopia with regard to the literacy rate is recorded as 27.3% in 1995/96, 24.8% in 1997/98, 26.6% in 1998/99 and 29.4% in 1999/00. These figures are

worrisome, for as can be seen more than half of the population is still illiterate². On the other hand looking at the school enrolment rate; at the primary level, the gross enrollment rate is estimated to be 58.9% and the net enrollment rate as 33.8% in the year 1999/00. For the secondary level it is recorded to be at gross level 15.5%, and net 11.5%.

For the aforementioned problems accessibility could be considered as one of the problems i.e. access to education facilities, health facilities and economic infrastructure. It is an important precondition for the public including the poor to utilize them. An important measure could be the distance existing between residence of household and the facility at hand. This on the other hand could also be used as an indicator of the efficiency and network of transport which is an implied important sector to improve the welfare of the poor. In Ethiopia with regard to public services like primary school, secondary school, health center and drinking water areas, a quarter of the population lives greater than the average distance estimated for the country. This also applies to distance to various economic infrastructure like food market, post office means of transport and road.

The glimpses of recent poverty situation discussed are enough to tell that Ethiopia still need to struggle a lot to win poverty. This hence pinpoints to the fact that addressing poverty should be at the heart of any development strategy.

3.3 Government Expenditure

The role of the government to development has been more and more considered important after the Keynesian revolution. The government intervention is justified in the provision of public goods and services and public investment using taxes, subsidies and other instruments to correct market failure. The existing situation of developing countries i.e., characterized by underdeveloped physical and social infrastructure, low levels of saving and investment requires for the government to participate so as to break the vicious circle of poverty (Ethiopian Economic Association, 1999/00)

Likewise as one of the developing countries, Ethiopia shares the aforementioned characteristics and the government has been involved at various levels. After the 1974

² Illiterate is an individual who is ten years old or more and cannot read and write

revolution the Derg regime has expanded the role of the government well beyond what is recommended by Keynesian theory. The government nationalized private properties and hence become engaged in the production and provision of basic goods in addition to providing basic infrastructure and social services. In the present government on the other hand the role of government has been reduced rationalizing it to give emphasis according to economic, social, infrastructure sectors (roads, education, health, clean water).

In both regimes their expenditure has not solely been covered from domestic sources. This can be seen in the budget deficit difference when calculated with grant and without grant. In the Derg regime (1973/74-1991/92) on average the deficit inclusive of grants as a percentage of GDP has been 5.9 and excluding grant 8.33. Also in the present government (1993/94-2002/03) the deficit on average inclusive of grant as a percentage of GDP has been 5.4 and without grant 9.17. Hence this implicates the need to properly manage the external finance in order to obtain the utmost benefit.

3.3.1 Recurrent Expenditure

Recurrent expenditure comprises of expenditure items which are recurring in the process of delivering government economic and social services (MoFED, 1999). Its categories and their main expenditures are: general services inclusive of expenditures like for defense, internal order and justice, economic services inclusive of expenditures on agriculture, industry and construction, social services inclusive of education and health and various expenditure including pension and debt servicing.

The lion share of the recurrent expenditure has been general service, rather mostly due to defense expenditure. In the Imperial era (1965/66-1972/73) expenditure on defense has been 20 percent of the total expenditure. In the Derg regime (1973/74-1990/91) it has been much higher, held half of the recurrent expenditure i.e. 52.5 %. This has been due to the civil conflict that was prevalent at that regime. During the present government (1991/92-2002/03), this share has decreased to 28% due to the peace and stability established. The share could have been lowered substantially had it not been for the Ethio-Eritrean conflict in 1996/97. The second largest share is held by social service sector in the three regimes. It has been 21.4% in the Imperial era, 18.4% in the Derg regime and slightly increasing to

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23.1% in the present government. On the other hand the economic sector share has been low, the highest share being recorded in the imperial era amounting to 10.6% (see table 3.7).

Table 3.7 Share of the Various Sectors on the Total Recurrent Expenditure

Categories	Percentage Share to the Total		
	1965/66- 1972/73	1973/74- 1990/91	1991/92- 2002/03
General Services	46.5	52.5	44.0
Defense	20.0	52.5	28.0
Economic Services	10.6	5.9	9.2
Agriculture	3.0	2.5	5.7
Industry	0.3	0.2	0.4
Transport& Communication	1.7	0.2	0.6
Construction	4.1	2.1	1.5
Social Services	21.4	18.4	23.1
Education	15.0	12.0	15.1
Health	5.0	3.7	4.7
Various Expenditures	21.5	23.1	23.7

Source: Computed on the basis of data obtained from EEPRI data base, 2003

3.3.2 Capital Expenditure

Capital expenditure is broadly defined as an outlay on development projects that result in the acquisition of fixed assets and there by enhance the capacity of the economy for the production of goods and the provision of economic and social services (MoFED, 1999). Its major three components are economic development which includes agriculture, industry, transport and communication and construction, social development which includes education and health and general development which includes compensation payments.

Table 3.8 Share of Various Sectors on the Total Capital Expenditure

Category	Percentage Share to the Total		
	1965/66-1972/73	1973/74-1990/91	1991/92-2002/03
Economic Development	78.5	88.8	64.2
Agriculture	15.9	28.8	11.7
Industry	11.7	11.4	4.2
Transport&Communication	6.0	6.7	5.6
Construction	28.8	11.3	22.3
Social Development	19.0	9.5	20.2
Education	10.2	3.9	10.4
Health	7.6	2.7	5.3
General Development	2.5	1.7	15.6

Source: Computed on the basis of data obtained from EEPRI data base, 2003

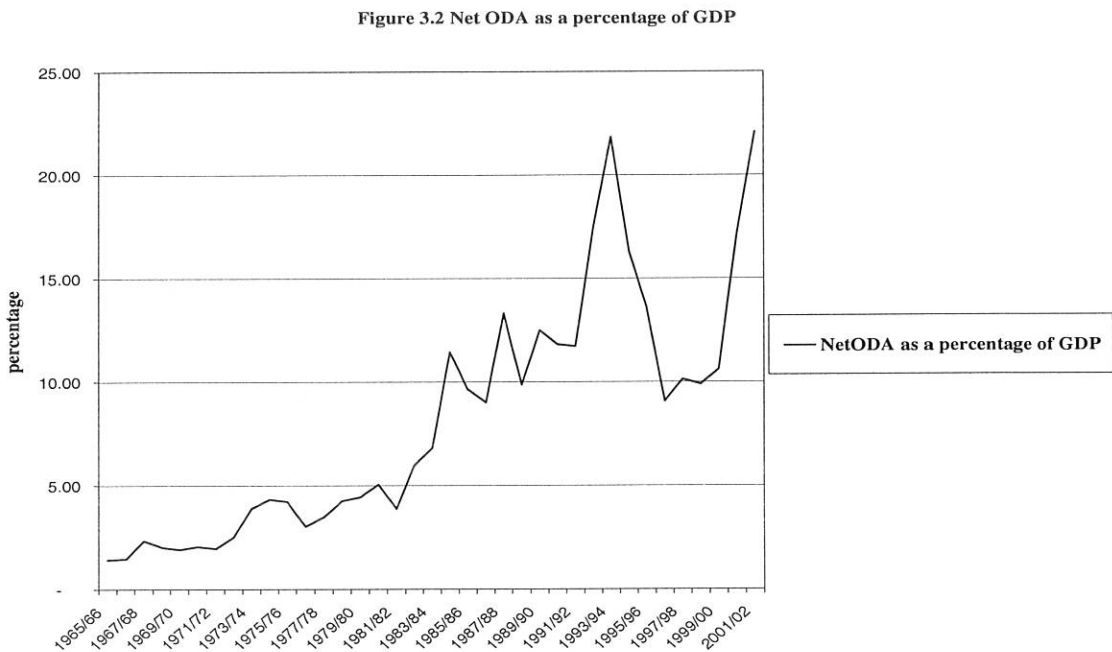
The sectoral performance of the capital expenditures (see table 3.6) shows that economic development held the lion share. The highest has been in the Derg era (1973/74-1990/91) which is 88.8% of the total capital expenditure. This though could be due to the government involvement directly in productive activities. The social development held the second place. In the Imperial era (1965/66-1972/73) it was 19%, in the Derg 9.5% and 20.2% in the present government (1991/92-2002/03).

In managing the expenditure the present government has aimed to emphasize its expenditure rationalizing according to economic, social, infrastructure sectors (roads, education, health, clean water). This has been revealed in the increase of share of construction to 22.3% and social development to 20.2% which has been the highest of the three regimes. Under the social development, education and health shares to total capital expenditure have also increased to 10.4% and 5.35 respectively which is more or less the same to the imperial regime i.e. 10.2% and 7.6%.

3.4 Trends in the Flow of Foreign Assistance

Behind the performance of the Ethiopian economy, foreign assistance has been an important factor in the endeavor of growth and poverty alleviation. Aid is needed to fill the resource gap i.e. be it the investment-saving gap, export-import gap, expenditure-revenue gap.

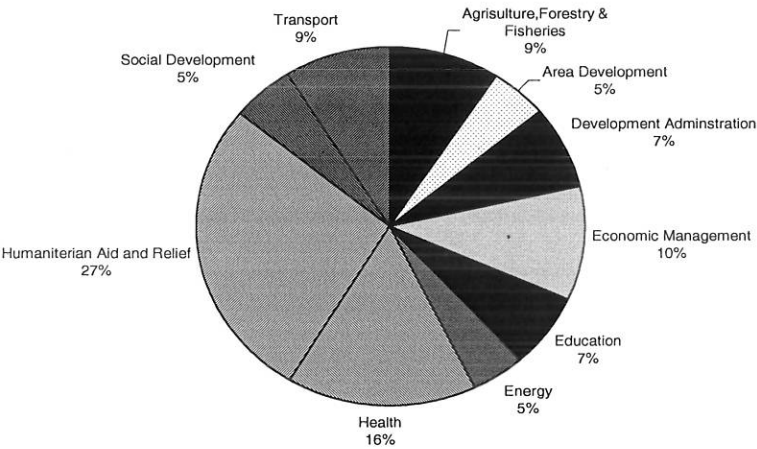
Net Official Development Assistance (Net ODA) which is gross ODA disbursements less principal repayments of previous ODA as a percentage of GDP has grown over the decades, implicating the increase in aid dependency (see Figure 3.2). It has been large especially in the present government between 1991/92-2001/02. On average, it has been 14.53 with the exception of the year 1996/97 sharp decline. This has been mostly attributed to the sharp drop in loans from the World Bank and African Development Bank, and the International Monetary Fund for that year (UNDP, 2001). During the Derg regime on the other hand it has been on average 7.05. The government's anti-imperialist rhetoric could not ensure large supply of foreign finance from more capable western sources. The government has been forced to rely on domestic resource of finance (Ethiopian Economic Association, 1999/00).



Source: Based on data from African Development Indicators CD-ROM (2004)

Looking at the sectoral allocation of ODA of which its main objective is economic development and welfare its distribution includes agriculture, forestry & fisheries, health, humanitarian aid & relief, economic management, transport, education, social development, communication, energy, industry, disaster preparedness and area development. The sectoral percentage share of total ODA between the year 1991/92 and 2001/02 excluding 1994/95 shows the largest share goes to humanitarian aid and relief i.e. 27% (see Figure 3.3). This is a reflection of Ethiopia being prone to disasters and cycles of natural calamities, most notably droughts. It is followed by health, 16% then by economic management, 10%.Transport, agriculture and education follow suit. This distribution goes with the need of foreign assistance to fund the rise in expenditure coming with the present government prioritization of economic, social and infrastructure sectors.

Figure 3.3 Ten Largest Recipient Sectors of Development Assistance,1992-2002



Source: Based on data from various UNDP publications

With respect to the previous regimes, based on the Jiffar (2002) calculation using the data from MEDaC of the external assistance allocation, the agriculture share has been large relative to the present regime. During the imperial era it held 24.13 % and the Derg era 13.71%. On the other hand to the respective regimes i.e. Imperial and Derg; the shares have been: for education aid 9.02 and 3.7, transportation and communication aid 4.5 and 3.8, and construction aid 19.9 and 8.64.

4 Methodology and Model Specification

4.1 Methodology

4.1.1 Stationarity and Unit root Test

In estimating a time series data, the concept of stationarity is very important. A time series is stationary, if its mean, variance, autocovariance (at various lag) are independent of time (Gujarati, 1995 and Harris, 1995). A regression based on non stationarty time series data will often lead to a problem of spurious regression, whereby the results obtained suggest that there are statistically significant relationships between the variables when infact all that is obtained is evidence of contemporaneous correlations rather than meaningful causal relation (Gujarati, 1995 and Harris, 1995). Hence before estimating a time series data, it is important to test for stationarity through conducting a unit root test.

There are various ways of conducting a unit root test like the non-parametric tests developed by Phillips and Perron which is based on Phillips (1987) Z-test, Saragan-Bhargava (1983) cointegration regression Durbin-Watson (CRDW) test and Dickey –Fuller (DF) approach. Among these, the Dickey –Fuller test is used. It is the most popular due to its simplicity or more general nature (Harris, 1995).

The Dickey-Fuller test starts with the following first order autoregressive model.

$$Y_t = \rho_a Y_{t-1} + U_t \quad \dots\dots\dots(4.1)$$

Introducing the lag operator where $LY_t = Y_{t-1}$

$$(1 - L)Y_t = \Delta Y_t = (\rho_a - 1)Y_{t-1} + U_t \quad U_t \approx IID(0, \sigma^2)$$

$$\Delta Y_t = \rho_a^* Y_{t-1} + U_t \quad \text{where } \rho_a^* = \rho_a - 1 \quad \dots\dots\dots(4.2)$$

The test for stationarity is conducted on the parameter ρ_a . The null hypothesis that a series does contain a unit root or is non stationary, $\rho_a = 1$ is tested against the alternative of

stationarity, $\rho_a < 1$. In a simplified way, using equation (4.2), the null hypothesis of non stationarity is $\rho_a^* = 0$ against the alternative, $\rho_a^* \neq 0$. Under non-stationarity, the static computed does not follow a standard t-distribution but rather a Dickey- Fuller distribution. The decision is then made using the τ (tau) statistics given by DF distribution.

Testing for a unit root using equation (4.2) involves making prior assumption of a simple first order autoregressive process with a zero mean and no trend component (Harris, 1995). The assumption of a zero mean implies that at time $t=0$, Y is also equals to zero (i.e. there is no constant term). However it is difficult to know beforehand whether Y is zero. If the assumption of mean zero is false, regression based on equation (4.2) is invalid. For this reason a regression including a constant (drift) is suggested. The appropriate critical values in this case are τ_μ statistics.

$$\Delta Y_t = \rho_a^* Y_{t-1} + \alpha + U_t \dots\dots\dots(4.3)$$

However if the series contains a trend component, equation (4.3) is also invalid. This is because when accepting the null hypothesis of non stationarity, it amounts to accepting that a series contains a stochastic trend when infact the system has a deterministic trend. Hence it is necessary to allow for a time trend T to enter the regression model as follows. The decision is made using DF distribution of τ_τ statistics.

$$\Delta Y_t = \rho_a^* Y_{t-1} + \alpha + \beta T + U_t \dots\dots\dots(4.4)$$

Furthermore using a simple autoregressive of order one, AR (1) when infact the series Y follows an AR (p) leads to autocorrelated error term. Autocorrelated error terms invalidate the use of DF distribution, which are based on the assumption that the error term is white noise³ (Harris, 1995). In order to tackle this problem, the Augmented Dickey –Fuller model which involves adding an unknown number of lagged first differences of the dependent variable is used to capture autocorrelated omitted variables that would otherwise, by default, enter the error term (Harris, 1995).The corresponding Augmented Dickey –Fuller (ADF) models for equations 4.2, 4.3 and 4.4 respectively are given as follows.

³ A variable is white noise if the mean is zero, variance constant and autocovariance of the process is zero.

$$\Delta Y_t = \rho_a^* Y_{t-1} + \sum_{i=1}^k \theta_i \Delta Y_{t-1} + U_t \tag{4.5}$$

$$\Delta Y_t = \rho_a^* Y_{t-1} + \alpha + \sum_{i=1}^k \theta_i \Delta Y_{t-1} + U_t \tag{4.6}$$

$$\Delta Y_t = \rho_a^* Y_{t-1} + \alpha + \beta_t + \sum_{i=1}^k \theta_i \Delta Y_{t-1} + U_t \tag{4.7}$$

Using the discussed ADF model, the first step in econometric analysis of a time series data is determining whether each series is stationary or not. If the test shows the variables to be non stationary series, the econometric analysis of the time series data could be based on spurious regression which is unreliable. Various studies use different mechanisms that enable the variables to be stationary.

A non stationary series could be stationary by including trend variable if it has a deterministic trend rather than stochastic. This series is called a trend stationary process. If the time series data has a stochastic trend; it is differenced to make it stationary. In this case, it is called difference stationary process. The required number of differencing might be more than once. If a variable becomes stationary after being difference (d) times then it is considered to be integrated of order (d) or I(d) (Gujarati, 1995 and Harris, 1995). In estimating a series of difference stationary variables, the longrun information is lost. This could be tackled in the theory of cointegration which will be discussed in the subsequent section.

4.1.2 Cointegration

Cointegration theory presents the possibility of retaining the long run information among non-stationary variables. The interpretation of cointegration is that if two (or more) series are linked to form an equilibrium relationship spanning the long-run, then even if the series are non-stationary, they will move together overtime and the difference between them will be stationary (Harris,1995). In general, if variables are integrated of order d and if the linear combination is integrated of order (d-b), where b> 0, then the variables are said

to be cointegrated of order d, b, or CI(d, b) (Enders,1995). There are two approaches to test for cointegration: Engle–Granger (E-G) methodology and Johanson approach.

The E-G testing procedure starts by testing the order of integration of the variables. In this procedure it is required for the variables to be integrated of the same order. The next step involves testing the residual from the long run relationship for stationarity. Hence if the residual is found to be stationary the system is considered to be cointegrated. If the variables are cointegrated, using the residual from the long run relationship, one will estimate the error correction model. This will allow estimating the dynamic model using differenced variables where the coefficient of the lagged residual will be the deviation from the long run relationship (Enders, 1995). This approach has however been criticized for its weakness. In the case of more than one cointegration vector, the system has no systematic way for the separate estimation of multiple cointegrating vectors and it does not allow the variables on the right hand side to be potentially endogenous (Enders 1995 and Harris, 1995). On the other hand the Johanson approach tackles these problems. It allows a test for more than one cointegration. Moreover, it permits to estimate the model without prior restriction of the variables as endogenous and exogenous.

The Johanson approach is a multivariate generalization of the Dickey – Fuller model (Enders, 1995). In the univariate case; $Y_t = a_1Y_{t-1} + e_t$ or $\Delta Y_t = (a_1 - 1)Y_{t-1} + e_t$; it is possible to view the stationarity of Y_t by testing for $(a_1 - 1) = 0$ against the alternative $(a_1 - 1) \neq 0$. Considering the simple generalization to n variables:

$$\begin{aligned} X_t &= A_1 X_{t-1} + e_t \text{ or} \\ \Delta X &= (A_1)X_{t-1} - X_{t-1} + e_t \\ &= (A_1 - I)X_{t-1} + e_t \\ &= \pi X_{t-1} + e_t \dots\dots\dots (4.8) \end{aligned}$$

Where X_t and e_t are (n x 1) vectors

A_1 = an (n x n) matrix of parameters

I = an (n x n) identity matrix

And π is defined to be $(A_1 - I)$

Here then the rank of $(A_1 - I)$ determines the number of cointegrating vectors. As with augmented Dickey – Fuller test, the multivariate model can be generalized to allow for a higher – order autoregressive process. That is,

$$X_t = A_1 X_{t-1} + A_2 X_{t-2} + \dots + A_k X_{t-k} + e_t \dots\dots\dots(4.9)$$

Where X_t = the (nx 1) vector $(X_{1t}, X_{2t}, \dots, X_{nt})'$

A_i = is an (n x n) matrix of parameters

e_t = is an independently and identically distributed n-dimensional vector with zero mean and variance matrix $\sum e$.

The starting point for the Johanson procedure is the vector autoregressive (VAR) model in the form of equation (4.9). Including a vector of deterministic component (i.e. constant and trend, μ) and vector of dummies, D , the VAR model is as follows.

$$X_t = A_1 X_{t-1} + A_2 X_{t-2} + \dots + A_k X_{t-k} + \mu + \phi D + e_t \dots\dots\dots(4.10)$$

The above model can be reparametrized by first subtracting X_{t-1} from each side, then adding and subtracting $(A_1 - I)X_{t-2}$ and further adding and subtracting $(A_1 + A_2 - I)X_{t-3}$ and continuing likewise to formulate a vector error correction model (VECM):

$$\Delta X_t = \pi_i \Delta X_{t-i} + \pi X_{t-p} + e_t \dots\dots\dots(4.11)$$

where $\pi = -\left(I - \sum_{i=1}^p A_i \right)$

and
$$\pi_i = -\left(I - \sum_{j=1}^p A_j\right)$$

The cointegrating vectors depend on the rank of π i.e. determining the rank of π boils down to determining the number of cointegrating vectors. $\pi = \alpha\beta$ where α represents the speed of adjustment to disequilibrium and β is a matrix of longrun coefficients. If $rank(\pi) = 0$, the matrix is null and the appropriate model is a VAR in first differences involving no longrun elements. Instead if π is of rank n , then the variables will be $I(0)$, hence the vector process is stationary. In the intermediate case, if $rank(\pi) = 1$, there is a single cointegrating vector and the expression πX_{t-p} is the error correction factor. For other cases of which $1 < rank(\pi) < n$, there are multiple cointegrating vectors (Enders, 1995). In identifying the number of cointegrating vectors, the Johansen procedure provides n eigenvalues denoted by λ (also called characteristics roots) whose magnitude measures the extent of correlation of the cointegration relations with the stationery elements in the model.

In general, to identify the number of cointegrating vectors in the system, the Lambda max ($\lambda_{\max}$) and Lambda trace (λ_{trace}) statistics are used. They are obtained from the following formulas.

$$\lambda_{\max} = -T \log(1 - \lambda_{r+1}), r = 0, 1, 2, \dots, n-1$$

$$\lambda_{trace} = -2\log(Q) = -T \sum_{i=r+1}^n \log(1 - \lambda_i)$$

where Q is (restricted maximized likelihood) / (unrestricted maximized likelihood), T is the sample size and λ_i is estimated eigenvalues

$\lambda_{\max}$ statistic tests the null hypothesis that there are 'r' cointegrating vectors against the alternative of 'r+1'. The λ_{trace} statistics, on the other hand, tests the hypothesis that there are at most r cointegrating vectors. The distributions of both test statistics follow Chi-square distributions (Harris, 1995).

The other important thing in the cointegration analysis is the issue of identifying endogenous and exogenous variables in the system. This is required because the Johansen procedure do not restrict the variables behavior a priori. This will determine the cointegrating vector and hence distinguish the exogenous variable and endogenous variables. This implies that the dynamic equation for that variable contains no information concerning the long run relationship in the system. Hence, variables that are weekly exogenous should appear in the right hand side of the vector error correction model (VECM) (Harris, 1995). The test amounts to checking the null hypothesis of weak exogeneity, $\alpha_{ij} = 0$ against the alternative of endogeneity $\alpha_{ij} \neq 0$ for $j = 1, \dots, r$ (r being the number of cointegrating vectors).

The test (for weak exogeneity) is conducted using the following formula.

$$-2 \log(Q) = T \sum_{i=1}^r \log \left\{ \frac{(1 - \lambda_i^*)}{(1 - \lambda_i')} \right\}$$

where T = the number of observations, r = the number of rank, Q = (restricted maximized likelihood) / (unrestricted maximized likelihood) and λ_i' and λ_i^* represents eigenvalues for unrestricted and restricted models respectively.

If the result obtained from the above formula is less than the Chi-squared distribution, then we can not reject the null hypothesis. This implies that the variable is weakly exogenous.

Determining the long run relationship through the cointegration analysis mimics the existence of a long run equilibrium to which an economic system converges over time. Hence the analysis implies the concept of short run evolution of the variables. The next step is then formulating the shortrun model through differencing and using the error correction term from the long run relationship of which the coefficient determines the adjustment towards the long run (Harris, 1995).

4.2 Model Specification

The analysis of the paper rests on testing the impact of aid on welfare through funding the government expenditure that is considered pro-poor. This analysis has been made at the cross-country level by Gomanee and Morrissey (2002), Gomanee et al. (2003b), and Gomanee et al (2004). The empirical analysis adopts the model of the aforementioned studies.

In general the analysis passes through three steps. First in order to formulate the pro-poor expenditure (PPE) index, expenditures which can be categorized as pro-poor are identified. To confirm the category and hence formulate the PPE index, a simple regression of each expenditure category on welfare is made. Consequently those categories of expenditures that are significant are selected to formulate the PPE index. In aggregating the expenditure a weighing system is used arguing that the impact of each category of expenditure on poverty does differ. The next step follows checking the significance of aid on PPE. This will have an implication on the final step of analyzing the impact of aid through funding the PPE. Running both PPE index and aid could result in double counting the effect of aid. Hence constructed regressor will be formulated. Thus our final analysis will safely see the effectiveness of aid through funding the public expenditure.

Before passing to formulating the mathematical equation and the estimation, since welfare is a general term an appropriate measure is chosen. The definition of welfare is based on Sen (1987) study quoted in Anand and Ravillion (1993). Sen argues that the well being has to do with capability, which in most elementary terms is about being able to live long, being well nourished, being healthy etc. This includes non-income dimension of poverty such as life expectancy at birth, infant mortality rate and gross primary enrolment rate. In this study the infant mortality rate is chosen based on the availability of the data. Further it is an important indicator to measure health conditions of the society at large and also indicate the overall social and economic development of the society (Heins et al, 2001).

Welfare (infant mortality) is assumed to be related to per capita real GDP, pro-poor public expenditure (PPE) and inflow of net ODA as a percentage of GDP, the basic relationship represented as; $W_t = f(Y_t, G_{pt}, A_t)$.

Specifically the statistical model is given by,

$$\text{Log}W_t = \beta_0 + \beta_1 \text{Log}Y_t + \beta_2 \text{Log}G_{pt} + \beta_3 \text{Log}A_t + \varepsilon_t \dots\dots\dots(4.12)$$

Where W_t is welfare (infant mortality rate), Y_t is per capita real GDP, G_{pt} is PPE index and A_t is net ODA as a percentage of GDP and ε_t is a white noise error term.

PPE index has to be constructed. In order to formulate the PPE index, first expenditures that have significant impact on welfare (infant mortality) is chosen using the following equation.

$$\text{Log}W_{it} = \beta_0 + \beta_1 \text{Log}G_{it} + e_t \dots\dots\dots(4.13)$$

where G_{it} = Government Expenditure as a percentage of GDP for each sector category “i”. “i” includes agriculture(Ag),construction(C),education(E),transport and telecommunication (T) and health (H).Here as the expenditures are categorized as pro poor the direction of relationship is expected to be positive with welfare. Since welfare is represented by infant mortality rate the expected direction of relationship here is negative for welfare is improved when infant mortality rate decrease.

The possible pro-poor expenditures have been selected following World Development Report (1990). The report suggests two important elements that can help in pursuing poverty alleviating strategies. The first element is to promote the productive use of the poor’s most abundant asset- labour i.e. policies that harness market incentive, social and political institutions, infrastructure, and technology. The second is to provide basic social services to the poor. With this respect the role of the public sector intervention through its spending in favor of the poor has been discussed as one of the mechanism. Public support for agriculture, given the expansion of agriculture being a driving force behind effective rural development is considered poverty reducing growth. In addition considering the role of investing in human capital played in reducing poverty, emphasized in the need for government spending on social sectors such as health and education are suggested. Further pointed out the importance of public investment in technology and infrastructure in leading

to increased productivity, technical change, and strengthened market linkages and hence reduce poverty. Based on this report in this study expenditure on agriculture, transport and communication, construction, education and health are considered as possible pro-poor expenditure. A fair share of aid has also been allocated to these sectors (see section 3.4). Based on the significance of the coefficient of G_{it} which represents the elasticity of welfare with respective expenditure the possible selected expenditures have been found pro-poor (see appendix A). Accordingly rather than simply aggregating the PPE, a beta4 coefficient weighing system used in Gomanee et al (2003b) is adopted in formulating the PPE index. Beta coefficients are unit free and are a statistical method of assigning weights to each expenditure components according to their relative importance. As been argued weighing is necessary for in reality different expenditures are expected to differ with respect to their impact on welfare. As can one also see in the regression, the impact of each expenditure category on welfare does differ. Consequently the weighted PPE index is formulated using the following equation:

$$WPPE_t = 0.00922P_{ag} + 0.00273P_t + 0.0045P_c + 0.01453P_e + 0.00626P_h \dots\dots\dots(4.14)$$

where $WPPE_t$ is weighted PPE index, P_{ag} is public expenditure on agriculture as a percentage of GDP, P_t is public expenditure on transport and telecommunication as a percentage of GDP, P_e is public expenditure on education as a percentage of GDP and P_h is public expenditure on health as a percentage of GDP.

The transmission mechanism of aid on welfare is through funding WPPE, from now onwards called PPE for simplicity. On the other hand PPE is also a function of aid as well as other sources of government revenue. The analysis will see first the significance of aid on PPE as a step towards testing the hypothesis. Here in the model the issues of fungibility and fiscal response have been acknowledged and abstracted from (refer the concepts in section 2.2). This is due to the interest of the analysis is rather primarily to see the impact

⁴The beta coefficient of expenditure category X is obtained by multiplying the regression coefficient on X by the standard deviation of X and then dividing this product by the standard deviation of the dependent variable.

of aid on welfare through funding PPE given the possibility of fungibility of aid and fiscal response to aid issue. However the model acknowledges the public sector role in relation to aid.

The functional form of the equation for PPE is then: $G_{pt} = f(Y_t, A_t, DR_t)$ where Y_t = Per Capita Real Income, A_t = Inflow of net ODA as a percentage of GDP, DR_t = Other source of government revenue which is domestic revenue as a percentage of GDP. The expectation is for both aid and domestic revenue to be positively related to PPE. Both are resources that allow for more expenditure. Moreover per capita real GDP is also expected to have positive relationship with PPE for growth gives the government more resource for outlay.

The model to be estimated is specified as:

$$\text{Log}G_{pt} = \gamma_0 + \gamma_1\text{Log}Y_t + \gamma_2\text{Log}A_t + \gamma_3\text{Log}DR_t + U_t \dots\dots\dots(4.15)$$

The above equation pinpoints to the fact that our basic equation (4.12) incorporates the problem of double counting the effect of aid i.e. PPE which is a function of aid and aid by itself being considered at the same time. To address this problem the paper will net out aid from the PPE. This is done by using a constructed regressor $\hat{G}_p$ rather than G_p . The methodology is through conducting PPE regression by which aid is the only explanatory variable. Then using the residual from the regression, the PPE netted out aid is formulated. The application of this methodology can be formulated as follows:

$$G_{pt} = \alpha_0 + \alpha_1Y_t + \alpha_2A_t + \alpha_3DR_t + e_t$$

$$G_{pt} - \alpha_2A_t = \alpha_0 + \alpha_1Y_t + \alpha_3DR_t + e_t = \hat{G}_{pt} \text{ which is pro-poor expenditure without aid}$$

Substituting G_{pt} in our basic equation in linear form

$$W_t = \beta_0 + \beta_1Y_t + \beta_2(G_{pt} - \alpha_2A_t) + \beta_2\alpha_2(A_t) + \beta_3A_t + e_t$$

$$W_t = \beta_0 + \beta_1Y_t + \beta_2\hat{G}_{pt} + (\beta_2\alpha_2 + \beta_3)A_t + e_t$$

Changing the above equation into log-linear form:

$$\text{Log}W_t = \beta_0 + \beta_1 \text{Log}Y_t + \beta_2 \text{Log}\hat{G}_{pt} + (\beta_2\alpha_2 + \beta_3)\text{Log}A_t + e_t$$

As can be seen with this method the coefficient that is been affected is that of aid in our basic equation (4.12). This coefficient incorporates the indirect effect of aid on welfare through funding PPE. It will be the interest in question to test the hypothesis.

Accordingly the PPE not financed by aid ($\hat{G}_p$) is constructed from the following equation (see appendix B).

$$\hat{G}_{pt} = G_{pt} - 0.00296 A_t \dots\dots\dots(4.16)$$

Therefore the functional form of the equation that will test the hypothesis will be specified as follows: $W_t = f(Y_t, \hat{G}_{pt}, A_t)$, where W_t is welfare, Y_t is per capita real GDP, $\hat{G}_{pt}$ is PPE non-aid financed pro-poor spending and A_t inflow of net ODA as a percentage of GDP. The direction of relationship with welfare is expected to be positive for $\hat{G}_{pt}$ and A_t while Y_t has the possibility of being negative. This can happen when inequality increases so much that the beneficial impact of growth is more than offset by adverse impact of rising inequality (Kakawani and Pernia, 2000). In the empirical analysis the direction of relationship is reversed for welfare is improved when infant mortality rate decrease.

The statistical model is represented as:

$$\text{Log}W_t = \beta_0 + \beta_1 \text{Log}Y_t + \beta_2 \text{Log}\hat{G}_{pt} + \beta_3 \text{Log}A_t + \varepsilon_t \dots\dots\dots(4.17)$$

4.3 Data Source

A time series data spanning the years between 1965/66 and 2001/02GC is used for the empirical analysis. The data sources are UN census Bureau (www.census.gov), Central Statistical Authority (CSA) (1993) publication, African Development Indicators (ADI) CD-ROM, and Ethiopian Economic Policy Research Institute (EEPRI) database.

5 Empirical Results and Interpretation

The first step towards estimating time series is checking for stationarity (see section 4.1.1). Accordingly the test has been done using ADF unit root test. The test reveals that the variables of interest are integrated of order one $I(1)$, i.e. the variables become stationary after being differenced once(see table 5.1).

Table 5.1 ADF Unit root test

VARIABLE		Without drift and trend, With lag		With drift, With lag		With drift and rend, With lag	
		1	2	1	2	1	2
LW		-1.146	-1.004	-1.076	-1.29	-2.543	-3.21*
LY		0.05163	0.0409	-2.205	-1.331	-2.482	-1.207
LA		-1.182	1.138	-1.202	-0.743	-2.696	-2.692
LG_p		-1.427	-2.041*	-0.8298	-1.447	-2.261	-2.104
$L\hat{G}_p$		-0.4017	-0.6346	-2.03	-2.108	-2.064	-2.022
LDR		0.6442	0.6783	-1.641	-1.819	-2.296	-2.443
Critical Value	5%	-1.951	-1.951	-2.947	-2.95	-2.947	-2.95
	1%	-2.63	-2.632	-3.629	-3.635	-3.635	-3.635
D LW		-3.905**	-4.27**	-4.015**	-4.484**	-3.949**	-4.406**
D LY		-6.579**	-3.371*	-6.476**	-3.314**	-6.446**	-3.355**
D LA		-3.773**	-3.094**	-4.166**	-3.678**	-4**	-3.588**
DLG_p		-4.37**	-2.91**	-4.874**	-3.45**	-4.845**	-3.477**
$DL\hat{G}_p$		-4.841**	-2.555*	-4.802**	-2.532	-4.755**	-2.519
D LDR		-3.155**	-3.854*	-3.268*	-4.105**	-3.238*	-4.097**
Critical value	5%	-1.951	-1.951	-2.95	-2.953	-2.95	-2.953
	1%	-2.632	-2.634	-3.635	-3.642	-3.635	-3.642

Given the variables are $I(1)$, the estimation procedure follows to conducting the cointegration test using Johanson maximum likelihood methodology to determine the longrun relationship.

The result for equation (4.15) in section 4.2 is presented subsequently.

Table 5.2 Test for the number of cointegration (PPE Regression)

Ho:rank=r	eigenvalue	-T log (1-λ _{r+1})	λ _{max} (95%)	-TΣ log (1-λ _i)	λ _{trace} (95%)
r =0	0.561663	28.87*	27.1	48.59*	47.2
r ≤1	0.2975	12.36	21.0	19.72	29.7
r ≤2	0.173191	6.656	14.1	7.359	15.4
r ≤3	0.019888	0.7031	3.8	0.7031	3.8

The result points to the fact that there is a possibility of at least one cointegrating vector (Table 5.2). The null hypothesis for no cointegration vector is rejected at 5% by both cointegration statistics (i.e. λ_{max} and λ_{trace} statistics). This will allow testing for exogeneity given one cointegration vector. The test is thus conducted by imposing restriction on the first column of α coefficients in table 5.3.

Table 5.3 Standardized \beta'(β) eigenvectors (PPE Regression)

L G _{pt}	LY	LA	LDR
1.0000	-1.7283	-0.37032	-0.43632
0.31940	1.0000	-0.012064	-0.18813
3.2405	3.4601	1.0000	-5.5974
-3.8849	-0.13623	-0.33104	1.0000

Table 5.4 Standardized \alpha (α) coefficients (PPE Regression)

L G _{pt}	-0.52332	-0.072690	0.028250	0.011041
LY	0.065883	-0.43061	0.0069166	0.0012918
LA	0.75354	0.78886	-0.045446	0.023402
LDR	0.20779	0.040636	0.046631	0.0017061

The null hypothesis of exogeneity (see appendix C) is rejected only for G_{pt} at 1% level of significance hence implying it to be endogenous. On the other hand the rest of the variables do not reject the null hypothesis and hence are weakly exogenous. Therefore the single equation with the longrun coefficients is as follows;

$$\text{Log}G_{pt} = 1.73Y_t + 0.37A_t + 0.44DR_t$$

p-value 0.0039** 0.0001** 0.0115*

Vector AR 1-2 $F(32, 56) = 1.3759 [0.1460]$
Vector normality $\text{Chi}^2(8) = 5.2939 [0.7258]$
Vector Xi^2 $F(160, 19) = 0.32143 [1.0000]$

The diagnostic tests are good. It can be observed that there is no autocorrelation problem by autoregressive of order of one up to two (AR 1-2) test i.e. the errors in the model are not autocorrelated. The vector normality $\text{Chi}^2(8)$ test also indicate that the error term is normally distributed. The vector heteroscedasticity (Xi^2) also shows that the error terms are homoscedastic.

The significance of the coefficients in the longrun equation is conducted by imposing zero restriction on each β coefficients. The result for the log likelihood statistic is presented in appendix C. The coefficient for per capita income and aid are found to be statistically significant at 1% and the coefficient for domestic revenue at 5%. Moreover the direction of relationship is as expected.

The result hence reveals that a one percent increase in per capita real income increases PPE by 1.73 percent. Growth has thus the tendency to increase PPE in the longrun. From here one can infer that maximizing growth in Ethiopia could possibly reduce poverty given its statistically significant impact on PPE. The parameters for aid and domestic revenue are also statistically significant. The elasticity of aid is 0.37 hence implying on average 37% of aid is allocated for PPE. This goes in line with what can be deduced from looking at the sectoral allocation of aid in section 3.4, i.e. a fair share being allocated for pro-poor sectors expenditure. Further the result reveals that domestic revenue does increase PPE. A one percent increase in domestic revenue results in 0.44 percent increase in PPE. This implicates that government uses 44% of domestic revenue to finance PPE.

Looking at the shortrun dynamics of the variable, the estimation will revert to applying Ordinary Least Squares (OLS) estimation. The result from Johanson Maximum Likelihood methodology confirms the presence of one cointegration vector. Thus OLS will be

efficient for estimation of the shortrun dynamics (Harris, 1995). The result of the error correction model is reported as follows;

Table 5.5 Result of the Shortrun Dynamic Estimation (PPE Regression)

Dependent variable DLG _{pt}					
Variable	Coefficient	Std.Error	t-value	t-prob	PartR ²
Constant	0.012865	0.021359	0.602	0.5518	0.0128
DLY	0.24693	0.43502	0.568	0.5748	0.0114
DLA	0.17366	0.081812	2.123	0.0428	0.1386
DLDR	0.55450	0.21003	2.640	0.0134	0.1993
VL G _{pt-1}	-0.45105	0.21710	-2.078	0.0470	0.1336
R ² = 0.302456 F(4,28) = 3.0352 [0.0338] \sigma = 0.112624 DW = 2.21 AR 1- 2 F(2, 26) = 1.196 [0.3185] ARCH 1 F(1, 26) = 1.4348 [0.2418] Normality Chi ² (2)= 1.3299 [0.5143] Xi ² F(8, 19) = 0.3577 [0.9302] RESET F(1, 27) = 1.6311 [0.2124]					

The diagnostic tests of the autocorrelation test (AR 1-2), the autocorrelation hetroscedastic test (ARCH), the Jarque-Bera normality test (Xi²), and the Ramsey RESET test of model specification show that there is no serious statistical problem. On the other hand the measure of goodness of fit of the model reveals that the explanatory variables in the shortrun model only explain 30 percent of the variation in the dependent variable. Therefore the test implicates that there are other explanatory variables that affect PPE decision in the shortrun.

The result based on the regression shows that aid and domestic revenue have significant impact at 5%. On the other hand the effect of per capita real GDP is insignificant (see table 5.5) unlike the longrun relationship. Hence the growth effect in inducing PPE is a longrun phenomenon.

In addition the model confirms that the error correcting term is significant at 5%.The result reveals that 45% of the disequilibrium will be adjusted to the longrun steady state path in one year i.e. given the data is annual.

So far in the analysis it has been confirmed that aid affects PPE positively. Hence, the next step will be testing the hypothesis. Accordingly among other observations, the proposition regarding the effect of aid through funding PPE on welfare will be tested. As specified in section 4.2, the aforementioned analysis rests on equation (4.17).

Since the variables of interest are I(1) (see tabe5.1), the next step will be cointegration test. The test statistics have contradicting implications. The λ_{max} test statistic accepts the null hypothesis of no cointegration while the λ_{trace} test statistic implies the possibility of atleast one cointegration vector at 5% significance level (see table5.6). However since the λ_{trace} is a preferred test statistic, the next analysis will follow, taking the possibility of one cointegrating vector (see Harris, 1995).

Table 5.6 Test for the number of cointegration (Welfare Regression)

Ho:rank=r	eigenvalue	-T log (1- λ_{r+1})	λ_{max} (95%)	-T $\sum$ log (1- λ_i)	λ_{trace} (95%)
r =0	0.518356	25.57	27.1	48.23*	47.2
r $\leq$ 1	0.317472	13.37	21.0	22.66	29.7
r $\leq$ 2	0.200671	7.839	14.1	9.293	15.4
r $\leq$ 3	0.0406764	1.453	3.8	1.453	3.8

Exogeneity test is hence conducted assuming one cointegration vector. The test is done by imposing zero restriction on the first column of α coefficients in table 5.8.The Likelihood Ratio test statistic (see appendix D) shows that only welfare (infant mortality) is endogenous (i.e. rejecting the null hypothesis of exogeneity) while the rest of the variables are weakly exogenous. Hence the long run relationship model can be formulated using the first row of the β eigenvectors in table 5.7.

Table 5.7 Standardized β eigenvectors (Welfare Regression)

LW	LY	LA	$L\hat{G}_{pt}$
1.0000	0.76850	0.24665	0.18303
-0.22666	1.0000	0.019475	-0.14914
3.8766	-4.8294	1.0000	-2.0240
-7.9262	18.784	4.3766	1.0000

Table 5.8 Standardized α coefficients (Welfare Regression)

LW	-0.65587	0.56020	-0.0066378	0.0011545
LY	-0.16549	-0.30351	0.015234	-0.00045619
LA	-0.24090	-0.72371	-0.063291	-0.010542
$L\hat{G}_{pt}$	0.51764	1.4399	0.083306	-0.0013751

Therefore the single equation with the longrun coefficients is reported as follows;

$$\text{Log}W_t = -0.77Y_t - 0.25\text{Log}A_t - 0.18\hat{G}_{pt}$$

$$P\text{-value } 0.2211 \quad 0.006^{**} \quad 0.0886$$

$$\text{Vector AR } 1-2 \quad F(32, 56) = 1.2235 [0.2502]$$

$$\text{Vector normality } \chi^2(8) = 7.5596 [0.4776]$$

$$\text{Vector } \chi^2 \quad F(160, 19) = 0.26962 [1.0000]$$

The result of the diagnostic tests confirms the adequacy of the model. The result reveals that both per capita income and PPE netted out of aid fund reduce infant mortality rate but are statistically insignificant. On the other hand aid funding PPE reduce infant mortality rate and is statistically significant (see appendix C for the Likelihood ratio test of significance).

Recalling the first analysis, the impact of growth on PPE presents the possibility of its effect being pro-poor. On the other hand the growth effect is found to be statistically insignificant in improving welfare. This contradicts with the previous inference. This could be a result of PPE being inefficiently allocated. The constructed PPE (i.e. non-aid financed PPE) being statistically insignificant also implies the possibility of PPE not reaching the poor efficiently. The impact of aid on welfare through funding PPE on the other hand is found to be statistically significant confirming the hypothesis. Here, the aid that has been shown to increase the PPE in the previous analysis has reached its target efficiently. A one

percent increase in aid will decrease infant mortality rate or rather improve welfare by 25% through funding pro-poor expenditure. The statistically significant result could be due to aid tied to the sectors being controlled in its utilization.

Further looking at the short run dynamic estimation, here again it is reverted to OLS estimation for the existence of one cointegration is confirmed allowing efficient OLS estimation (Harris, 1995). Hence the error correction model is presented in table 5.9.

Table 5.9 Result of the Shortrun Dynamic Estimation (Welfare Regression)

Dependent variable DLW					
Variable	Coefficient	Std.Error	t-value	t-prob	PartR ²
Constant	-0.0056070	0.014765	-0.380	0.7069	0.0049
DLY	0.032411	0.30630	0.106	0.9165	0.0004
DLA	-0.077861	0.063825	-1.220	0.2323	0.0488
DL $\hat{G}_{pt}$	-0.099555	0.072636	-1.371	0.1810	0.0608
VLW_1	-0.87190	0.21240	-4.105	0.0003	0.3675
R ² = 0.4175 F(4,29) = 5.1963 [0.0028] \sigma = 0.0814972 DW = 1.50 AR 1- 2 F(2, 27) = 1.7878 [0.1866] ARCH 1 F(1, 27) = 0.24875 [0.6220] Normality Chi ² (2)= 0.062156 [0.9694] Xi ² F(8, 20) = 0.77383 [0.6299] RESET F(1, 28) = 0.36682 [0.5496]					

The diagnostic tests with respect to autocorrelation, autocorrelation hetroscedasticity, normality and model specification show that the model has no statistically significant problem. However, the model fitness represented by R² only shows that the 41% of the variation in welfare is being affected by the presented explanatory variables. Hence, it is acknowledged for the possibility of other explanatory variables in affecting welfare. The F-test of overall significance of the regression is though significantly different from zero.

Furthermore except the error correcting term, all the rest of the variables are statistically insignificant. The result for per capita income shows that it has a negative impact on welfare. This presents the possibility of growth increasing poverty in the short run. Hence

in the shortrun the impact of growth is more than offset by adverse impact of inequality. However it is statistically insignificant and hence at best its effect is weak. The sign for constructed PPE is as expected but statistically insignificant. Hence the inefficiency of constructed PPE on welfare also applies in the shortrun. The impact of aid on welfare through funding PPE is positive and statistically insignificant in the shortrun. This could be due to the time lag before implementation. The error correcting term which is statistically significant further shows that the disequilibrium adjusts to the longrun steady state by 87%. Thus entails though the variables in the shortrun are insignificant the longrun relationship is attained within about a year.

6 Conclusion and Policy Implication

6.1 Conclusion

Ethiopia is one of the poorest countries in the world. Moreover Ethiopia has been a recipient of substantial amount of aid. On the other hand the aim and economic justification for aid has been promoting growth and/or alleviate poverty. These circumstances force one to raise the issue of aid effectiveness.

In addressing this concern of the paper, the public sector has been acknowledged to be an important sector. Most of aid passes through this sector. Drawn from the fact that in part if not all aid can have an effect on welfare via pro-poor government spending, the objective of the paper was to test the hypothesis that aid funding pro-poor government expenditure could alleviate poverty. An index of pro-poor expenditures has been constructed to analyze this transmission mechanism. Furthermore in order to obtain a coefficient on aid that includes the indirect effects through public expenditure allocation induced by aid, a constructed regressor is used.

The estimation is based on the annual data covering the period 1965/66 – 2001/02 GC. The Johanson Maximum Likelihood procedure is used in the analysis. The estimation result reveals that both domestic revenue and aid tend to increase PPE. Per capita income also has tendency to augment PPE presenting a possibility of growth being pro-poor. Further analyzing the impact of aid on welfare, the result confirms the hypothesis that aid improves welfare through funding PPE. In the shortrun however it is statistically insignificant. This could be due to the time lag for implementation. Therefore in Ethiopia aid is effective in enhancing welfare through the indirect channel in the longrun. However the non-aid financed PPE has been found to be statistically insignificant. This raises a question on its efficacy. From this one can infer that aid funding PPE is efficient while non-aid financed PPE is inefficient. This could be due to tied aid funds to PPE are well controlled. The result also reveals that the contribution of growth on welfare is weak at best. Thus it conforms to the present consensus that growth is not enough by itself.

6.2 Policy Implication

From the empirical results one can draw the following policy implications. The result shows that aid has significant impact in alleviating poverty through funding PPE. Thus PPE targeted aid is to be encouraged. On the other hand while the contribution of domestic revenue in funding PPE is statistically significant, non-aid funded PPE has not been able to improve welfare. This implicates to the existence of inefficiency. The government is hence advised to give more attention to the efficiency of the allocated fund. This could help minimize aid dependency in the longrun.

Further the result implicates that growth on its own accord is not sufficient. This conforms to the Alemayehu et al (2004) study recommendation that Ethiopia needs pro-poor growth strategy. The present government policy which concurs with this implication is hence encouraged.

References

- Aberra S. (2004) "Fiscal Response to Empirical Finance: An empirical Evaluation using alternative approaches" Unpublished M.Sc. Thesis, AAU.
- Alemayehu G. (2002) "Finance and Trade in Africa, Macroeconomic Response in the World Economy Context" London, palgrave-Macmillan.
- Alemayehu G., Abebe S. and Weeks, J. (2004) "The pattern of Growth , Poverty and Inequality in Ethiopia: Which way for a pro-poor Growth?" edited by Alemayehu Seyoum, Assefa Admasse, Befekadu Degefe, Brehanu Nega, Mulat Demeke, Tadesse Biru Kersemo and Wolday Amha, proceedings of the first international conference on the Ethiopian Economy.
- Alemayehu G., and Befekadu D. (1999) "Management Transition from Aid Dependence in Ethiopia" Forthcoming in Carol Lancaster and SamWang (ed.) Managing Transition from aid in Sub Saharan Africa, Macmillian.
- Ali, A.A.G., Malawanda, C. and Suliman, Y. (1999) "Official Development Assistance to Africa: An Overview" *Journal of African Economies*, Vol8, No.4, PP.504-527.
- Anand, S. and Ravillion, M. (1993) "Human Development in Poor Countries: On the role of Private incomes and Public Services" *The journal of Economic Perspective*, Vol.7, Issue 1, PP. 133-150.
- Bacha, Edmar L. (1990) "A Three -Gap Model of Foreign Transfers and the GDP Growth Rate in Developing Countries" *Journal of Development Economics*, Vol. 32, PP.279-296.
- Burnside, C. and Dollar, D. (2000) "Aid, Policies and Growth" *American Economic Review*, Vol. 90, No.4, PP.847-68.
- Chenery, H.B. and Eckstein, P. (1970) "Development alternatives for Latin America" *Journal of Political Economoy*, Vol. 78, No. 4, PP. 966-1006.

- Chenery, H.B. and Strout, A.M. (1966) "Foreign Assistance and Economic Development" *American Economic Review*, Vol. 56, No. 4, PP. 679-733.
- Collier, P. and Dollar, D. (2002) "Aid Allocation and Poverty Reduction" *European Economic Review*, Vol.46, PP1475-1500.
- Dawit W. and Yemisrach A. (2002) "The Impact of Foreign Aid on Economic Growth in Ethiopia" edited by Gebrehiwot Ageba, Jemal Mohammed and Solomon Tesfay, proceedings of the eleventh annual conference on the Ethiopian Economy Nov. 2-4, 2001, Nazareth.
- Dollar, D. and Easterly, W. (1999) "The search for the Key: Aid, Investment and Policies in Africa" *Journal of African Economics*, Vol.8, No.4, PP.546-577.
- Dollar, D. and Kraay, A. (2000) "Growth is good for the Poor" Draft, World Bank.
- Durbary, R., Gemmel, N. and Greenaway, D. (1998) "New Evidence on the Impact of Foreign Aid on Economic Growth" Credit Research Paper, Center for research in Economic Development and International Trade, University of Nottingham
- Easterly, W., Levin, R. and Roodman, D. (2003) "New Doubts: Revisiting 'Aid, Policies and Growth' " Working Paper No. 26.
- Enders, W. (1995) *Applied Econometric Time Series*, Wiley series in Probability and Mathematical Statistics, USA: John Wiley and Sons, Inc.
- Ethiopian Economic Association (1999/2000) *Annual Report on the Ethiopian Economy* Vol.1, edited by Befekadu Degefe and Brehanu Nega.
- Ethiopian Economic Association (2000/2001) *Second Annual report on the Ethiopian Economy*, Vol II, prepared by Befekadu Degefe, Brehanu Nega and Getahun Tafesse.
- Franco-Rodriguez, S., McGillivray, M., and Morrissey, O. (1998) "Aid and the Public Sector in Pakistan: Evidence with Endogenous Aid" Credit Research Paper, Center

for Research in economic Development and International Trade, University of Nottingham.

- Getahun T. (1999) "Poverty and Poverty Reduction in Ethiopia" edited by Tegegne G/Egziabher, Abdulhamid Bedri, Workneh Negatu and Dilnesaw Asrat, proceedings of a workshop on the Twenty Fifth Anniversary of the Institute of Development Research, AAU.
- Gomanee, K. and Morrissey, O. (2002) "Evaluating Aid Effectiveness against a Poverty Reduction Criterion" Prepared for DESG conference, Nottingham.
- Gomanee, K., Sourafel, G., and Morrissey, O. (2003a) "Aid, Public Spending and Human Welfare: Evidence from Quintile Regressions" Paper for a session on 'Poverty and Human Development' organized by Dr Noorbakhsh at the DSA Annual Conference, Glasgow.
- Gomanee, K., Morrissey, O., Mosely, P. and Verschoor, A. (2003b) "Aid Pro-poor Government Spending and Welfare" Credit Research Paper, Center for Research in economic Development and International Trade, University of Nottingham.
- Gomanee, K., Morrissey, O., Mosely, P. and Verschoor, A. (2004) "Aid, Government Expenditure and Aggregate Welfare" Credit (Mimeo), University of Nottingham.
- Gujarati, D.N. (1995) Basic Econometrics, third edition, New York, McGraw-Hill.
- Hansen, H. and Trap, F. (2000a) "Aid and Growth Regressions" *Journal of Development Economics*, Vol. 64, PP. 547-570.
- Hansen, H. and Trap, F. (2000b) "Policy Arena: Aid Effectiveness Disputed" *Journal of International Development*, Vol. 12, PP. 375-398.
- Harris R. (1995) "Using Cointegration Analysis in Econometric Modeling", Prentice Hall/Harvester Wheat Sheaf.

- Hajimicheal, M.T., Ghura, D., Mühleisen, M., Nord, R., Uçer, E.M. (1995) "Sub-Saharan Africa: growth, savings, and investment, 1986-93" Occasional Paper 118, International Monetary Fund.
- Heins, F., Mekonen T. and Valente, P. (2001) "Infant and Child Mortality in Urban Ethiopia: with special reference to socio-demographic and housing conditions in Urban Areas and Addis Ababa" Institute for Population Research, Italian National Council for Research (IRP-CNR), Roma.
- Heller, P.S. (1975) "A Model of Public Fiscal Behavior in Developing Countries: Aid, Investment and Taxation" *American Economic Review*, Vol. 65, 429-445.
- Jiffar T. (2002) "The Impact of Foreign Aid on Public Spending: The Ethiopian Case", Unpublished M.Sc. Thesis, AAU.
- Kakawani N. (2001) "A Note on Growth and Poverty Reduction" Asia and Pacific Forum on Poverty.
- Kalkawani, N. and Pernia, Ernesto M. (2000) "What is Pro-poor Growth?" *Asian Development Review*, Vol. 18, No.1, PP. 1-16.
- Krueger, Anne O. (1986) "Aid in the Development Process" *Research Observer*, Vol.1, No. 1, PP. 57-78.
- Le, Thu Huong and Winters, P. (2001). "Aid Policies and Poverty Alleviation: The case of Viet Nam." *Asia Pacific Development Journal*, Vol. 8, No.2, PP. 27-44.
- Lensink, R., and White, H. (1999) "Is there Laffer curve?" Credit Research Paper 99/6, University of Nooingham.
- McGillivray, M. and Morrissey, O. (2001) "A Review of Evidence on the Fiscal Effects of Aid" Credit Research Paper, Center for Research in economic Development and International Trade, University of Nottingham.

- Ministry of Finance and Economic Development (1999) "Survey of the Ethiopian Economy: Review of Post-reform Developments (1992/93-1997/98)" Addis Ababa.
- Ministry of Finance and Economic Development (2002a) "Development and Poverty Profile of Ethiopia, (Analysis based on the 1999/00 Household Income, Consumption and Expenditure and Welfare Monitoring Survey)" Welfare Monitoring Unit, Addis Ababa.
- Ministry of Finance and Economic Development (2002b) "Ethiopia: Sustainable Development and Poverty Reduction Program" Federal Democratic Republic of Ethiopia, Addis Ababa.
- Pankhurst R. (1967) "Economic History of Ethiopia" Haile Selassie University Press, Addis Ababa.
- Philips, P.C.B. (1987) "Time Series Regression with a Unit-root" *Econometrica*, Vol. 55, 277-301.
- Sargan, J.D. and Bhargava A. (1983) "Testing Residuals from Least Square Regression for being Generated by the Gaussian Random Walk" *Econometrica*, Vol. 51, 153-74.
- Sen, Amarta K. (1987) "The Standard of Living" The Tanner Lectures. Cambridge: Cambridge University Press.
- Teferi M. (2004) "Aid and Dutch Disease in Ethiopia" Unpublished M.Sc. Thesis, AAU.
- United Nations Development Programme (2001) "A Four-year Review and Analysis of Development Co-operation Activities of External Partners in Ethiopia" UNDP Ethiopia.
- United Nations Development Programme (1996) "Development Co-operation (Report 1994): Ethiopia" UNDP Ethiopia
- United Nations Development Programme (2003) "Development Partnership in Ethiopia: A Summary of Development Cooperation Funding" Compiled by UNDP Ethiopia.

- Wondwosen T. (2003) "The Role of Economic Policy in the Aid-Growth Relationship: An empirical Investigation" Unpublished M.Sc. Thesis, AAU.
- World Bank (1990) *World Development Report 1990: Poverty*, Oxford University Press for the World Bank, New York
- World Bank (1998) *Assessing Aid: What works, What doesn't, and Why*, Washington DC: Oxford University Press for the World Bank
- World Bank (2001) *World Development Report 2000/2001: Attacking Poverty*, Oxford University Press for the World Bank, New York

Appendices

Appendix A: Welfare Regression to Determine PPE Weights

Dependent Variable LW, p-value in parenthesis

Constant	4.81 (0.000)
Log Health Expenditure(Exp)	-0.54 (0.000) $R^2 = 0.71$
Constant	5.3 (0.000)
Log Education Exp.	-0.48 (0.000) $R^2 = 0.68$
Constant	4.65 (0.000)
Log Transport & Telecom. Exp.	-0.24 (0.000) $R^2 = 0.41$
Constant	4.97 (0.000)
Log Agriculture Exp.	-0.23 (0.000) $R^2 = 0.59$
Constant	4.91 (0.000)
Log Construction Exp.	-0.18 (0.011) $R^2 = 0.17$

Appendix B: Constructed Regressor

To construct the level of PPE that is not financed by aid i.e. $\hat{G}_{pt}$, the $PPE(G_{pt})$ is first regressed on aid.

$$G_{pt} = \alpha_0 + \alpha_1 A_t$$

Then netting out the effect of aid, the constructed residual is formulated as follows;

$$\hat{G}_{pt} = G_{pt} - \alpha_1 A_t$$

$$\hat{G}_{pt} = G_{pt} - 0.00296A_t$$

Appendix C: Test for Weak Exogeneity and Beta Significance (PPE Regression)

TEST OF WEAK EXOGENITY(i.e. Test for zero restriction on α_i)

VARIABLE	LWPPE	LY	LA	LDR
α coefficient	-0.52332	0.065883	0.75354	0.20779
LR Test χ^2	5.6171	0.49996	2.8993	1.2719
P Value	0.0178*	0.4795	0.886	0.2594

** and * denote rejection at 1% and 5% level of significance respectively

TEST OF BETA SIGNIFICANCE (i.e. Test for zero restriction on β_i)

VARIABLE	LY	LA	LDR
β Coefficient	-1.7283	-0.37032	-0.43632
LR Test χ^2	8.3508	16.444	6.3908
P Value	0.0039**	0.0001**	0.0115*

** and * denote rejection at 1% and 5% level of significance respectively

Appendix D: Test for Weak Exogeneity and Beta Significance (Welfare Regression)

TEST OF WEAK EXOGENITY(i.e. Test for zero restriction on α_i)

VARIABLE	LW	LY	LA	LWG*res
α coefficient	-0.65587	-0.16549	-0.24090	0.51764
LR Test χ^2	9.175	2.6793	0.21254	1.1162
P Value	0.0025**	0.1017	0.6448	0.2907

** and * denote rejection at 1% and 5% level of significance respectively

TEST OF BETA SIGNIFICANCE (i.e. Test for zero restriction on β_i)

VARIABLE	LY	LA	LWG*res
β Coefficient	0.76850	0.24665	0.18303
LR Test χ^2	1.4974	11.76	2.9004
P Value	0.2211	0.006**	0.0886

** and * denote rejection at 1% and 5% level of significance respectively

Declaration

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

Declared by:

Name:

Mehari Jomma

Signature:

Mehari Jomma

Date:

15/07/05

Confirmed by advisor:

Name:

Tassew Woldehanna

Signature:

Tassew Woldehanna

Date:

July 15, 2005

Place and date of submission: Addis Ababa, July 2005.