Institute of Social Studies

MACROECONOMIC IMPACT OF EXTERNAL ASSISTANCE: THE CASE OF ETHIOPIA

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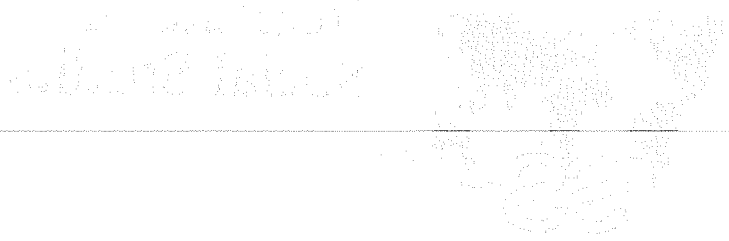

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The findings, interpretations and conclusions expressed are, however,entirely those of the author and should not be attributed in any manner to any one else.

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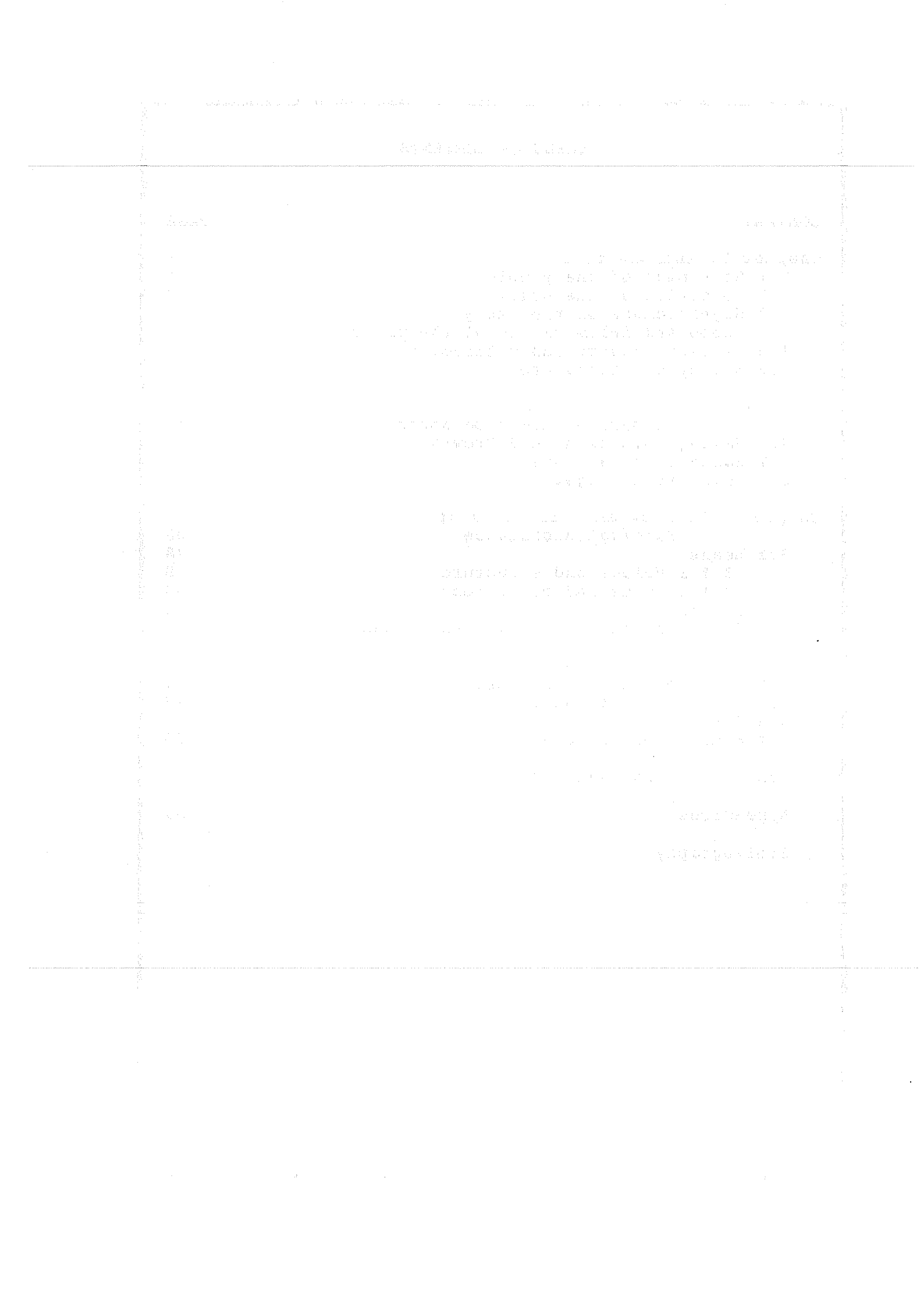

CHAPTER I: Introduction

1.1 Statement of the Problem

Generally, the role of foreign assistance in the process of economic development has thus far been debatable. For some countries , it is believed to have helped to increase their investment resources, to ease their foreign exchange constraint and to create a multiplier effect on their overall economic development. On the other hand, the record for other countries, as suggested by some studies, seems to have been counterproductive.Thus, the impact of external aid on growth remains ambiguous and controversial.

The impact of aid on the Ethiopian economy could be assessed in this context.The country is one of the least developed countries whose investment resources are very much limited and this problem is compounded by severe foreign exchange constraint.Prima facie, external assistance could play a great deal to ease out this resource deficiency.

However,to my knowledge, there is no such work done that assesses the dual role of external assistance on the Ethiopian economy and comes up with conclusive results.Therefore, this paper attempts to analyze the performance of development aid and its overall impact in macroeconomic level. To this purpose , a variant of investment constrained two-gap model will be estimated and used to analyze the effect of aid on the level and pattern of domestic saving.Besides, its productivity as measured by the incremental stream of income generated as a result of its flow will be estimated and analyzed.Hence the main thesis could be stated as:

Since the development need of Ethiopia is constrained by low level of domestic saving and inadequate foreign exchange , external assistance could ease the problem.

Thus it is hypothesised that development aid is positively

related with the growth of output and has significant impact on the level and structure of aggregate savings.

In addition to this main hypothesis,some other relevant questions will be as well addressed.In this regard attempt will be made to shade light on questions such as what was the impact of external assistance in macroeconomic context?,in increasing investment resources?,in creating multiplier effects?,in easing out foreign exchange constraint? and what measures could be envisaged to optimize its flow and effectiveness?

1.2 Objective of the study

The objective of this paper rests on the following considerations:

1) To succinctly review and cast light on the contrasting theoretical views of economic aid and the technical literature related to it;

2) to measure and quantify the different types of foreign aid; and select an appropriate estimation model that would enable empirical testing;

3) Based on the empirical work, to thoroughly analyze the overall impact of development assistance on the aggregate and sectoral level of the economy;namely,on savings, investment and thereby on growth of the economy.

4) To demonstrate the policy implications that might be appropriate and come up with relevant recommendations.

1.3 Significance of the study

Ethiopia is, by any standard of development criterion,categorised as one of the least of the LDCs. During the last decade,the pace of economic growth has lagged behind its population growth and hence per capita income steadily declined;the national savings rate fell.

Since the 1980s, almost all the annual investment plans formulated by the government have had a significant amount of foreign aid as complementary. The Ten-year perspective plan, for instance, envisaged about 45% of the total investment required to be financed from foreign resources in the form of loans and

grants of which more than 20%[1] was expected to be covered from development related grants alone.

Thus, external assistance has greater place and role in the Ethiopian economy. But research and study in this area in the Ethiopian context is yet virgin and this paper, if not capable of profoundly treating due to a number of limitations it faces, intends to initiate further investigations and indicate the major lines of research work in this subject area.

In addition, a number of government employees and offices entrusted with such responsibilities of mobilizing external finance may hopefully benefit from the study. Particularly, the Central Planning and Ministry of Finance offices can make use of the findings and recommendations that will be arrived at.

1.4 Scope and delimitation of the paper

The scope of the study does not go beyond development aid, conventionally called as Official Development Assistance (ODA), to include other types of external assistance such as relief, humanitarian and military aid provided by donor countries and organizations.

The data available on technical assistance is very problematic to measure as it is usually donated and received in kind rather than in financial terms. For this reason, some round-about means is employed to estimate such kind of assistance and hence the quality of data could not be as reliable as it would be otherwise.

Another important limitation is related to the fact that most of the data are from secondary sources. The greater part of the time series data for the various variables specified in the model were derived from World Bank sources. This is so because the government of Ethiopia has not yet any compiled data that covers the required span of time- for the 20 years ending 1988-

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[1] *The cumulative investment required for the Ten-Year plan adopted for the period 1984-1994 was estimated at 41.8 billion birr in current prices. The corresponding domestic savings for the period was projected at 23.2 billion birr. Source: the Ten-Year perspective Plan 1984/85-1993/94, p.25.*

while the World Bank does.

Furthermore, the scope of the paper is delimited to the assessment and analysis of economic aid at a macro level and little attention is paid to individual projects and programmes.

1.5 Research design and methodology

There are a large number of studies that have attempted to empirically test the magnitude and direction of relationship between aid and other macroeconomic variables. However, most of them are confronted with a number of shortcomings; notably the methodological approaches evolved largely depend on cross-sectional and pooled data in testing the impact of aid on other macro variables which makes difficult application of the conclusions drawn to a specific individual country. Besides, they are limited to the econometric problem of inappropriate estimation technique and model specification that is far from representing the true nature of macroeconomic variables considered.

Notwithstanding the difficulties in availability of reliable data, in this paper endeavour is made to overcome most of the serious inadequacies incorporated in many of the tests carried out and thereby to resolve the consequent ambiguity of results.

To do so, the behaviourial relationship of the principal macroeconomic variables that deemed relevant in analyzing the macro impact of aid are specified. Basically, the features of the model specified incorporate most of the behaviourial functions and identities given in the traditional two-gap model of Adelman and Chenery (1966). It also includes the fiscal balance contained in Bacha's (1990) three-gap model as tuned to the sectoral breakdown of national saving into its two categories following Desai's (1979) and Levy's(1984) approaches. Hence, the model is of a character that lies somewhere in between the two-gap and the three-gap models with some variations of its own that will be discussed in part four of the paper. Following the specification, the structural parameters will be estimated based on a time-series data for the period 1970-1988. This would enable to test

the direction of statistical relationship between aid, and other aggregate variables including domestic saving and output; and eventually to estimate their functional relationship in the specified model.

Admittedly, some important approaches have been redundantly suggested albeit with little attempt to test their empirical validity. More specifically,the aid debate has focused too much on the aid-saving relation without due regard to consideration of the interdependence and proper linkages among the various macroeconomic variables which is the case in the real world.Thus an application of simple multiple regression analysis rather than full simultaneous equations method has been the common practice in the literature of aid economics.There is little work that resolves the problem of simultaneity bias. The method of estimation in this paper therefore,relies on full simultaneous systems estimating technique, though single equation estimation has been as well performed. The justification for using both methods is in order to measure the direct and indirect effect of the key variables in the system of equations. While the unidirectional influence of such variables could be estimated by single equation , their second-round indirect effect could not be captured by this method but by simultaneous equation method.The same is true for estimating the direction and magnitude of the relationship between aid and saving.

This is so because the interrelationships between the dependent and the independent variables can not be captured by simple multiple regression equation as is the case in most of the empirical work in the field area. An application of a single equation method using Ordinary Least Squares is inappropriate since it implies the explanatory variables of an equation are not endogenous to the system. The need for an application of simultaneous estimation technique is clearly seen when one considers the findings of Gupta and Islam [2]:

> *Using the simultaneous equations model, we have shown that foreign capital affects saving and growth both directly, as shown in the single equation models, but also indirectly, because of the*

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[2] *K. Gupta and M.A. Islam (1983),Foreign Capital, Savings and Growth: An International Cross-Section Study, Dordrecht-Holland, Reidel Publishing Company,p.129.*

interdependence between savings and growth. We have further shown that the total effect, which consists of both the direct and the indirect effects, may be different from the direct effect both in terms of the magnitude, and sometimes even more significant, in terms of direction (that is, the sign of the total and the direct effects may be opposite).

Hence, the estimation methods that would be pursued in this paper include both the single equation estimation by OLS and simultaneous estimation methods by Two-Stage and Three-Stage Least Square estimation techniques. In short, application of simultaneous estimating techniques would enable us to incorporate the feed back effects of the endogenous variables into the system and attack the problem of simultaneity bias.

Furthermore, in its attempt to minimize the danger of mis-specification, behaviourial equations were carefully modelled on the basis of a priori theoretical expectations and sound empirical findings. Unlike the traditional practice in the literature, instead of considering capital as the only input contributing to growth, the labour force and technical change has been built in as additional factors influencing output. Similarly, the fiscal balance has been spelled out to reflect the specificities of the country where defense expenditure and foreign assistance play significant role in determining the annual fluctuations in public saving. The private saving function is made to capture the dynamism as they reflect the effects of lagged savings and additional(transitory) income on current savings as suggested by the Houthakker-Taylor dynamic saving function[3].

Therefore, this paper tackles as much as possible not to share the weaknesses of earlier works in specification and estimation of the model. The use of time-series data for one country also resolves the problem of interpreting cross-country data results and drawing awkward conclusions.

A detailed description of the model is referred to in chapter four of the paper. Having estimated the model, the size

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[3] *H.S. Houthakker, " On some Determinants of Saving in Developed and Underdeveloped Countries", in Problems in Economic Development ,ed. E.A.G. Robinson (London: International Economic Association, 1965); and H.S. Houthakker and Lester D.Taylor, Consumer Demand in the United States: Analyses and Projections; 2d ed. (Cambridge, MA: Harvard University Press,1970).*

and direction of structural parameters is determined and analyzed. Following interpretation of results, simulation exercises are run on alternative levels of foreign inflow and defense expenditure.

With regard to what the constituents of aid are, Official Development Assistance (ODA) would be proxied by current account deficit before official transfers in the model. In fact, most of the earlier works have also approximated development aid as the current account deficit.Griffin and Enos , for instance , used the current account deficit as aid in their statistical analysis.Indeed, this approach has been attacked since this variable includes other forms of capital(private capital) inflow which may have different impact on output than foreign assistance. But in the case of the Ethiopian economy, there is hardly any private capital inflow during the period under study.Hence, the inclusion of private capital inflow could not change the results. Therefore the paper will consider the current account deficit as representative of Official Development Assistance(ODA), as defined conventionally, in estimation of the model.In other words, whether aid has positive or negative effect on the economy, which would be determined by the outcome of the model in chapter four,largely depends on the influence of real ODA flows as approximated by the current account deficit excluding unrequited official transfers.

As will be argued in the next section, this paper's peculiar feature lies in its attempt to analyze the impact of aid on savings as disaggregated into two components: private and government savings. As long as all ODA is allocated to the public sector, its impact on national savings should first run through the fiscal balance and there is no reason why it should be directly related to the aggregate saving.

As noted earlier ,the sources of data include both first-hand and secondary ones. In appendix 4.1 detailed methods of data construction and their specific sources are provided.

1.6 Survey of literature

Although the giving and taking process of external assistance between the developed western countries and their respective overseas territories has existed even earlier, the origin of economic aid is commonly cited as dating back to the late 1940s. More specifically, it is associated with the proposal and implementation of the Marshal Plan that took place from 1948 to 1952. Accordingly, about $13 billion of economic aid was dispensed to western European countries to enable their economies revive from the aftermath of II World War[4] .

However,as Riddle puts it, 'whatever its precise origins, aid began to be an important facet of international relations in the 1950s' and he further notes that 'in the next 30 years it grew in importance both as quantities of aid flows increased and as international attention focused more and more on the economic conditions'[5] of the developing countries.

A number of studies have been undertaken to test the relationship between foreign aid flows and the level of a country's economic growth since the late 1950's. But, there is no general agreement on the results and the controversy is still unsettled one.

In the mid 1950s, Rostow argued aid was important for the developing countries to undertake the process of 'take-off into self-sustaining growth' [6]. Chenery and Strout gave an in depth classical theoretical explanation of the role of aid which was published in the American Economic Review, 1966. This theoretical justification attempted to demonstrate the specific mechanisms through which aid would assist in speeding up the pace of development. Hence, all the following literature on foreign

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[4] *Robert E. Wood, From Marshall Plan to Debt Crisis;Foreign Aid and Development Choices in the World Economy, (California:University of California Press),1986,p.29.*

[5] *Roger D.Riddle(1988),Foreign Aid Reconsidered, (Baltimore;Johns Hopkins university Press),P.85.*

[6] *M.F. Millikan and W.W. Rostow (1957),AProposa.: key to an Effective Foreign (olicy, New York, Harper and Brothers.*

assistance, be it pro or against, did not pass without referring to this Chenery-Strout work.

While aid was believed to foster growth by supplementing domestic saving and relieving foreign exchange constraint in the 1960's, this wisdom was challenged during the 1970's. Griffin (1970), Griffin and Enos (1970) and Weisskopf (1972b and 1973) were the leading figures who challenged the positive relationship between aid and output. On the contrary, they argued that there is a negative relationship between economic growth and external assistance.

Yet, proponents of the traditional view of positive relationship between aid and income emerged. Papanek (1972 and 1973) using the data employed by Griffin arrived at a positive relationship and attacked Griffin's thesis.

Furthermore, still another group of aid advocates shade doubt on the statistical methods used to test the correlation between the two variables. Lipton (1972) criticised the practice of not taking account of the lagged nature of aid while Moseley (1980) argued the use of single equation estimation to be inappropriate for it assumes that foreign aid influences but is not influenced by the income level of the country in question.

While a variety of issues are raised ,one of the core tenets of foreign aid theory , as encapsulated in the two-gap model, takes an important place in the literature. The contention that aid and economic growth have positive relationship is advocated by the two-gap model which argues " that the insertion of aid funds into a recipient economy sets in motion a causal chain of positive influence" where an aid impulse increases domestic investible resources, leading to increase in domestic investment and thereby contributing to more rapid rate of economic growth (Riddle 1988:103).

The main proponent of such framework is H. Chenery and his works could be represented as in Chenery and Bruno (1962), Chenery and Adelman (1966), Chenery and MacEwan (1966),Chenery and Strout (1966) and Chenery and Syrquin (1975). While these works analyzed saving deficient and foreign exchange constrained

Least Developed Countries in a two gap framework, their works were evaluated ,inter alia ,by Bruton (1969), Fei and Ranis (1968), Luxton(1979), Rahman (1967) and Quibria (1981) (Ahmad 1990:55). Findlay (1973, 1984) attacked the two-gap approach on the ground that it does not take into account the influence of relative prices. Following this criticism, the extent to which relative prices are relevant to the model and the possibility for flows of aid to have 'differential impact' on traded and non-traded goods was demonstrated by Wijnbergen (1986:123)

Setting aside the voluminous theoretical controversies surrounding the macro impact of aid, much theoretical and empirical analysis remains wedded to the two-gap model of Chenery and Strout. Basically, as the name implies, the model contains two growth constraints with which developing countries are faced and foreign assistance is called for to relieve these constraints by virtue of its dual role. these constraints are formally known as the savings and foreign exchange (or trade) gaps. The former refers to the capacity limit imposed by the inadequacy of domestic savings to meet the required level of investible resources. The foreign exchange gap is the difference between the capacity to import (as reflected by the level of exports) and import requirements. In essence, the two-gap model is an extension of the Harrod-Domar model adapted to demonstrate the theoretical positive link between aid and growth.

However, the positive impact of aid implied by the traditional two-gap model was heavily attacked of which Griffin is the best known exponent . Griffin's challenge that aid inflows will be accompanied by a decline in domestic savings however is not deterministic as the stress of his criticism crucially depends upon the actions of the recipient governments. More specifically, his attack emphasised that as a result of capital inflows, "public savings may decline; this may happen if either tax receipts fall or there is a change in the composition of government expenditure".[7] Thus, the gist of his argument and other related criticisms revolved around the impact of aid and

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[7] K.Griffin (May 1970), Bulletin of Oxford University Institute of Economics and Statistics, p.106.

the fiscal balance since public savings (the difference between government revenues and expenditures) play the key role in determining the effectiveness of aid.

Nevertheless, neither the traditional two-gap model nor the critics have incorporated the behaviour of the public sector in their various models in investigating the macro impact of capital inflows to developing economies. The only exception who has recently made a seminal contribution to this subject matter is Heller (1975) who only compared aid flows to indices of tax effort for recipient countries. Very recently, few theoretical elaborations and subsequent works have come to the fore by Mosely, Hudson and Horrell (1987) and by Gang and Khan(1991) enriching this dimension of the literature.

It is the contention of this paper, therefore to contribute to the debate by incorporating the public saving in modelling the impact of aid on key macroeconomic variables.

The paper tries to test the validity of the criticism surrounding that foreign capital inflow has a detrimental macro impact. My argument is not to assert that aid has been always effective in achieving the purported results.But, instead to demonstrate the economic mechanism implied behind the critics of aid and test its empirical validity based on a time-series data for Ethiopia. Particularly, the issue of aid displaces savings will have to be assessed from different angle other than that pursued by most of the previous approaches. Any inquiry to the relationship of aid versus savings could not be clear unless a distinction is made between the saving behaviour of different institutions. In the context of Ethiopian economy for instance,consideration of the impact of aid on private and government savings is more appropriate than on aggregate savings. If there is any negative relationship, then it should be the government savings as distinct from private savings,that should be affected. Most of the empirical work that claims a negative aid-saving relationship, however ignore this sectoral distinction and regress aggregate savings on aggregate aid.

On the contrary , their explanation for such inverse relationship is usually attributed to government savings decline

and/or switch to consumption as 'aid relieves government tax effort'. Thus I am spurred to specify only government savings as a function of aid. Besides the overwhelming part of foreign assistance is received by the public sector which reinforces the first argument.

Hence the results from the model specified in chapter four is believed to offer some useful insights as to how foreign assistance might affect the public saving and thereby other key macro variables.

Whilst in the second chapter the economic setting for the economy is set and the role of external assistance in macroeconomic balances reviewed, in the third chapter, assessment of the flow and structure of loans and grants and their fiscal dimension is discussed.

In the empirical work part in chapter four, which is the core of the paper, the detailed description of the model, its subsequent estimation, interpretation of the derived results and simulation exercise is made to be finally followed by relevant economic implications suggested by the model as concluding observations.

CHAPTER II THE ROLE OF EXTERNAL ASSISTANCE IN MACROECONOMIC BALANCES

2.1 SAVING, INVESTMENT AND GROWTH

To start with, the performance of the overall Ethiopian economy during the past two-decades was generally very disappointing. The annual average GDP growth rate that was estimated at 2.7% in 1965-80 sharply fell to 1.4% in 1980-88. Such a dismal performance is in marked contrast with the average annual growth rates of GDP achieved by low-income economies which has increased from 5.4% to 6.4% during the period.[8]

The declining growth trend of Ethiopia was not however without intertemporal variations. Particularly, 1974 marks a departure from normal economic activities due to the revolution, that took place during this year, and its adverse consequences. The post-1974 period was also accompanied by intensified civil war, recurring drought and the resultant low levels of savings and investment. The combined effect of a host of such factors therefore found their reflection on the poor performance of the economy.

Moreover, the problem of such low economic growth is further worsened when we consider the rate at which population was growing. During the same periods of 1965-80 and 1980-88, the average annual growth rate was registered as 2.7% and 2.9% and hence outstripping the pace of production.[9]

The implications of such awful feature for the whole economy is far-reaching. Among many other adverse consequences, low per capita income and thus low savings is sure to be a concomitant.

Ethiopia's domestic savings, though low they are from the outset, have had marginal significance particularly during recent years. As is summarised in the following table, the level of

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[8] World Bank (1990), World Development Report, p.180.

[9] ibid, p.228.

domestic saving was so low that additional resources have had to come from rest of the world to cover the deficiency in investment.

Table I:

Total Resources and their Utilization

(Periodic averages as % of GDP)

. . . . .	1975/76 -1977/78	1978/79 -1979/80	1980/81 -1982/83	1983/84 -1984/85
GDP at market prices	100	100	100	100
Net Imports	3.6	4.8	8.3	11.7
Total Resources	103.6	104.8	108.3	111.7
Consumption	94.3	95.7	96.8	100.5
Investment	9.3	9.1	11.5	11.8
Domestic Savings	5.7	4.3	3.2	-0.3

Source: World Bank(1987). Ethiopia:Recent Economic Developments and Prospects for Recovery and Growth. Feb. 25, P. 23.

Over the four consecutive periods indicated in the table, the share of domestic savings steadily declined which reached to below zero level during the drought period of 1983/84-1984/85. During the specified 10-years period, the percentage share of domestic savings averaged to about 3.6 of GDP whereas the share of investment stood at 10.4% of GDP. Thus, the role of external resources in financing investment was of paramount significance as noticed by the world bank mission:[10]

> As the savings rate declined over the years, the share of investment financed from external resources increased progressively from 39% during 1975/76-1977/78 to about 72 percent during 1980/81-1982/83. During the period 1983/84-1984/85 namely the drought years, domestic savings turned negative, with

[10] World Bank (1987), Ethiopia: Recent Economic Development and Prospects for Recovery and Growth, February 25, p.23.

consumption exceeding total output. In other words a part of net capital inflows went into consumption during this period.

The weak performance of domestic saving had inevitably been reflected on the level of investment. In real terms, aggregate domestic savings have lagged behind fixed investment in recent years.In 1981 prices, Gross fixed investment hovered around 8.5% of GDP for the period 1975-79 as shown in Table II. This ratio reached 10% in 1980 and then after followed an increasing trend, which actually rose to about 15.7% in 1988. Though this level of investment is quite low in view of rapid growth goal, its source of financing is an issue that merits more concern.

As discussed earlier, domestic savings have been steadily declining which necessitated resort to external financing. Measured as a percentage of GDP, the gap between investment and savings went on invariably widening -from an initial low level of 2.9% in 1974/75 to over 10% for the years after 1980/81[11].

Once again, comparative statistics of this resource gap stands unfavourably for Ethiopia than to other Sub-saharan countries. The record for these countries as a group was reported to be slightly above 6% of their GDP for the period 1985-1987.[12]

As a result of the ever widening resource gap experienced in recent years, the role of external loans and grants had been

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[11] *World Bank (1990),Ethiopia's Economy in the 1980s and Framework for Accelerated Growth, March, P.66.*

[12] *World Bank (1990), World Development Report, p.163.*

financing this gap will be discussed shortly after and now let us consider the components of aggregate investment.

As exemplified in the next table, the public sector has been the dominant force in the domestic investment scene throughout the years following the 1974 revolution.

Table II:

Macroeconomic Balances
(as % of Gross Domestic investment)

	1975-79	'80	'81	'82	'83	'84	'85	'86	'87	'88
1. Foreign savings= balance on current account (excl.net off.transfers)	38.8	45.0	62.1	76.3	62.5	67.0	62.9	55.1	60.3	64.3
2. National savings	61.2	55.0	37.9	23.7	37.5	33.0	37.1	44.8	39.7	35.7
3. Gross Investment	100	100	100	100	100	100	100	100	100	100
of which:										
3.1 public	56.5	73.0	75.7	78.0	77.7	78.9	84.3	84.3	86.3	87.3
3.2 private	43.5	27.0	24.3	22.0	22.3	21.1	15.7	15.7	13.7	12.7
4. Resource Gap (2-3)=(1)	38.8	45.0	62.1	76.3	62.5	67.0	62.9	55.1	60.3	64.3
Gross fixed Investment (as a % of GDP)	8.5	10.0	10.3	11.8	11.2	12.8	14.0	12.7	14.6	15.7

Source: World Bank (1990), Ethiopia's Economy in the 1980's and Framework for Accelerated Growth, March, pp 6, 137, 138.

Apparently, its percentage share in gross fixed investment outlays rose from about 56 during 1975-79 to slightly below 87 in 1989. In contrast, the private sector has seen a falling share of investment. Its share in total investment steadily declined over the years captioned in the table. The proportion of private investment in gross investment in 1989 was only 30% of its 1975-79 level.

The figures as calculated from national accounts statistics depict the declining trend of national savings. Its level oscillated within the range given by the high record of 61.2% in

1975-79 and the low record of 23.7% in 1982.Thus, its annual average hovered at only 40% of the total public and private investment. Consequently the remaining balance had to be covered from foreign sources as is shown in the table.

The counterpart of the investment-saving gap, which is equal to the current account deficit in expost sense, therefore, has been widening throughout the years under consideration.

In other words, the two-gaps ,as are conventionally called-saving and trade-,has been reinforcing to each other whose combined effect set a limit on the progress of growth of the economy.

2.2 BALANCE OF PAYMENTS

The magnitude of resources allocated to merchandise imports grew at a faster rate than earnings from exports. Starting from 466.78 million birr in 1970, the import bill drastically grew to 2751.65 million birr in 1988 with an annual average growth of 27.2%. On the contrary, the record of merchandise exports during these years rose from 383.57 to 1317.35 million birr with an annual average growth rate of only 13.5%.[13] The lay out of the balance of payments current account is summarised as in the following table.

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[13] *figures computed from World Bank Diskettes, World Tables 1989-90.*

TABLE III

BALANCE OF PAYMENTS CURRENT ACCOUNT
(In million Birr)
Cumulative totals during period

	1970-74	1975-79	1980-82	1983-85	1986-88
1.Export,goods(fob)	1904	3077	2580	2483	2492
2.Import,goods(cif)	1841	4103	4458	5587	6721
3.Net Non-factor services	-25	-242	205	437	585
4.Resource Balance	39	-1267	-1673	-2667	-3644
5.Net Factor Service	-143	-47	-19	-136	-267
6.Private Transfers	58	188	186	698	1148
7.Current Account Balance (Before off.transfer)	-47	-1126	-1507	-2105	-2763
8.Current Account Balance (as % of GDP)	-0	-3	-6	-7	-8

Memo: 1 US$ = 2.07 is the exchange rate used to convert values.

Source:World Bank:World Tables 1989-90,diskettes(extracted).

While the weak export performance and the growing import bill has led to a widening trade deficit , the deteriorating terms of trade has further compounded the problem.

The severity of the trade deficit was, however, tempered by the positive contribution of net exports of non-factor services in the 1980's. For instance, of the total 4229 million birr trade deficit in 1986-88, over 585 million birr (or 13.8%) was covered from these sources. The corresponding figures for the year 1988 stands out at 1434 million birr and 130 million birr (or 9% of the total). Thus, unlike the merchandise trade, the net non-factor services were favourable throughout the 1980's, albeit with mild negative impact of the preceding years.

However, the effect of net factor payments to and from abroad has invariably been negative. It rose from 19.9 million

birr in 1970 to 130.4 million birr in 1988 as a net payment to abroad and hence eroding the current account position of the country. Yet, private transfers followed a continuous increasing trend from low level of 58 million birr in 1970-74 to high of 1148 million birr in 1986-88.It was only in 1970 and 1971 that private transfers had a record of net outflows from the country.[14]

However, the net result is all but a continuous deficit of the current account which consequently had to be financed either from external loans and grants or by running down the foreign exchange reserves of the country.

Table IV

FINANCING THE CURRENT ACCOUNT DEFICIT
(In million Birr)

	1975-79	1980-82	1983-85	1986-88
Current Account[15]	-1128	-1777	-2432	-2867
Financed By:				
Official Grants	444	388	1144	1434
Net MLT Loans*	516	1285	1130	1531
Disbursements	690	1438	1560	2425
Amortization	-174	-153	-429	-894
Short Term Capital	-95	-3	90	4
Change in Reserves	247	205	137	33
Errors & Omissions	16	-98	-69	-135
Current Account (as % of GDP)	-3	-6	-7	-8

Note:MLT refers medium and long term
Change in Reserves :- =increases.

Source:World Bank(1990),Ethiopia's Economy in the 1980's ,pp. 46,138.

In particular, the problem of the balance of payments was

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[14] *ibid.*

[15] *Figures slightly differ compared to those shown in Table III because of different data sources. The trend, however remains the same.*

very serious during the 1980s when current account deficit as a proportion of GDP sharply rose from 6.4% in 1980/81 to 10.1% in 1987/88. As the figures in table IV exemplify, its financing heavily relied upon official grants and loans which together accounted for about 96% of the total sources for the period 1975-88. Of these two sources, the share of medium and long-term loans played the greater role with a record of over 54% as contrasted with slightly less than 42% for official grants.

The composition of loans, in addition to its size, is crucial which thus is worth considering. Of the total gross loan disbursements in the years 1982 to 1987, about 65% were on concessional terms leaving the other 35% to be raised with harder terms and conditions from non-concessional sources[16] ;such as commercial banks and supplier credits. The trend was not much different in the preceding years as well.

As a result, the total debt service of the country went on continuously increasing from 43.88 million in 1970 to over 582 million in 1988. Of this amount, interest payments alone accounted for 29.7% and 26.3% in the specified years, respectively.[17]

Viewed in proportion to the value of exports of goods and service, total debt service sharply rose from a low level of 11.44% in 1970 to 44.23% in 1988. Since the level of exports has ben increasing in absolute terms, the rising ratio is associated with the growing debt-service payments. This relatively faster

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[16] World Bank(1990),Ethiopia's Economy in the 1980s,p.46.

[17] Source: World Bank, 'World Tables' and 'World Debt Tables', 1989-90, Diskettes.

growth rate of debt-servicing was because of the growing level of the debt-stock fuelled by the rising interest payments associated to it. Thus the structure of external debt, as reflected by all principal indicators[18], have been changing unfavourably.

In summary ,the ever growing debt-burden was a composite product of the rising foreign exchange gap and the inadequate level of domestic savings that have failed to meet the investment demand of the economy.

An enquiry to identify and analyze the root causes of the many and diverse factors that are liable to low level of savings and shortage of foreign exchange is obviously beyond the scope of this paper. However, any analysis of the role of external assistance on the overall economy is at best incomplete unless a clear understanding of the role of the government in this sphere is not understood.

Particularly, the case in point is stronger in the context of the Ethiopian economy where almost every type of foreign official aid is received and administered by the government. Hence, in what follows, analysis of the government budget in connection to external assistance would be attempted so as to give a clearer picture of its impact at the macroeconomic level.

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[18] *ibid.*

2.3 GOVERNMENT BUDGET

In order to demonstrate the extent to which the government budget was dependent on external financing, one needs to be clear of the structure and behaviour of government expenditure and revenue elements.

The size of government revenue, on the whole, tended to increase in the last twenty years period. Between 1970 and 1988, it has been increasing at an average rate of more than 11% annually. This is far greater than the rate of growth of GDP of 5.4% and indicates a greater than unitary elasticity. Alternatively, the ratio of total revenue to GDP has tended to rise from 11% in 1970 to over 29% in 1988.

As regards to the composition, taxes has until 1986 accounted for the bulk (more than 70%) of total government revenue. However, recently the relative contribution of taxes "has been declining owing to a rapid rise of transfers to the budget from the profits of state enterprises and financial agencies."[19] Thus the share of non-tax revenues has shown a gradual rise from 16.9% in 1980 to over 33% of total revenue in 1986.[20]

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[19] *Chole,E., ' The Ethiopian Economy',in International Institute for Relief and Development, (1988),p.44, unprocessed.*

[20] *See p.153 of World BAnk,(1990),Ethiopia's Economy.*

Likewise, current expenditure has seen a continuously rising trend since 1970. Ever since, the annual average growth rate is estimated at about 10% which is only slightly below the growth rate of revenue cited above. In fact, there are even many years during which current revenue has fallen short of the level of current expenditure (see Figure 1).

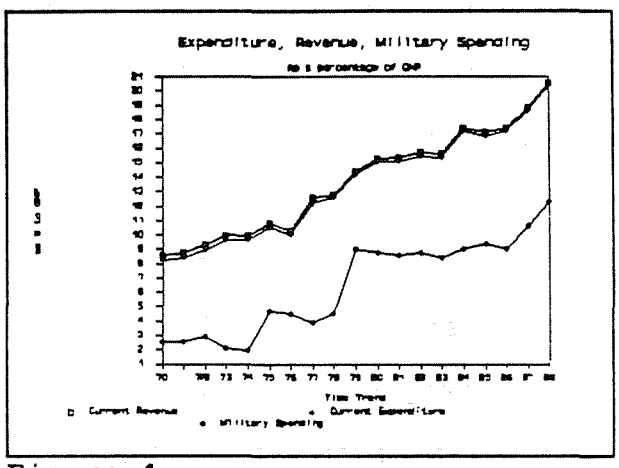

Figure 1

In addition to this, when we consider the capital budget, the overall balance consistently reveals an upward growing deficit throughout these years. The negligible size of capital revenue was no match for the rising level of capital expenditure. As a result, the net effect of the capital budget on the total budget has been one of aggravating. Thus the overall government budget invariably suffered from severe and increasing deficit levels with an annual average growth rate of 17.9% for the period between 1972 and 1987.In absolute terms, the deficit shot from 64.2 million to 754.9 million during these respective years.

The causes for the growing size of deficit could be ascribed to a number of factors. But, the growing size of military expenditure is for sure the most important one. Though military expenditure had had a high record even before 1974, its magnitude

was very much scaled up after this year.[21] Its share in current expenditure rose from 16.6% in 1970 to 56%; implying a more than three-fold increment. A corollary of this is that the share of non-defense outlays has shrinked dramatically by this rate.

The extent to which defense expenditure has been increasing is much more alarming when its pace is contrasted with that of GDP. As discussed earlier, production has been stagnating and during drought periods even declining. The growth rate of GDP at current market prices rose from 4460.6 million in 1970 to 11538.8 million in 1988 which is less than a three-fold increase.On the contrary, military expenditure has sharply rose from 88 million to 1687 million -implying a more than 19-fold increase - during the same period.Thus, while output was less than tripled, military spending increased 19 times or,as Chole has also pointed out, speeded at a rate seven times faster than output. Chole further contends that;[22]

> *This development has had an obvious impact on the economy's capacity to mobilize resources internally. The rate of growth of military expenditure has been far out of pace with the capacity of budgetary resources to finance it. True, government revenue has increased considerably in recent years, but it has not been able to match the rate of increase of expenditure, which has been soaring, largely (but not solely) on account of military expenditures.*

Consequently, the ever growing expenditure-revenue gap has had an adverse impact on the level of resource mobilization and most importantly on the level of the country's rate of capital accumulation.

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[21] *Chole,E., 'The Impact of War on the Ethiopian Economy',1989,p.93, unprocessed.*

[22] *Ibid.,p.95. (Chole)*

The rising level of public consumption largely as a result of expenditure on defense and public administration has meant declining government savings which in turn worked out to depress the level of aggregate savings.

It is recalled from earlier discussion that the rate of investment that has been achieved recently has been low in regard to the development needs of the country. Yet the level of domestically generated savings has been too low to finance even this low level of investment attained. Therefore, inevitably the resource-gap as reflected by the excess of gross investment over domestic savings had to be financed by foreign assistance and domestic borrowing. Thus, the proportion of foreign loans and grants (together) in the total deficit accounted for more than 60% in 1970 which rose to 64% in 1987. The remaining balances during these years was obviously covered from bank and non-bank borrowing of domestic origin.[23]

In a nutshell, due to the increasing level of resource deficit, resort has been increasingly been made to the use of external financing in the form of loans and grants an issue to which we now turn.

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[23] *Figures computed from p.152. of World Bank (1990), Ethiopia's Economy in the 1980s, pp.152.*

CHAPTER III: FLOW AND STRUCTURE OF EXTERNAL ASSISTANCE

In this chapter, the volume and structure of foreign assistance, and the various sources to which it is associated will be discussed. The true impact of foreign aid on growth will be concealed to the extent that the proportion of aid from different donors varies. Since the donors to Ethiopia differ to include bilateral, multilateral and regional organizations, so will the nature of foreign assistance from these sources and hence its impact on growth. Furthermore, the extent the economy has been dependent on foreign inflows; notably on external assistance that qualify as ODA will be highlighted. Any work that attempts to study the macro impact of aid should provide also a reasonable glimpse of its volume and nature so as to lay the background for any further study. Though an in depth analysis of how the different types of ODA might have affected both the balance of payment and budgetary position is beyond the scope of this paper, some pertinent insights are casted.

As discussed in the preceding section, the deficiency in resources, as reflected by either the current account deficit or the trade deficit, steadily increased from year to year in the past 2-decades. Thus, the economy has been increasingly dependent on external assistance flows.

The two major sources of external financing have taken the form of loans and grants .Together their volume amounted to 1.61 and 4.84 billion Birr in 1980 and 1986 ,respectively.[24] In net terms, however, the total sum of Official Development Assistance received by the country is reported to be of the magnitude 438.84 million and 1328.94 million birr during these years.[25]

In fact the definition of external assistance is so wide

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[24] *The grant amount was taken from World Bank diskette as given by unrequited transfers(official).Thus it includes technical assistance and relief support in addition to development related assistance.*

[25] *World Bank (1988), World Development Report, p.264.*

that it includes foreign transfers from governments, non-government and private institutions of the developed countries to the developing countries. Such transfers may take the form of official loans and grants or private investments. Official assistance could still be alternatively divided into humanitarian (relief and rehabilitation) and development related supports that are meant to finance selected projects and programmes. The latter is conventionally referred to as ODA (official development assistance). On the other hand, the private components encompass "direct investment by private companies based in the 'donor' country, portfolio investments, export credits, and bank lending."[26]

Therefore it would be necessary to mention to which component of aid this paper is referring to. It categorically addresses to that part of external assistance that comes in the form of loans and grants for specific projects and programmes. Only a by passing mention of humanitarian support will be made.

Essentially, the growing volume of loans and grants reflects the inadequacy of domestic resources to finance the investment requirements of the economy and the subsequent increasing government expenditure: both current and development. On the other hand, during the past couple of decades the relative importance of donors has varied and so do the forms of assistance.The changing composition of the various types of ODA would mean that loans and grants had different impact on the debt burden and on the government budget;to be discussed shortly.Even within the various types of loans, those with favourable grant element had less impact in augmenting the debt burden which gets its reflection in the fiscal stance as virtually all ODA to Ethiopia is administered and managed under the auspices of the government. Grants ,citrus paribus,are preferable to loans and loans with less interest rate and better terms and conditions would mean less burden to the budget. These issues are recurring themes of this chapter that will be

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[26] *Terasa Hayter and, Catharine Watson (1985), Aid:Rhetoric and Reality, London and Sydney: pluto Press,p.7.*

addressed in three sections.

3.1: Loans

3.1.1: Volume and Structure

The level of external assistance as given by the size of outstanding and disbursed debt (hence forth referred to as DOD) was recorded low at 324.1 million birr in 1967.This figure steadily increased to reach at 1092 million birr in 1985.[27] More importantly, its level was dramatically increased by more than 9-fold in the 1983-86 period from its low level of 1592.3 million birr in 1967-70 period (see Table V).

At the other end of the spectrum, the picture of indebtedness could well be reflected by the size of the external loans (including undisbursed). Thus, total loans that were committed from different sources was registered at 489.5 million birr and 1692.6 million birr in 1967 and 1978,respectively. For the year 1985, this figure rose to 6020.8 million birr.[28] Like DOD, the general trend of external indebtedness (including undisbursed) has been rising from 2483 million in 1967-70 to 2018 million in 1983-86 (see table V).

At this juncture, it is worth noting that conceptually there is a difference between these two variables of debt referred to in Table V.Whilst the term in column two represents the actual indebtedness of the country on the disbursed amount, the term in column one refers to total commitments of loans for which contracts were signed. In as much as commitment charges and other fees are to be paid, the later includes debt elements other than repayments of the principal and interest on disbursements. By comparing these two magnitudes, one could

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[27] *Ministry of Finance and National Bank of Ethiopia, as Quoted in Befekadu Degefe,'Growth and Foreign Debt', The Ethiopian Experience 1964-86,unprocessed,May 1990,p.22.*

[28] *ibid.*

assess the rate at which debt was utilized.

TABLE V

External Debt and its Utilization:1967-86
(in million birr)
End-of-Period totals

Period	External Indebtedness Including Undisbursed (1)	Debt Outstanding and Disbursed (2)	Utilization Rate (2/1)% (3)
1967-70	2483.3	1592.3	64.1
1971-74	3791.8	2324.7	61.3
1975-78	6053.5	3753.7	62.0
1979-82	10454.3	7175.5	68.6
1983-86	20181.8	14785.6	73.3

Source:Ministry of Finance and National Bank of Ethiopia, as Quoted in Befkadu Degefe,'Growth and Foreign Debt; The Ethiopian Experience 1964-86, unpublished material,May 1990,p.22.

From the above table , the calculated rate of utilization reveals the fact that on the average about 60% of the debt has been released and used.

This rate of utilization should be read with caution, however. Though the rate is apparently below full utilization(100%), it does not mean the left-over was because of lack of absorptive capacity.Rather it simply suggests of the total debts committed, this specified percentage has been disbursed and outstanding. As the initial amount of loan is scheduled to be disbursed over a period of given time,with a given rate in each interim years, one should not expect all the debt to be used at once ;say, within a year.

A critical assessment of how and at what rate the committed debt is utilized is only possible by reviewing the debt related

projects/programmes at a micro level. This is so because different projects/programmes have different gestation period to which the pattern of disbursement is attached. Some projects may have a life-span of 10 years while others may have only 5 years. Thus, for the same level of debt, they may have different patterns of utilization. The problem gets complicated when we consider the utilization rate of all the projects or programmes in totality.

Thus, it is better to look for another way of weighing the debt hangover. Debt service ratio , as measured by total amortization and interest payments to total exports of goods and services could give us a better explanation of how worse the position of a country is in meeting its debt obligations.

As mentioned earlier, the debt service ratio, leaped from 11.4% in 1970 to over 44% in 1988 , increasing by more than a four-fold during this period.This was in sharp contrast with the level of debt-burden for all Sub-saharan African countries in which Ethiopia is also included.

In 1988, the figure for this group of economies was recorded at 22.2%[29],which is only half of that for Ethiopia. Hence, Ethiopia's debt service ratio ranks high within this group of low income countries.

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[29] World Bank (1989),World Debt Tables, 1990-91: External Debt of Developing Countries, Vol.I, Analysis and Summary Tables, p.130.

TABLE VI:

EXTERNAL DEBT SOURCES BY CREDITOR

For the period 1962-1987

	cumulative Amount of loans in mill'n birr	%share
A) Multilateral (1-4)	3,126.3	39.3
1.World Bank	1,916.2	24.1
1.1 IDA	1,767.1	22.18
1.2 Other affiliates	149.1	1.87
2.African Development:B/F	807.9	10.1
2.1 Bank	218.5	2.7
2.2 Fund	589.4	7.4
3.EEC/EIB:	122.2	1.5
3.1 EEC	49.4	0.6
3.2 EIB	72.8	0.9
4.Others	280.0	3.6
4.1 IFAD,IMF,Arab Loan	239.0	3.1
4.2 OPEC	41.0	0.5
B) Bilateral	4,841.5	60.8
1. OECD	2,162.1	27.1
2. Socialist countries	1,933.7	24.3
3. Others*[30]	745.7	9.4
Total (A+B)	7,967.7	100.0

Source: OSCFER Unpublished document, (Amharic),June 1989,p.16.

With regard to its sources, almost all the total debt originated from bilateral and multilateral institutions.*[31] As is shown in Table VI, of the total volume of loans registered for the period 1962 to 1987, loans from bilateral sources accounted for over 60% while loans from multilateral sources accounted for the remaining 39%. Thus, the bilateral sources have had greater significance,relatively.

[30] *Includes Libya,Algeria,Yugoslavia,India, China .*

[31] *The role of commercial creditors was negligible.*

The western bloc were the major sources of bilateral loans compared to eastern bloc.The former accounted for over 27% while the later's share was estimated at 24%of the total loan during the period specified above.

On the other hand, the World Bank have been the major source of the multilateral loan from which about 24% of the total loan originated. African Development Bank/Fund ranks second within the multilateral financiers accounting for 10% of the total loan. Other multilateral institutions such as EEC, OPEC and IFAD has played insignificant role.

The classification of sources merely by multilateral and bilateral institutions masks, however, the fact that the composition of creditors had changed within their respective categories. This fact is particularly pronounced for the bilateral countries.

It was only after 1974 the ADB/F, OPEC, IFAD funds contributed to their multilateral counterpart. Since then, the importance of the World Bank has relatively been decreasing.

Within the bilateral countries, there was hardly any loan from socialist countries until the year 1976. The main sources have been only the western block until then. However, after this same year, the relative importance of the socialist countries increased; implying that the relative importance of western countries has diminished.

Therefore, both in the multilateral and the bilateral categorization, the year 1974-76 marks a major shift within the respective financiers. It is not surprising,however, as this was a time during which the country experienced a major political

shift to be accompanied by a change in the composition of creditors.

3.1.2 Terms and Conditions

In addition to the size of loans generated, it is important to understand what terms and conditions were stringent to it. In general, loans originated from different sources have varying degrees of terms and conditions. The level of the interest rate, the grace period, during which interest rate and repayment are suspended, and the length of the repayment period had on the average been as in the following table.

Table VII

Table VII

Average Terms and Conditions

	1970	1980	1982	1983	1984	1985	1986	1987
Interest(%)	4.2	2.3	2.6	1.8	2.4	2.1	1.6	2.5
Maturity(years)	37.6	23.8	31.7	25.8	33.9	26.3	35.4	29.5
Grace period(yr)	7.9	5.2	6.4	6.4	7.4	5.6	7.5	7.6
Grant element(%)	49.5	51.8	56.0	57.1	59.3	52.2	63.3	54.7

Source: World Bank (1990), World Debt Tables 1990-91:External Debt of Developing countries, p.116.

As is seen from the table, the average interest rate on DOD seems to have declined from 4.2% in 1970 to 2.5% in 1987, with some fluctuations in the meantime. However, when this trend is contrasted with the average interest rate calculated for all sub-saharan countries, it is less comforting.The figure for the group as a whole declined from 3.5% to 2.0% in the respective years[32].Thus the average interest rate for Ethiopia declined by

[32] World Bank(1989), Sub-saharan Africa:from crisis to sustainable growth,p.260.

40% as against 43% for the whole group.

On the contrary, the terms as suggested by the repayment period went on harder during the specified period. For Ethiopia it was shortened from 37.6 years in 1970 to 29.5 years in 1987, while the estimated figure for low-income countries showed an improvement from 26 to 34 years during these same years[33]. The grace period did not varied much in both cases. Therefore, the terms and conditions of loans during the period under discussion seems to have operated unfavourably to Ethiopia as compared with other low income countries.

Though the average terms exhibited above hint at the general picture of the conditions with which debt is serviced, they fail to adequately show the variations that exist among the different types of loans.

For instance, if these figures were calculated on the basis of multilateral and bilateral grouping, instead of all official creditors, the former no doubt would show favourable terms than the later. As discussed in the preceding section, IDA is the main source of multilateral credits during the past 2-decades.Loans from such sources are much more softer than from bilateral sources. This is evidenced by the fact that IDA credits have an interest rate of 0.75%, grace period of 10 years and maturity period of 30 years which are more softer than computed for all official creditors. Terms and conditions of ADB/F are similar with that of IDA as well.

Notwithstanding the variations from donor to donor

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[33] *ibid, p. 260.*

countries, generally, bilateral loans have a record of comparatively harder terms.Within the bilateral countries ,loans from socialist countries have tended to show milder terms,for instance.

3.2 GRANTS

In addition to foreign loans,capital flows also take the form of grants which we shall discuss now. Such grants may be further broken down into financial flows and technical assistance or could be categorized in terms of development related and relief grants. Unfortunately, data on these various compositions are not readily available.Particularly the large inflow of relief and rehabilitation assistance that come by as a result of drought is scarcely recorded. However, as some records of donor sources indicate, Ethiopia has received about 637 million birr relief support during the period 1985-1987[34].

In what follows the discussion is restricted to the consideration of only development related assistance, therefore - because this area has a better data records.

Generally, the trend of assistance that is related with development grant has seen an upward movement. From 21.94 million birr in 1970, it has been continuously rising to reach 617.69 million birr in 1985, nevertheless falling dramatically to 251.92 in 1988.

With regard to the level and source of development grant, the record could be summarised as in the following table for the

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[34] *Calendar Years are in accord to Ethiopian fiscal year that ends july 7.*

period covering 1984 to 1988.

Table: VIII

Development Related Grant (1984-88)[35]

In Million Birr

Year	United Nations	EEC	World Bank	Western Count's	Eastn Count's	Total
1984	97.1	1.2	-	106.7	89.1	289.1
1985	93.3	4.7	1.0	99.2	78.1	275.4
1986	111.7	3.8	0.2	84.7	80.5	280.7
1987	93.3	58.2	-	138.8	82.5	372.8
1988	100.6	153.8	0.2	524.9	84.5	864.1
Total	491.0	221.7	1.4	954.4	415.0	2082.1
% share	23.6	10.6	0.0	45.8	19.9	100.00

Source: Office of State Committee for foreign Economic Relations (memo: Figures for grants are very much understated when compared to that reported by DAC countries.)

As is evident from the table, total grants from all sources amounted to 2082 million birr during the specified period. Of this total, bilateral countries (west and east) accounted for 65.7%; contributing the largest share. The share of western countries is however more than two-fold of the socialist countries.

Multilateral donors, on the other hand, had lesser role contributing the remaining 34.3% of the total grant. The United nations and the European Economic Commission are the two most important sources of multilateral aid which accounted for 23.6% and 10.6% of the total, respectively.

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[35] *Larger proportion of grant from socialist countries is in the form of technical assistance and the amount given here is reported to be expert estimates.*

An important factor worth noting here is the fact that, as is true for loans , the conditions with which grants are received differs from source to source. Prima facie, bilateral grants may seem to have been received on similar terms as those from multilateral sources. However, the records of these two sources show to have a wide margin of differences in their respective donations.

Suffice it to mention the following points as an illustration. Grants from socialist countries have had higher components of training that should take place in the donor country. Likewise,a sizeable part of western assistance that is particularly related with acquisition of equipment and machinery has generally tended to be tied to the donor country.

Comparatively, the quality of assistance in the form of grants extended from the United Nations and EEC is on better conditions. Thus the quality of assistance from bilateral countries has been relatively unfavourable on these considerations. Furthermore, there are also other relevant consequences related to the quality of assistance an issue which we consider in the following section.

3.3: Fiscal dimension of external finance

In the previous chapter, it was shown that even though domestic revenues have increased, the total public expenditure has grown more quickly with a resultant wider fiscal deficit. It is worth reminding capital outlay has been the most rapidly growing element in government expenditure. As summarised in Table IX , the government had to rely on foreign and domestic sources

as the budget deficit continued to increase.

Table IX:

Fiscal Balance and its Financing
Periodic-annual-averages* (in million Birr)

	75-79	80-82	83-85	86-88
I. Current surplus/deficit	-87.5	-56.3	-227.2	-285.8
II. Overall Deficit	-396.1	-610.7	-1349.0	-1165.7
Financed By:				
1. External Source:	211.2	466.6	703.7	771.7
Net Loans	106.8	257.9	322.3	425.6
Grants	104.4	208.7	381.4	346.1
2. Domestic Sources:	184.9	144.2	645.3	394.0
III. Current Account Deficit	-225.6	-592.3	-810.7	-955.7

Source: National Bank of Ethiopia, in World Bank(1990), Ethiopia's Economy in the 1980s and Framework for Accelerated Growth ,March, p.152.
*NB:Periodic-average-figures denote total values for all years in the given period divided by the number of years contained in that period.

During 1983-85, the annual average budget deficit jumped to a high record of 1349 million Birr, and external financing in the form of loans and grants increased more than threefold from the 1975-79 figure. Besides, external sources as against domestic sources, had much higher importance in financing the budget deficit as depicted in the table.

Examination of the evolution of the fiscal deficit reveals that it has been widening along with a deteriorating current account deficit. The causal linkages between these two balances is however mixed and difficult to determine.

On the one hand, as the government runs large deficit, it has to resort to external sources in view of the limited alternative from domestic sources. On the other hand, such

external resources are future liability with conditionalities attached to them. This conditionality may generate additional expenditures of government budget as a result of the local fund stringent attached with foreign assistance.

Apparently, some of the investment in capital equipments and economic infrastructure will have been funded by foreign assistance. Such loans and outright grants from the rest of the world are often attached to considerable strings of the matching fund requirements.

Consequently, the increase in foreign financed development projects and programmes will have to be attended with higher government expenditures. Since the degree of conditionality of grants and loans vary from source to source, so will their budgetary implications.

Thus, the structure of aid is crucial in understanding the behaviourial response of the fiscal stance.[36] In this perspective, the structure of foreign aid received by Ethiopian government affects spending in two ways. First, loan assistance from bilateral sources has harder terms that is hazardous to the government budget as higher interest rates are applied and repayment will have to be made in short period of time. Second, assistance from multilateral development banks are basically attached to closed-end matching structure where the government is required to share the total costs of a particular investment project.

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[36] *P.Cashel-Cordo and S.G. Craig (1990), "The public sector impact of international resource transfers", Journal of Development Economics, Vol. 32, p.36.*

It is also the case in Ethiopia that the fiscal dimension of external assistance extends to affect the revenue side of the government budget. Foreign financed development projects notably large-scale investments in major industries and infrastructures are expected ultimately to contribute to government either through increased tax revenues or surplus transfers. An important point worth noting , however, is the pace and timing of investment expenditures and the anticipated returns from these projects do not coincide. Although there may be high returns, these returns are often long delayed. Therefore, the maturity structure of foreign aid also affects the government budget.

Hence, as all the ODA is disbursed directly to the central government or public enterprises (whose ownership and administration is still under the government) , the budgetary impact of aid is central to the understanding of the specific links between foreign aid and development.[37]

On this rationale, the model specified in the following chapter consists the public saving (revenue less expenditure) as one of its main features in a strive to determine the net outcome of an aid dollar on the budget and thereby on the whole economy.

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[37] *Ira N. Gang and Haider Ali Khan (1991), "Foreign aid, taxes , and public investment", Journal of Development Economics, Vol.34. pp.335-369.*

CHAPTER IV: EMPIRICAL WORK

As discussed in chapter two, Ethiopia's sluggish growth rate since the 1970's is mainly attributable to the declining rate of savings that resulted from various hostile economic and non-economic factors. The combined effect of drought, war, demographic factors, structural rigidities, deficiency of technology and its know-how operated to reduce the domestic saving rate which in turn reduced investment and thereby the growth rate of output. As a consequence of the reduced income, the propensity to save has been too low to allow for increasing investment by restraining consumption. In other words, the overwhelming majority ekes out a meagre existence that falls below what is conventionally termed as the 'poverty line'.[38] The economy is therefore confronted with low investment due to low savings which results from low income that again leads to low investment. Thus it is not a hyperbole if we stated the situation as one of Nurks's 'vicious circle' of poverty.[39]

In addition to the incapacity to raise adequate domestic resources, the level of economic development was inhibited by the inability to supplement the available domestic resources with external resources. The export sector, whose structure is highly agricultural and undiversified (dependent on coffee) has been adversely affected by weather changes and unfavourable world markets. On the other hand, the steadily growing ambition for key production inputs and capital goods coupled with the 1970's increase in oil prices has worsened the external disequilibrium.Thus, investment has also been foreign exchange constrained as the capacity to import has been deteriorating.

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[38] *'poverty line ' is a situation where a population is able to meet only its bare subsistence essentials of food, clothing, shelter in order to maintain minimum levels of living. For definition, see Todaro(1989), pp.613-632.*

[39] *R. Nurkse (1953), Problems of Capital Formation in Underdeveloped Countries, (Oxford:Blackwell), P.4.*

As a result, the economy is faced with both internal and external disequilibrium situations. Provided that the possibility of domestic resource mobilization and structural change in the short-run is remote, the dual role of aid flows as encapsulated in two-gap models is therefore an area of important concern now than ever in the Ethiopian case.

Notwithstanding the case against it, the two-gap model has been widely utilized in development economics to analyze the interactions between the savings-constrained and foreign exchange in determining the growth rate of a developing country.[40]

It is commonplace for most of the dual-gap models constructed for developing countries to assume a foreign exchange constrained growth. The underlying premise of such assumption is that the potential saving rate is high enough but unrealized owing to the rigid structure of domestic production which can not adequately cater for the required investment goods that will have to be imported otherwise. Thus, what could have been saved is consumed or 'wasted'.

In contrast, I argue that this does not hold in the Ethiopian context. Instead I assume the economy more likely to be saving constrained.Some recent empirical findings have also shown that very poor countries are in the saving rather than in the foreign exchange constraint regime.[41] As has been mentioned in the previous section, the Ethiopian economy is a war-ravaged economy thereby making the generation of higher savings impossible at present.The series of economic disruption as a result of such hostilities has not only absorbed a substantial amount of government expenditure but also reduced the level of private savings as a result of halting production process in large part of the country. Besides, recurrent drought had compounded the problem of inducing higher saving and the structure of the economy is dominantly characterised by a very

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[40] *The principal references of the two-gap model are Chenery and Bruno(1962), Chenery and Strout(1966).*

[41] *For example, S. Ahmad had found the Bangladesh economy, which is at comparable level of economic development with Ethiopia, to be saving constrained. See S. Ahmad (1983),and (1990).*

narrow base of industrial sector - thus being incapable of producing the required consumer goods let alone capital goods.The combined effect of these and the rapidly growing population had thus an adverse impact on the rate of potential savings. Therefore, on this ground,it is plausible to assume that in recent years as well as in the foreseeable future, growth would be saving constrained.

In fact investment resources that are designed to guide the allocation of investment in directions that would increase the overall output per unit of capital might possibly reduce the investment-saving gap and hence it might be argued the trade gap is rather likely to be the dominant limitation in the future. However, such policy measures deem not virtually be effective in the short-run period owing to the structural inflexibilities we mentioned earlier.

The issue boils down therefore, given the specifically low potential rate of marginal saving, we can reasonably estimate the order of magnitude of these two-gaps as being predominantly saving-investment one. True, ex post these gaps will be equal by definition, but there is no reason that they should be so in an ex ante sense. Though it is not uncommon to assume either of the gaps is binding merely for analytical reasons, they are in essence independent of each other for purposes of analyzing their consequences. In other words, "these are" rather "two sides of the same coin and, unfortunately, they tend to reinforce each other"[42].

The attempt of this paper is therefore to estimate the effectiveness of aid in relieving the critical problem of capital accumulation in basically saving constrained macroeconomic regime. To do so, the saving function has been related to aid flows via the public sector.

In an effort to understand the specific links between foreign aid and growth, and to analyze future growth possibilities based on past growth pattern, three-step procedures

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[42] *E. Chole, 'The Ethiopian Economy' in Beyond the Famine; IIRD, January 1988, p.43 (unprocessed).*

have been followed. First, the relevant model is described; second, estimation of the basic model is carried out and third projection of aid requirements depending on alternative growth paths is simulated and analyzed.The model was adapted from various earlier works and is constructed in such a way that it would describe the economy under consideration.

While the general framework is not basically different from Chenery and his collaborators, the major modification follows the recent work by Levy (1984) who has incorporated the saving function as disaggregated into private and public sectors. Early models have been criticized as faulty for treating savings as a residual other than a functional variable which made it difficult to understand its response to aid flows. As argued earlier, the saving function is central to the understanding of the aid-growth relationship and hence is embodied in the model.

4.1 Description of The Model

The model specified has six structural and behaviourial equations with six definitional and identities. Assuming foreign aid could be estimated by the current account deficit before official transfers and taking investment as a residual instead of the usual practice of assuming saving as residual, the predominance of the savings gap is reflected and the model is set for solution.

In specifying the production function; though it would have been more appropriate to decompose capital (K) and labour (L) into at least two sectors; namely agricultural and nonagricultural , the scarcity of data has set a limit. The methodology employed to arrive at the level of labour, depreciation and the capital stock data are presented in appendix 4.1.

Production Function

(1) $Q_t = Q_o e^{\pi t} K^{\sigma}_{vt} L_t^{\beta}$; to be linearised by log-transformation.

The specification of the production function is in accord to the Cobb-Douglas production function but in its unrestricted version where the respective elasticities of capital and labour (given as σ and β respectively) are left unconstrained to take any value. As the constrained version of the production function assumes perfect competition and constant returns to scale, it is obvious that such perfect market condition is irrelevant to the Ethiopian economy. For this reason, the unrestricted version would be more appropriate. Also assumed in this function is a neutral technical progress ,that would affect output leaving the rate of substitution between factors unaffected. The estimated annual rate of technical progress is thus given by the index (π).

Moreover, this index could be interpreted as constituting the "catch all" residual that absorbs the combined effect of other unexplained variables which influence the rate of growth of output - other than capital and labour.[43]

In the production function, though labour is embodied as a complementary input, growth is limited by the availability of capital. In other words, the labour supply equation is dropped from the system as it is plausible to assume labour demand is always met by its supply.This conforms to the relative abundance of labour which implies that there will be unemployment or that "suppliers will freely supply all labour demanded at the fixed wage".[44]

Savings Function

The savings function has been disaggregated into two components: private and government. The private saving is influenced by past saving behaviour and current additional income from the sector. On the other hand, government saving is associated with the total revenue from taxes, military expenditure and foreign aid. Thus:

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[43] J.M. Katz, Production Functions, Foreign Investment and Growth:A Study Based on the Aggregate Manufacturing Sector 1946-1961,Amsterdam:North Holland Publishing Co., 1969,p.28.

[44] S. Robinson, 'Multisectoral Models', in Handbook of Development Economics, Vol.II,ed.H.Chenery and T.N. Srinivalan, North Holland:Elsevier Science Publishers B.v., 1989,p.923.

(2) $S_{pt} = b_o S_{pt-1} + b_1 CY_{pt}$

(3) $S_{gt} = T-G$

(4) $T_t = T_o + {}_{t1} Qt + {}_{t2} Ft$

(5) $Gt = G_o + {}_{g1} W_t + {}_{g2} F_t$

(6) $Ypt = \Theta Ydt + \Sigma_t$

(7) $YD_t = Q_t - T_t$

Capital Formation

In order to link investment with the production function equation, capital (K) and depreciation (R) have been expressed in terms of the average annual capital stock (Kvt) to which they correspond at each point of time.

(8) $Rt = \mu K_{vt} + \Sigma_t$

(9) $K_t = K_{t-1} + I_t - R_t$

(10) $K_{vt} = 1/2\ (K_t + K_{t-1})$

Saving and Trade Gaps

(11) $S_t = S_{gt} + S_{pt}$

(12a) $I_t^* > S_t$;implies that the required level of investment is greater than the potential level of savings.

(13) $M_t^* > X_t$; yields the trade gap where the capacity to import (given by the level of X_t) falls short of the minimum level of import requirements (M_t^*) and hence additional imports over and above the capacity to export should come from external sources in the form of loans and grants.

Assuming the Investment-saving is operational, inequality (13) could be dropped off and equation (12a) could be expressed as equality of the form:

(12b) $I_t = S_t + F_t$

Worth mentioning here is that the values of all the monetary variables should be expressed in real terms in order to isolate the influence of relative prices from the model. For this reason, all the data given in current prices were deflated by appropriate indices taking 1980 as the base year. The nominal values of

Q,CYP,YP,and YD were thus deflated by GDP deflator index (YIN) while I,G,T,W,R,K,Kv,and SP were adjusted by domestic absorption deflator (ABIN) to arrive at their real values. Likewise, the value of F in constant prices was arrived at by adjusting it by import price index-US $ based -(MIN).

However, since the closure equation (12b) holds only when the variables in this equation are meant nominal values;it should be expressed as:

I*ABIN = S*ABIN + F*MIN;

which , the appropriate mathematical formulation of the accumulation balance could be derived and written as:

(12) It = St + Ft (MIN/ABIN) ;and hence the model is made computable.

Therefore, the model is characterised by a multiplier effect in the keynesian tradition where changes in aggregate demand lead to changes in aggregate supply which in turn would lead to increased savings and thereby to increased investment. In symbolic terms the chain of reaction can be shown to be transmitted as (↑Ft → ↑It → ↑Kvt → ↑Qt → ↑St → ↑It...).
Thus an exogenous injection in the form of aid would induce higher investment than without aid and hence higher income. Alternatively, with fixed saving rate,the level of income increases through a Keynesian multiplier process, and so generate the increased savings necessary to match the higher level of investment.

Exogenous Variables

(16) $L_t = L_t$
(17) $W_t = W_t$
(18) $F_t = F_t$

Notations Used

Q = GNP

π = index of neutral technical progress

K_v = the average effective capital stock (see equation 10)

L = the total labour force

σ and ß = denote the elasticity coefficients of capital and labour, respectively.

S_p = private savings

Y_p = private disposable income

S_g = government savings

W = defense expenditure

F = external assistance as measured by the current account deficit before official transfers.

T = Total Government revenue of domestic origin including taxes, fees and other charges.

G = Total Government recurrent expenditure

Yd = Disposable income

I = Gross investment (flow concept)

M = Import of goods and services

K_t and K_{t+1} = levels of capital stock at consecutive years.

R_t = Depreciation allowance.

S = National saving

Tr = Time trend; T1=1970

CYP = Change in private income(YPt-YPt-1)

YIN = GDP deflator index

ABIN = Domestic Absorption deflator index

MIN = Import price index(US $ -based).

4.2 Estimation of the Model

In estimating the model, various techniques ranging from single to simultaneous methods were used. Apparently, the functional relationships specified depict that there is an interdependence between the various endogenous variables which necessitate the application of simultaneous estimating techniques in estimating the model. If single equation method is used, then the feed back effects of such variables would not be captured in

the system.

However, in addition to simultaneous equation techniques, Ordinary Least Square (OLS) ,which is in the category of single estimation methods was applied for the following reasons:

1) Hitherto, most of the empirical works that attempted to test the relationship between foreign assistance and other aggregate variables have used OLS methods. Thus the estimates found here on similar ground may serve the purpose of comparisons with earlier works.
2) Ordinary Least Square estimates capture only the direct effect of the explanatory variables leaving the indirect effect of such variables while simultaneous estimating techniques take into account both effects (direct and indirect). Therefore, the extent to which these two estimates differ may give clues to the magnitude of the indirect effect. For these reasons, the OLS estimates are presented together with estimates obtained using simultaneous equation techniques in appendices 4.2 to 4.4.

Yet, application of OLS directly to the structural equations of a simultaneous system is sure to produce biased estimates of the parameters.[45] Thus, the estimates from this method are not expected to generate an appropriate result for the system and hence Two-Stages Least Squares was applied to correct for such biases. The results of these estimates are displayed in the above mentioned appendix.

Still, the 2SLS has also its own limitation. Though this method solves the problem of simultaneity bias, it fails to take into account the possibility that the 'error terms' are correlated. To get rid of this problem, it would be proper to use Zellner and Theil's Three-Stages Least Squares(3SLS) method.[46] In such system of equations, it is almost certain that the residual

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[45] *A.H. Studenmund and H.J. Cassidy,(1987),Using Econometrics, A Practical Guide, Boston:Little, Brown and Company, p.344.*

[46] *Zellner and Theil, (1962),"Three-Stage Least Squares:Simultaneous Estimation of Simultaneous Relations",Econometrica,pp.54-78.*

of any equation would be correlated with the residual of any other equation. As pointed out earlier, the economy under consideration was affected , *interalia* ,by drought, famine, war ,etc., non of which were explicitly stated in the model except as residual terms. Thus, it is more plausible to expect that each of these random variables appear in more than one equation and are correlated. Thus, 3SLS method would be more legitimate as it treats also the contemporaneous dependence of these random terms of the various equations. For further reference see the results obtained using this method as shown in appendix.

As exemplified in the appendices, the magnitude of the coefficients obtained by OLS method are quite different from those obtained using simultaneous estimating techniques.Besides, the estimated parameters using the latter method have been found to be in accord to the theoretical expectations. Of the two simultaneous methods, however, 3SLS method obtains statistically more accurate and efficient parameter estimates because it utilizes knowledge of all the available information in the estimation and therefore has a smaller asymptotic variance-covariance matrix. It has been observed that all the regression coefficients without any exception are significantly different from zero as indicated by their respective t-statistics. Moreover, the 'overall fit' of the estimated equations has been shown to be good as measured by the F-statistic and the adjusted R^2. However, it is noted that there is only one structural equation (private saving) that has statistically poor fit in the estimated model. Though two of its coefficients are significantly different from zero at over 90% confidence interval, it has low adjusted R_2 of 11%. Survey of the residual plots for this function reveal that during 1974 and 1985 (years that coincide with severe drought) there were very deviant outliers indicating the influence of extraneous factors other than taken in the model. Besides, there is no pretence to deny the possibility of specification problem in this specific function. In any case, in as much as all foreign assistance is associated with government savings rather than private savings, the link between (F) and (Sp) is to be very marginal and would not affect the very feature

of the results. Reference is made to appendices 4.2 to 4.4 for detailed results.

The estimated parameters for the more important structural equations on the basis of 3SLS are summarised in the following table.

Table 4.1: Estimated Results for 1971-88 using 3SLS

$$(1)\ Log(Q) = \underset{(6.3)}{3.30} - \underset{(-5.3)}{0.019TR} + \underset{(6.8)}{0.098Log(KV)} + \underset{(10.9)}{1.69Log(L)}$$

$$\bar{R}^2 = 0.94 \quad F^* = 86.2$$

$$(2)\ Sp = \underset{(2.4)}{0.29Spt\text{-}1} + \underset{(5.8)}{0.04CYP}$$

$$\bar{R}^2 = 0.11$$

$$(4)\ T = \underset{(-20.4)}{-3236} + \underset{(28.4)}{0.59Q} + \underset{(8.9)}{0.35F}$$

$$\bar{R}^2 = 0.88 \quad F^* = 61.5$$

$$(5)\ G = \underset{(14.8)}{601.3} + \underset{(21.8)}{1.75W} + \underset{(3.95)}{0.26F}$$

$$\bar{R}^2 = 0.85 \quad F^* = 50.3$$

* As is always the practice, the t-statistics of the coefficients are listed below each coefficient in parenthesis. $\bar{R}^2$ denotes the value of the coefficient of multiple determinationadjusted for degrees of freedom while F^* denotes the variance ratio.

In addition to the statistical tests just mentioned, the descriptive validity of the model could be tested "by comparing the predicted values of the endogenous variables with the values actually observed during the sample period"[47] 1980-88. The estimated and the actual values of the most important endogenous variables are thus presented in the following table.

[47] I.Adelman and H.B. Chenery,(1966),'Foreign Aid and Economic Development: the case of Greece', The Review of Economics and Statistics, Vol.48, No.1, p.5.

Table 4.2: Actual and predicted values of the most important variables

For the period 1980-1988

	Output		Revenue		Expenditure		Investment	
	actual	predicted	actual	predicted	actual	predicted	actual	predicted
1980	8512.40	8727.15	1764.40	2010.71	1858.80	2004.97	977.83	1212.79
1981	8660.84	8747.53	1910.77	2027.43	1906.32	1993.59	1012.87	1264.00
1982	8796.75	8780.50	2048.46	2156.18	2109.30	2145.94	1209.77	1554.86
1983	9237.39	8808.83	2226.63	2171.23	2564.05	2157.64	1295.97	1549.69
1984	9023.53	8834.82	2264.97	2235.33	2237.67	2233.38	1539.58	1676.88
1985	8307.69	8853.78	2535.18	2182.48	2704.55	2195.05	1875.50	1478.56
1986	8916.43	9332.71	2754.21	2475.60	2708.48	2267.35	1802.84	1747.06
1987	9747.50	9823.47	2696.24	2864.30	2618.21	2629.44	1924.48	2081.65
1988	9900.77	10323.61	2798.68	3214.66	2491.82	2939.63	2461.25	2302.96

Source:see Appendix 4.6 ,the actual and predicted values for all other variables is also shown in this appendix as baseline scenario.

Following Adelman and Chenery's (1966) procedure, the predicted values were obtained by solving the estimated system of equations on the assumption that all the disturbance terms (other than those which arise as a result of fluctuations in the exogenous variables) will take the value of zero. As argued by Adelman (1966:7),

> this procedure provides a more stringent test of the performance of the model economy, in as much as it tends to reveal systematic biases which may arise because of the cumulative effects of estimation errors introduced by the nature of the simultaneous and dynamic structure inherent in the model.

As shown in the table, the comparison of the actual and the predicted values of the variables attests that the model describes fairly well the time paths of these variables and there is hardly any evidence of systematic bias that attenuate the descriptive validity of the model. Of course, there are some observations which merit cautious considerations. Even though the predicted values for many of the endogenous variables did not in most cases diverge by more than 10% from their corresponding actual values, there is some deviation in some instances, notably for investment and saving. These occurrences, as might be seen from the graphic presentation in Appendix 4.5, coincide with the abnormal years of 1977 and 1985. It is noticed that during the former year, the country was waging a fully-fledged war with a

neighbouring country while in the latter year there was grave drought that had a large coverage of the country. For the rest of the variables, there is barely any pronounced discrepancy between the actual and the predicted values and hence the descriptive validity of the model is still passable.

4.3 Interpretation of Results

The estimated results displayed in Table 4.1 shed important new insight into the impact of foreign aid on the public budget and thereby on government saving. The results stand in sharp contrast with the hypothesis that aid is systematically substituted for public saving by releasing the 'tax effort' of the government.

Till now, however, there is little empirical evidence that supports such a relationship between foreign aid and budgetary deficit, except the attempt made by Heller (1975) who only compared aid flows to indices of tax effort for recipient countries.[48]

The contribution of this paper is therefore its attempt to empirically test whether this claim is valid or not. To do so, the specification of the model addresses to the basic issues of the impact of foreign aid on macroeconomic variables by linking it to the variables that define government saving (i.e. taxation and current expenditures) instead of the aggregate saving variable. Though the hypothesis of aid supplants versus supplements saving implied the decline or the rise of government saving by way of discouraging or encouraging tax revenue, earlier works were faulty in relating foreign assistance to aggregate saving in their enquiry to its macro impact.

It is not surprising therefore that the findings in this paper are different from those implied in the simple regression of aid on saving. According to the presently used model, the impact of foreign assistance on domestic savings depends upon the

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[48] A.A. Tait, W.L.M. Gratz, and B.J. Eichengreen, (1979), International Comparisons of Taxation for Selected Developing Countries, 1972-76, IMF Staff Papers, Vol.26.

combined responses of domestic revenue(T) and Government expenditure(G) to the variation in the level of aid(F). There is a positive and significant relationship between tax revenue and foreign aid. The marginal tax rate on income derived directly and indirectly from foreign aid is measured at 0.35. Therefore, the issue of 'tax complacency' as a result of any change in the level of foreign assistance becomes an effete argument and the results rather suggest foreign aid to have promoted government revenue.

On the other hand, the response of government spending to variations in the level of foreign aid has been found to be positive with a statistically significant magnitude of 0.26. Such a positive response of expenditure is plausible since the bulk part of grants and loans received are supplemented (directly or indirectly) with the 'matching fund' of the government.[49]

Hence,the net effect of foreign assistance on government saving could be measured by the extent $\delta T/\delta F$ exceeds over $\delta G/\delta F$ which in this case is calculated as 0.35-0.26 = 0.09. Accordingly, the overall impact of one Birr aid is expected to raise the level of domestic saving by this amount since saving is simply the sum of private saving and government saving. In other words, the former is not directly influenced by aid as virtually all development loans and grants are related to the government budget in the Ethiopian economy.

Another area worth paying attention to is the estimated parameters of the production function. These parameters as presented in Table 4.1, reveal an interesting picture with regard to the general performance of the economy. Obviously, the fit of the production function is remarkably good and yields plausible elasticities of output of 0.1 and 1.7 with respect to capital and labour,respectively. However, the total factor productivity as indicated by the technical change index turned out to be negative: -0.01. As discussed in the first section of this chapter, this coefficient is of far amount importance which

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[49] *For a lucid analysis as how 'matching fund' requirements of a recipient country are related with grants and loans of donor countries, see P. Cashel-Cordo and S.G. Craig,'the Public Sector Impact of International Resource Transfer', Journal of Development Economics, 32 (1990), pp.17-42.*

captures the influence of other residual factors (other than partial impact of labour and capital) and more importantly, the influence of the efficiency with which all inputs were combined in the process of production. According to this finding, therefore, the efficiency with which resources were utilized in the past couple of decades had a negative consequence on the level of total output. Such disappointing result is not surprising in view of the prevalent political instability, recurrent drought, and other adverse phenomena which in some way or another affected the allocation, management and organization of resources. Nevertheless, detailed investigation of how such inefficiency was related to allocation, managerial, technical or some combination of all is beyond the scope of this paper and is deferred to further research work. Aside from this, simulation exercises were run under various assumptions to which we turn now.

4.4: Simulation Exercises

In order to determine the effects that would have resulted from utilization of different levels of external capital(F), the estimated parameters were used to perform a backcast simulation for the period 1971-88. In addition, the impact of changes in military spending(W) were simulated and contrasted on similar basis. Next, the results of the simulation run under alternative assumptions were compared with the baseline scenario(given in appendix 4.6).

In consequence, it was noted that the simulation exercise has invariably produced a consistently varying levels of all the endogenous variables. However, attention is focused here only to three important ones; namely output, saving and investment and the complete result for all the variables is presented in appendix 4.7 for further reference.

The effect of an increase (decrease) in foreign assistance has resulted in a uniform increase (decrease) in output, saving and investment. On the other hand, an increase (decline) of military spending has entailed a fall (rise) in these same

variables.

Alternatively, the productivity of foreign assistance that was actually forthcoming may be measured by the difference between the cumulative incremental values of the simulated and the baseline scenario expressed in percentage terms.Mathematically,this could be spelled out as:

$$\frac{\Sigma Qz_{it} - \Sigma Qb_{it}}{\Sigma Qb_{it}} * 100$$

; Where Qz denotes the value of simulated output and Qb the value of baseline output at each successive years.

The different scenarios and their impact on key variables is summarised as in the following table while appendix 4.6 gives the detailed results.

Table 4.3

Summary of Simulation Results

Scenario	% Cumulative Change in		
	Output	Saving	Investment
1. An increase of F by 25%	+0.38	+2.93	+10.50
2. If F were Zero	-1.82	-13.45	-43.13
3. When W declines by 25%	+0.74	+27.44	+18.04
4.If W were Zero	+3.13	133.87	+87.97
5. An increase of f by 25% and a simultaneous decline of W by 25%	+1.08	+30.16	+28.93

Note that + = increases and - = decreases.

Accordingly,(and as summarised in Table 4.3), an increase of F by 25% has resulted in an increase of 0.38% in output, 2.93% in saving and 10.5% in investment in the first scenario.In the second scenario, F was equated to zero and the result has been a decline of 1.82% in output, 13.45% in saving and 43.13% in investment. On the contrary, a decline of military spending (W) by 25% has led ,as would be expected, to a rise in output, saving and investment by 74, 27.4, and 18.0 percentage points, respectively, in the third scenario. The remaining two scenarios do reveal similar results that output responded positively to changes in the level of foreign aid and negatively to changes in the level of military expenditure as the results in the table

(Table 4.3) might speak for themselves.

In a nut shell, the simulation results consistently conform with what have been discussed in the preceding section. Consequently, the empirical findings suggest that the impact of aid on the Ethiopian economy has been positive as opposed to that suggested by the counter hypothesis.

4.4 Concluding Observations

This paper has attempted to contribute to the debate regarding the impact of aid on developing countries by trying to resolve the limitations previous studies has faced. Unlike most of the earlier works, the set of data used has some peculiarities since it is a time-series for a single country and hence avoids the problem of interpreting cross-country results. The pooling of cross-country data across countries and the use of inappropriate econometric techniques is the major limitation of earlier studies. Besides,I have tackled the specification problem by linking foreign aid to the government saving and I have used simultaneous equation model to attack the simultaneity problem.

The results obtained are at variance with those implied in earlier empirical works. The results show that grants and loans have stimulated domestic revenue and increased expenditure of the government. Their net effect, which is more important, has promoted government saving and thus domestic savings.

The simulation results furthermore illustrate that the level of output has been consistently higher with aid than it would have been achieved without aid. The productivity of foreign assistance according to the results has therefore been found to be positive rather than negative.

The results also give indication that technical deceleration as opposed to technical progress has acted as a detriment factor to growth.Such technical deceleration which is associated with the efficiency with which total factors are organized and utilized might have been the main cause for the stagnation of the economy during the last two decades. Hence one may even suspect that the effectiveness of aid might have been tempered by the

adverse impact of inefficient resource allocation that are rooted in the economy at large with a wide margin of structural interdependences.

Therefore, it could tentatively be concluded that government effort should be directed to the reorganization of resources from lower -productivity to higher-productivity so as to improve the level of efficiency and foreign assistance may play a significant role in such an effort in view of the limited domestic resources available.

Appendix 4.1

Methodology and Data

The time series data are collected from different , but presumably reliable, sources. Data for Q, I, F are readily available from the World Bank diskettes,from which also Y_p ,S_g and S_pt have been computed as well. The total labour force was derived from the proportion of active population (between the ages of 15 and 64) shown in the World Bank's World Social Indicators diskette.The level of government spending on defense is available from two sources: Swedish International Peace and Research Institute ;and from annual statistical handbooks of the US arms control and Disarmament Agency (USACDA).

However the level of capital stock and its replacement,as in other studies, will have to be estimated from an accepted formula. Thus the following formula has been applied:
$I = (\delta + \Gamma) K$;where I denotes gross investment, δ is the coefficient of annual depreciation, and Γ is the annual growth rate of the capital stock.
Tentatively , Γ could be estimated in either of the following ways:
1) It can be represented by a growth rate of GNP during a selected stable period;
2) It could be determined by the formula [1]

$$\frac{\Sigma I_{\Gamma}}{Q_t - Q_{o+1}} = \frac{\Sigma I_{\Gamma}}{Q_{1988} - Q_{1971}}$$

; in both estimates, the result was close to about 3 points.

With regard to estimation of the depreciation rate, I have used the rate estimated for Egypt[2]. This rate was given as 2.5% and 8% for agricultural and non-agricultural sectors,respectively. Though the former may reasonably be used as a prxy, the use of 8% rate for non-agricultural sector might underestimate the corresponding depreciation rate in the Ethiopian case. This is so because the rate is believed to be very high in this particular sector due to higher maintenance costs associated with obsolete technology. Thus I assumed it to be 10%. The aggregate depreciation rate could therfore be arrived at by taking the weighted average of the respective sectors according to their importance.The share of agriculture is about 50% of the total production while the remaining balance is accounte for by other sectors.Accordingly the estimated aggregate depreciation rate for the whole economy was estimated to be about 4.8%. Thus (δ+Γ) was totaly estimated as 7.8%.

Finally, the determination of (δ+Γ) enables us to calculate the initial capital stock and its time path was computed thence from the annual depreciation and gross investment.

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[1] *This has been ,for instance,used by I. Adelman and H.B. Chenery,'Foreign Aid and Economic Development: the case of Greece', the Review of Economics and Statistics, 1966,Vol.48,No.1, pn.8.*

[2] *Victor Levy,(1984), 'The Savings Gap and the Productivity of Foreign Aid to a Developing Economy:Egypt',The Journal of Developing Areas, 19,p.32.*

Appendix 4.2

SYS - LS // Dependent Variable is LQ
SMPL range: 1971 - 1988
Number of observations: 18
System: ESTM.SYS - Equation 1 of 14
LQ=C(1)+C(2)*TR+C(3)*LKV+C(4)*LL

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(1)	3.5159966	1.8903362	1.8599848	0.084
C(2)	-0.0176222	0.0137001	-1.2862841	0.219
C(3)	0.0825595	0.0543579	1.5188119	0.151
C(4)	1.6573034	0.5702180	2.9064382	0.011

R-squared	0.949212	Mean of dependent var	9.004087
Adjusted R-squared	0.938328	S.D. of dependent var	0.118695
S.E. of regression	0.029476	Sum of squared resid	0.012164
Durbin-Watson stat	1.332524	F-statistic	87.21794

SYS - LS // Dependent Variable is SP
SMPL range: 1971 - 1988
Number of observations: 18
System: ESTM.SYS - Equation 2 of 14
SP=C(6)*SP(-1)+C(7)*CYP

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(6)	0.2707715	0.2395710	1.1302353	0.275
C(7)	0.0399753	0.0132754	3.0112221	0.008

R-squared	0.165907	Mean of dependent var	778.5773
Adjusted R-squared	0.113776	S.D. of dependent var	239.4290
S.E. of regression	225.3972	Sum of squared resid	812862.5
Durbin-Watson stat	2.158782		

SYS - LS // Dependent Variable is T
SMPL range: 1971 - 1988
Number of observations: 18
System: ESTM.SYS - Equation 4 of 14
T=C(8)+C(9)*Q+C(10)*F

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(8)	-2972.6495	783.24302	-3.7953093	0.002
C(9)	0.5493985	0.1072204	5.1240098	0.000
C(10)	0.4100444	0.2679392	1.5303634	0.147

R-squared	0.892294	Mean of dependent var	1715.286
Adjusted R-squared	0.877934	S.D. of dependent var	709.4001
S.E. of regression	247.8502	Sum of squared resid	921445.9
Durbin-Watson stat	1.153105	F-statistic	62.13423

SYS - LS // Dependent Variable is G

SMPL range: 1971 - 1988

Number of observations: 18

System: ESTM.SYS - Equation 5 of 14

G=C(11)+C(12)*W+C(13)*F

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(11)	582.23961	140.91873	4.1317405	0.001
C(12)	1.8280342	0.3933020	4.6479146	0.000
C(13)	0.2066769	0.3282463	0.6296396	0.538

R-squared	0.870453	Mean of dependent var	1732.701
Adjusted R-squared	0.853180	S.D. of dependent var	710.6489
S.E. of regression	272.3005	Sum of squared resid	1112213.
Durbin-Watson stat	1.335428	F-statistic	50.39383

SYS - LS // Dependent Variable is YP

SMPL range: 1971 - 1988

Number of observations: 18

System: ESTM.SYS - Equation 6 of 14

YP=C(14)*YD

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(14)	1.1158131	0.0201279	55.436243	0.000

R-squared	0.491534	Mean of dependent var	7217.826
Adjusted R-squared	0.491534	S.D. of dependent var	776.7518
S.E. of regression	553.8769	Sum of squared resid	5215253.
Durbin-Watson stat	0.201488		

SYS - LS // Dependent Variable is R

SMPL range: 1971 - 1988

Number of observations: 18

System: ESTM.SYS - Equation 8 of 14

R=C(15)*KV

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(15)	0.0499062	0.0004441	112.36541	0.000

R-squared	0.979656	Mean of dependent var	579.1757
Adjusted R-squared	0.979656	S.D. of dependent var	158.5436
S.E. of regression	22.61362	Sum of squared resid	8693.386
Durbin-Watson stat	2.030975		

Appendix 4.3.

SYS - TSLS // Dependent Variable is LQ
SMPL range: 1971 - 1988
Number of observations: 18
System: ESTM.SYS - Equation 1 of 14
Instrument list: C W F SP(-1) TR LL CYP K(-1)
LQ=C(1)+C(2)*TR+C(3)*LKV+C(4)*LL

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(1)	3.6311351	1.9345214	1.8770198	0.082
C(2)	-0.0168625	0.0139655	-1.2074355	0.247
C(3)	0.0781838	0.0565828	1.3817584	0.189
C(4)	1.6294880	0.5787628	2.8154677	0.014

R-squared	0.949188	Mean of dependent var	9.004087
Adjusted R-squared	0.938300	S.D. of dependent var	0.118695
S.E. of regression	0.029483	Sum of squared resid	0.012170
Durbin-Watson stat	1.338579	F-statistic	87.17543

SYS - TSLS // Dependent Variable is SP
SMPL range: 1971 - 1988
Number of observations: 18
System: ESTM.SYS - Equation 2 of 14
SP=C(6)*SP(-1)+C(7)*CYP

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(6)	0.2648500	0.2398308	1.1043204	0.286
C(7)	0.0403169	0.0132910	3.0333951	0.008

R-squared	0.165872	Mean of dependent var	778.5773
Adjusted R-squared	0.113739	S.D. of dependent var	239.4290
S.E. of regression	225.4019	Sum of squared resid	812896.2
Durbin-Watson stat	2.144685		

SYS - TSLS // Dependent Variable is T
SMPL range: 1971 - 1988
Number of observations: 18

System: ESTM.SYS - Equation 4 of 14

T=C(8)+C(9)*G+C(10)*F

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(8)	-3450.1150	842.84237	-4.0934285	0.001
C(9)	0.6152147	0.1154715	5.3278488	0.000
C(10)	0.2757392	0.2829199	0.9746196	0.345

R-squared	0.889589	Mean of dependent var	1715.286
Adjusted R-squared	0.874867	S.D. of dependent var	709.4001
S.E. of regression	250.9439	Sum of squared resid	944592.6
Durbin-Watson stat	1.169101	F-statistic	60.42789

SYS - TSLS // Dependent Variable is G

SMPL range: 1971 - 1988

Number of observations: 18

System: ESTM.SYS - Equation 5 of 14

G=C(11)+C(12)*W+C(13)*F

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(11)	582.24106	140.91870	4.1317514	0.001
C(12)	1.8280267	0.3933019	4.6478976	0.000
C(13)	0.2066830	0.3282462	0.6296586	0.538

R-squared	0.870453	Mean of dependent var	1732.701
Adjusted R-squared	0.853180	S.D. of dependent var	710.6489
S.E. of regression	272.3005	Sum of squared resid	1112213.
Durbin-Watson stat	1.335428	F-statistic	50.39383

SYS - TSLS // Dependent Variable is YP

SMPL range: 1971 - 1988

Number of observations: 18

System: ESTM.SYS - Equation 6 of 14

YP=C(14)*YD

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(14)	1.1158888	0.0201355	55.419108	0.000

R-squared	0.491534	Mean of dependent var	7217.826
Adjusted R-squared	0.491534	S.D. of dependent var	776.7518
S.E. of regression	553.8771	Sum of squared resid	5215257.
Durbin-Watson stat	0.201510		

SYS - TSLS // Dependent Variable is R

SMPL range: 1971 - 1988

Number of observations: 18
System: ESTM.SYS - Equation 8 of 14
R=C(15)*KV

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(15)	0.0498829	0.0004444	112.25313	0.000

R-squared	0.979652	Mean of dependent var	579.1757
Adjusted R-squared	0.979652	S.D. of dependent var	158.5436
S.E. of regression	22.61544	Sum of squared resid	8694.791
Durbin-Watson stat	2.030722		

Appendix 4.4

SYS - 3SLS // Dependent Variable is LQ
SMPL range: 1971 - 1988
Number of observations: 18
System: ESTM.SYS - Equation 1 of 14
Instrument list: C W F SP(-1) TR LL CYP K(-1)
LQ=C(1)+C(2)*TR+C(3)*LKV+C(4)*LL

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(1)	3.2953009	0.5195829	6.3422039	0.000
C(2)	-0.0189130	0.0035811	-5.2813193	0.000
C(3)	0.0984102	0.0143963	6.8358129	0.000
C(4)	1.6860377	0.1551719	10.865616	0.000

R-squared	0.948658	Mean of dependent var	9.004087
Adjusted R-squared	0.937656	S.D. of dependent var	0.118695
S.E. of regression	0.029637	Sum of squared resid	0.012297
Durbin-Watson stat	1.310843	F-statistic	86.22623

SYS - 3SLS // Dependent Variable is SP
SMPL range: 1971 - 1988
Number of observations: 18
System: ESTM.SYS - Equation 2 of 14
SP=C(6)*SP(-1)+C(7)*CYP

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(6)	0.2895521	0.1223430	2.3667244	0.031
C(7)	0.0397591	0.0068796	5.7792448	0.000

R-squared	0.163243	Mean of dependent var	778.5773

Adjusted R-squared	0.110946	S.D. of dependent var	239.4290
S.E. of regression	225.7568	Sum of squared resid	815458.3
Durbin-Watson stat	2.197866		

SYS - 3SLS // Dependent Variable is T
SMPL range: 1971 - 1988
Number of observations: 18
System: ESTM.SYS - Equation 4 of 14
T=C(8)+C(9)*G+C(10)*F

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(8)	-3236.3981	158.55297	-20.412094	0.000
C(9)	0.5859456	0.0206453	28.381578	0.000
C(10)	0.3464827	0.0391137	8.8583561	0.000

R-squared	0.891337	Mean of dependent var	1715.286
Adjusted R-squared	0.876848	S.D. of dependent var	709.4001
S.E. of regression	248.9499	Sum of squared resid	929640.5
Durbin-Watson stat	1.171265	F-statistic	61.52042

SYS - 3SLS // Dependent Variable is G
SMPL range: 1971 - 1988
Number of observations: 18
System: ESTM.SYS - Equation 5 of 14
G=C(11)+C(12)*W+C(13)*F

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(11)	601.26653	40.622226	14.801417	0.000
C(12)	1.7526413	0.0804979	21.772514	0.000
C(13)	0.2589045	0.0656162	3.9457432	0.001

R-squared	0.870134	Mean of dependent var	1732.701
Adjusted R-squared	0.852818	S.D. of dependent var	710.6489
S.E. of regression	272.6353	Sum of squared resid	1114950.
Durbin-Watson stat	1.328708	F-statistic	50.25172

SYS - 3SLS // Dependent Variable is YP
SMPL range: 1971 - 1988
Number of observations: 18
System: ESTM.SYS - Equation 6 of 14
YP=C(14)*YD

	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.

C(14)	1.1103647	0.0170808	65.006772	0.000

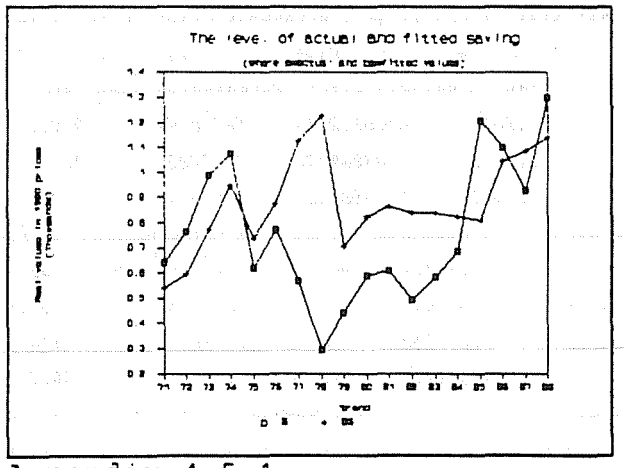
R-squared	0.489343	Mean of dependent var	7217.826
Adjusted R-squared	0.489343	S.D. of dependent var	776.7518
S.E. of regression	555.0692	Sum of squared resid	5237731.
Durbin-Watson stat	0.199068		

SYS - 3SLS // Dependent Variable is R
SMPL range: 1971 - 1988
Number of observations: 18
System: ESTM.SYS - Equation 8 of 14
R=C(15)*KV

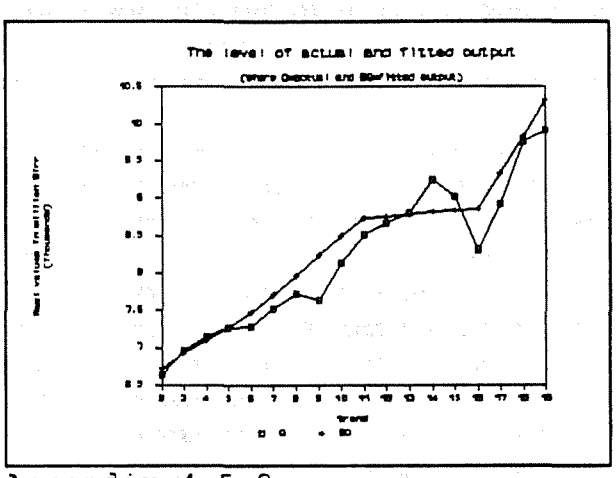
	COEFFICIENT	STD. ERROR	T-STAT.	2-TAIL SIG.
C(15)	0.0497286	0.0001119	444.23214	0.000

R-squared	0.979464	Mean of dependent var	579.1757
Adjusted R-squared	0.979464	S.D. of dependent var	158.5436
S.E. of regression	22.71969	Sum of squared resid	8775.130
Durbin-Watson stat	2.012680		

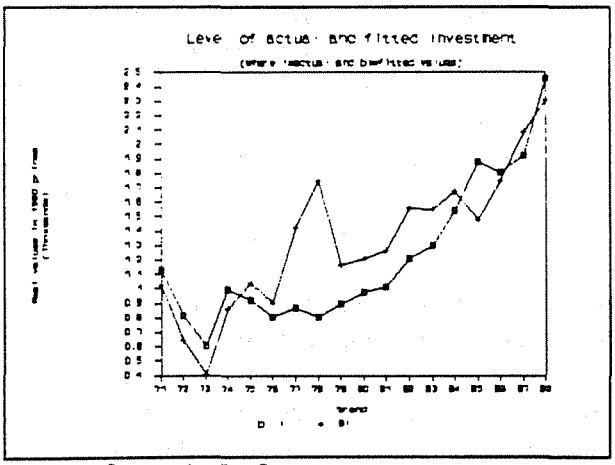
Appendix 4.5



Appendix 4.5.1.



Appendix 4.5.2.



Appendix 4.5.3.

Appendix 4.6 : Baseline solution as solved using the estimated model where the prefix B refer to the base line value of each variable (1971-1988)

obs	Q	BQ	SP	BSP	T	BT
1971	6634.147	6724.403	664.9623	698.0539	806.4732	870.8080
1972	6953.019	6919.853	705.7189	729.1551	872.9346	835.3325
1973	7151.992	7097.998	885.2199	758.0636	955.6735	793.5767
1974	7265.133	7272.582	985.5319	774.9066	956.0314	996.1451
1975	7281.998	7464.505	678.5817	776.2159	1057.967	1240.896
1976	7525.080	7710.780	917.7097	782.8941	1064.568	1291.657
1977	7729.686	7964.793	569.0034	794.0418	1230.983	1532.472
1978	7648.754	8239.517	453.4951	799.4627	1309.679	1770.719
1979	8136.173	8498.367	440.0421	808.3128	1621.314	1901.126
1980	8512.400	8727.148	686.9900	821.8079	1764.400	2010.713
1981	8660.836	8747.530	609.3948	831.1395	1910.770	2027.432
1982	8796.751	8780.502	555.7662	829.7750	2048.456	2156.177
1983	9237.390	8808.834	923.0330	825.7382	2226.633	2171.226
1984	9023.529	8834.815	660.8312	823.4725	2264.968	2235.335
1985	8307.689	8853.783	1378.050	824.3039	2535.175	2182.480
1986	8916.427	9332.705	1054.206	835.9180	2754.212	2475.599
1987	9747.502	9823.470	851.6410	851.9891	2696.240	2864.303
1988	9900.771	10323.61	994.2149	867.7607	2798.678	3214.655

obs	G	BG	YP	BYP	R	BR
1971	826.8704	1026.254	6008.619	6499.607	486.6368	494.0585
1972	811.8798	967.6176	6196.953	6756.035	552.6799	510.6290
1973	853.0756	774.9108	6351.422	7000.202	514.2231	511.3344
1974	863.5252	825.3793	6543.192	6969.130	451.3050	517.2557
1975	1114.888	1279.942	6497.413	6910.472	468.9601	538.2168
1976	1206.186	1196.966	6711.687	7127.562	443.8072	559.2216
1977	1227.944	1200.233	6772.769	7142.217	419.7005	588.5381
1978	1469.416	1339.808	6656.943	7182.721	350.8680	636.8414
1979	1615.644	2000.512	7115.173	7325.335	435.4656	676.5973
1980	1858.800	2004.971	7478.990	7457.689	525.5400	701.4497
1981	1906.319	1993.589	7463.294	7461.755	548.9509	727.5037
1982	2109.296	2145.935	7651.972	7355.412	643.8639	760.5922
1983	2564.053	2157.639	8312.727	7370.161	638.3812	799.0065
1984	2237.671	2233.382	7832.543	7327.824	681.7174	838.5169
1985	2704.550	2195.050	7619.672	7407.574	747.1818	874.3846
1986	2708.476	2267.350	8041.651	7613.884	738.9722	910.2144
1987	2618.205	2629.443	8450.447	7727.203	859.0171	958.9370
1988	2491.818	2939.631	8215.407	7893.524	917.8926	1018.783

obs	KV	BKV	S	BS	I	BI

1971	9755.130	9935.138	644.5651	542.6004	1126.774	1024.809
1972	11049.23	10268.28	766.7737	596.8742	816.0502	646.1519
1973	11030.95	10282.50	987.8179	776.7296	615.3171	404.2289
1974	9572.528	10401.60	1078.038	945.6721	994.9353	862.5684
1975	9514.630	10823.08	621.6608	737.1690	920.3785	1035.887
1976	9259.635	11245.47	776.0917	877.5855	804.8341	906.3279
1977	8542.480	11835.00	572.0425	1126.281	866.2447	1420.483
1978	7715.198	12806.34	293.7579	1230.372	810.9810	1747.595
1979	8075.973	13605.81	445.7122	708.9232	901.5650	1164.776
1980	9954.490	14105.56	592.5900	827.5501	977.8254	1212.786
1981	11015.92	14629.48	613.8463	864.9818	1012.867	1264.002
1982	12422.43	15294.86	494.9258	840.0172	1209.766	1554.857
1983	13075.68	16067.34	585.6137	839.3251	1295.974	1549.685
1984	13544.53	16861.86	688.1285	825.4251	1539.580	1676.877
1985	14730.64	17583.13	1208.675	811.7346	1875.502	1478.561
1986	15415.84	18303.64	1099.943	1044.167	1802.837	1747.061
1987	16500.11	19283.41	929.6752	1086.844	1924.483	2081.651
1988	18213.60	20486.86	1301.074	1142.784	2461.254	2302.964

Appendix 4.7: Simulation runs where the prefix z denote the simulated value of the variables under consideration under each scenario.

Appendix 4.7.1 Scenario One:Simulation run when F increases by 25%

obs	Q	ZQ	SP	ZSP	T	ZT
1971	6724.403	6728.676	698.0539	696.2869	870.8080	915.0819
1972	6919.853	6928.642	729.1551	726.8483	835.3325	844.7502
1973	7097.998	7103.923	758.0636	758.9004	793.5767	764.7826
1974	7272.582	7274.406	774.9066	777.0326	996.1451	990.0156
1975	7464.505	7468.322	776.2159	776.1100	1240.896	1269.007
1976	7710.780	7717.467	782.8941	781.8032	1291.657	1298.066
1977	7964.793	7974.080	794.0418	792.7830	1532.472	1563.398
1978	8239.517	8255.011	799.4627	796.4481	1770.719	1824.595
1979	8498.367	8520.912	808.3128	804.4143	1901.126	1953.823
1980	8727.148	8755.701	821.8079	818.3967	2010.713	2060.812
1981	8747.530	8780.577	831.1395	828.2783	2027.432	2081.359
1982	8780.502	8819.745	829.7750	826.0083	2156.177	2241.092
1983	8808.834	8855.371	825.7382	820.7653	2171.226	2260.021
1984	8834.815	8888.547	823.4725	817.8926	2235.335	2340.573
1985	8853.783	8913.741	824.3039	818.9601	2182.480	2275.373
1986	9332.705	9400.692	835.9180	831.4712	2475.599	2576.315
1987	9823.470	9900.602	851.9891	846.8618	2864.303	2995.658
1988	10323.61	10411.58	867.7607	861.0529	3214.655	3366.689

obs	G	ZG	CYP	ZCYP	R	ZR
1971	1026.254	1057.465	744.8782	700.4336	494.0585	497.2600

1972	967.6176	970.8071	256.4281	300.1709	510.6290	517.2592
1973	774.9108	750.8002	244.1670	283.4160	511.3344	515.6874
1974	825.3793	820.0004	-31.07182	-60.78906	517.2557	518.5757
1975	1279.942	1299.277	-58.65821	-94.46582	538.2168	541.0225
1976	1196.966	1198.826	217.0898	244.3770	559.2216	564.1701
1977	1200.233	1219.276	14.65478	-9.682129	588.5381	595.5485
1978	1339.808	1373.286	40.50382	21.90381	636.8414	649.1132
1979	2000.512	2030.017	142.6132	151.7646	676.5973	695.0659
1980	2004.971	2029.905	132.3535	141.9004	701.4497	725.1192
1981	1993.589	2019.416	4.066405	4.808594	727.5037	755.9207
1982	2145.935	2192.204	-106.3433	-133.8672	760.5922	795.8446
1983	2157.639	2203.618	14.74854	18.52979	799.0065	842.9558
1984	2233.382	2288.493	-42.33691	-52.59912	838.5169	891.8059
1985	2195.050	2238.210	79.75001	100.3696	874.3846	936.4541
1986	2267.350	2312.846	206.3093	206.5303	910.2144	979.8884
1987	2629.443	2693.833	113.3192	89.44775	958.9370	1038.259
1988	2939.631	3014.725	166.3207	155.4009	1018.783	1110.531

obs	KV	ZKV	S	ZS	I	ZI
1971	9935.138	9999.454	542.6004	553.8585	1024.809	1156.620
1972	10268.28	10401.69	596.8742	600.7914	646.1519	662.3871
1973	10282.50	10370.03	776.7296	772.8788	404.2289	307.2529
1974	10401.60	10428.12	945.6721	947.0478	862.5684	843.1695
1975	10823.08	10879.52	737.1690	745.8398	1035.887	1119.237
1976	11245.47	11345.02	877.5855	881.0425	906.3279	916.9705
1977	11835.00	11975.97	1126.281	1136.906	1420.483	1504.658
1978	12806.34	13053.12	1230.372	1247.757	1747.595	1894.285
1979	13605.81	13977.19	708.9232	728.2205	1164.776	1298.037
1980	14105.56	14581.53	827.5501	849.2986	1212.786	1330.843
1981	14629.48	15200.92	864.9818	890.2161	1264.002	1388.991
1982	15294.86	16003.76	840.0172	874.8960	1554.857	1768.446
1983	16067.34	16951.14	839.3251	877.1682	1549.685	1765.118
1984	16861.86	17933.46	825.4251	869.9666	1676.877	1934.281
1985	17583.13	18831.30	811.7346	856.1179	1478.561	1689.651
1986	18303.64	19704.73	1044.167	1094.941	1747.061	1973.559
1987	19283.41	20878.53	1086.844	1148.687	2081.651	2392.197
1988	20486.86	22331.86	1142.784	1213.022	2302.964	2663.248

Appendix 4.7.2 Scenario Two:Simulation run when F = 0.

obs	Q	ZQ	SP	ZSP	T	ZT
1971	6724.403	6707.060	698.0539	705.1134	870.8080	693.5739
1972	6919.853	6883.554	729.1551	738.3489	835.3325	796.9928
1973	7097.998	7073.758	758.0636	754.6751	793.5767	908.4388
1974	7272.582	7265.158	774.9066	766.3776	996.1451	1020.588
1975	7464.505	7448.945	776.2159	776.6242	1240.896	1128.278

1976	7710.780	7683.363	782.8941	787.2359	1291.657	1265.635
1977	7964.793	7926.481	794.0418	799.0377	1532.472	1408.088
1978	8239.517	8174.515	799.4627	811.4329	1770.719	1553.423
1979	8498.367	8401.818	808.3128	823.7106	1901.126	1686.614
1980	8727.148	8602.775	821.8079	835.0938	2010.713	1804.360
1981	8747.530	8601.299	831.1395	842.0361	2027.432	1803.494
1982	8780.502	8603.260	829.7750	844.0551	2156.177	1804.643
1983	8808.834	8593.265	825.7382	844.4928	2171.226	1798.787
1984	8834.815	8579.393	823.4725	844.1833	2235.335	1790.658
1985	8853.783	8561.738	824.3039	843.5175	2182.480	1780.319
1986	9332.705	8994.677	835.9180	850.9160	2475.599	2033.993
1987	9823.470	9431.179	851.9891	868.9509	2864.303	2289.759
1988	10323.61	9864.044	867.7607	890.0643	3214.655	2543.394

obs	G	ZG	CYP	ZCYP	R	ZR
1971	1026.254	901.4075	744.8782	922.4327	494.0585	481.2635
1972	967.6176	954.8597	256.4281	81.14379	510.6290	484.0595
1973	774.9108	871.3528	244.1670	87.44232	511.3344	493.8633
1974	825.3793	846.8949	-31.07182	87.99274	517.2557	511.9171
1975	1279.942	1202.603	-58.65821	84.49953	538.2168	526.9230
1976	1196.966	1189.525	217.0898	107.7765	559.2216	539.3410
1977	1200.233	1124.063	14.65478	111.7735	588.5381	560.3932
1978	1339.808	1205.897	40.50382	114.0333	636.8414	587.5960
1979	2000.512	1882.489	142.6132	104.5034	676.5973	602.4341
1980	2004.971	1905.231	132.3535	92.38624	701.4497	606.2475
1981	1993.589	1890.281	4.066405	-0.678223	727.5037	612.9674
1982	2145.935	1960.860	-106.3433	0.900391	760.5922	618.2356
1983	2157.639	1973.724	14.74854	-4.595218	799.0065	621.1692
1984	2233.382	2012.938	-42.33691	-6.377924	838.5169	622.3612
1985	2195.050	2022.405	79.75001	-8.112792	874.3846	621.8422
1986	2267.350	2085.368	206.3093	199.0445	910.2144	625.6587
1987	2629.443	2371.883	113.3192	200.6777	958.9370	633.7874
1988	2939.631	2639.255	166.3207	199.0137	1018.783	641.3924

obs	KV	ZKV	S	ZS	I	ZI
1971	9935.138	9677.787	542.6004	497.2835	1024.809	497.2838
1972	10268.28	9734.015	596.8742	580.4836	646.1519	580.4841
1973	10282.50	9931.177	776.7296	791.7606	404.2289	791.7603
1974	10401.60	10294.20	945.6721	940.0676	862.5684	940.0680
1975	10823.08	10595.97	737.1690	702.2992	1035.887	702.2993
1976	11245.47	10845.67	877.5855	863.3506	906.3279	863.3511
1977	11835.00	11269.02	1126.281	1083.067	1420.483	1083.067
1978	12806.34	11816.05	1230.372	1158.964	1747.595	1158.964
1979	13605.81	12114.43	708.9232	627.8356	1164.776	627.8358
1980	14105.56	12191.12	827.5501	734.2220	1212.786	734.2221
1981	14629.48	12326.25	864.9818	755.2492	1264.002	755.2492

1982	15294.86	12432.19	840.0172	687.8388	1554.857	687.8388
1983	16067.34	12491.18	839.3251	669.5558	1549.685	669.5558
1984	16861.86	12515.15	825.4251	621.9042	1676.877	621.9043
1985	17583.13	12504.71	811.7346	601.4310	1478.561	601.4310
1986	18303.64	12581.46	1044.167	799.5461	1747.061	799.5462
1987	19283.41	12744.92	1086.844	786.8271	2081.651	786.8271
1988	20486.86	12897.85	1142.784	794.2087	2302.964	794.2087

Appendix 4.7.3 Scenario Three:Simulation run when M declines by 25%.

obs	Q	ZQ	SP	ZSP	T	ZT
1971	6724.403	6726.392	698.0539	698.0906	870.8080	871.9779
1972	6919.853	6926.098	729.1551	729.3163	835.3325	838.9910
1973	7097.998	7108.518	758.0636	758.4165	793.5767	799.7412
1974	7272.582	7286.641	774.9066	775.4580	996.1451	1004.383
1975	7464.505	7483.886	776.2159	776.9868	1240.896	1252.252
1976	7710.780	7737.682	782.8941	783.9632	1291.657	1307.420
1977	7964.793	7998.085	794.0418	795.4515	1532.472	1551.976
1978	8239.517	8277.912	799.4627	801.1810	1770.719	1793.215
1979	8498.367	8546.279	808.3128	810.3879	1901.126	1929.200
1980	8727.148	8788.863	821.8079	824.4123	2010.713	2046.873
1981	8747.530	8820.611	831.1395	834.3573	2027.432	2070.253
1982	8780.502	8863.508	829.7750	833.5596	2156.177	2204.814
1983	8808.834	8900.405	825.7382	830.0250	2171.226	2224.882
1984	8834.815	8933.953	823.4725	828.1998	2235.335	2293.425
1985	8853.783	8960.046	824.3039	829.4274	2182.480	2244.744
1986	9332.705	9451.446	835.9180	841.5142	2475.599	2545.174
1987	9823.470	9954.634	851.9891	858.1773	2864.303	2941.158
1988	10323.61	10467.92	867.7607	874.5877	3214.655	3299.217

obs	G	ZG	CYP	ZCYP	R	ZR
1971	1026.254	966.2254	744.8782	745.8015	494.0585	495.5461
1972	967.6176	896.8989	256.4281	258.3706	510.6290	515.3342
1973	774.9108	720.8935	244.1670	246.1377	511.3344	519.0892
1974	825.3793	776.2537	-31.07182	-29.44638	517.2557	527.5090
1975	1279.942	1159.675	-58.65821	-56.21054	538.2168	552.5887
1976	1196.966	1079.314	217.0898	220.5476	559.2216	579.3701
1977	1200.233	1095.674	14.65478	17.58982	588.5381	614.0159
1978	1339.808	1218.882	40.50382	42.84953	636.8414	667.6484
1979	2000.512	1744.267	142.6132	146.9911	676.5973	716.3788
1980	2004.971	1744.178	132.3535	138.6960	701.4497	753.5158
1981	1993.589	1735.786	4.066405	9.297834	727.5037	791.6824
1982	2145.935	1874.016	-106.3433	-101.7853	760.5922	836.8966
1983	2157.639	1883.148	14.74854	18.69091	799.0065	887.5421
1984	2233.382	1951.048	-42.33691	-38.85744	838.5169	939.1951
1985	2195.050	1910.822	79.75001	83.02531	874.3846	987.0818

1986	2267.350	1970.530	206.3093	212.0402	910.2144	1034.997
1987	2629.443	2275.319	113.3192	119.0349	958.9370	1097.297
1988	2939.631	2532.033	166.3207	172.3634	1018.783	1173.139

obs	KV	ZKV	S	ZS	I	ZI
1971	9935.138	9965.021	542.6004	603.8419	1024.809	1086.050
1972	10268.28	10362.94	596.8742	671.4049	646.1519	720.6813
1973	10282.50	10438.45	776.7296	837.2640	404.2289	464.7632
1974	10401.60	10607.76	945.6721	1003.586	862.5684	920.4835
1975	10823.08	11112.09	737.1690	869.5629	1035.887	1168.280
1976	11245.47	11650.65	877.5855	1012.067	906.3279	1040.809
1977	11835.00	12347.34	1126.281	1251.754	1420.483	1545.956
1978	12806.34	13425.85	1230.372	1375.510	1747.595	1892.733
1979	13605.81	14405.78	708.9232	995.3160	1164.776	1451.168
1980	14105.56	15152.58	827.5501	1127.102	1212.786	1512.337
1981	14629.48	15920.06	864.9818	1168.824	1264.002	1567.844
1982	15294.86	16829.29	840.0172	1164.352	1554.857	1879.192
1983	16067.34	17847.72	839.3251	1171.759	1549.685	1882.119
1984	16861.86	18886.42	825.4251	1170.576	1676.877	2022.028
1985	17583.13	19849.38	811.7346	1163.350	1478.561	1830.176
1986	18303.64	20812.94	1044.167	1416.152	1747.061	2119.046
1987	19283.41	22065.72	1086.844	1524.009	2081.651	2518.816
1988	20486.86	23590.86	1142.784	1641.764	2302.964	2801.943

Appendix 4.7.4 Scenario Four:Simulation run when W = 0.

obs	Q	ZQ	SP	ZSP	T	ZT
1971	6724.403	6734.287	698.0539	698.2347	870.8080	876.6039
1972	6919.853	6950.587	729.1551	729.9497	835.3325	853.3403
1973	7097.998	7149.193	758.0636	759.7907	793.5767	823.5709
1974	7272.582	7340.415	774.9066	777.5821	996.1451	1035.888
1975	7464.505	7556.903	776.2159	779.9194	1240.896	1295.036
1976	7710.780	7837.070	782.8941	787.9634	1291.657	1365.652
1977	7964.793	8119.127	794.0418	800.6389	1532.472	1622.904
1978	8239.517	8415.956	799.4627	807.4192	1770.719	1874.102
1979	8498.367	8715.113	808.3128	817.8037	1901.126	2028.128
1980	8727.148	9000.297	821.8079	833.5107	2010.713	2170.763
1981	8747.530	9064.800	831.1395	845.3203	2027.432	2213.334
1982	8780.502	9134.964	829.7750	846.1597	2156.177	2363.872
1983	8808.834	9194.448	825.7382	844.0103	2171.226	2397.175
1984	8834.815	9247.229	823.4725	843.3506	2235.335	2476.987
1985	8853.783	9290.852	824.3039	845.5873	2182.480	2438.574
1986	9332.705	9816.006	835.9180	858.9037	2475.599	2758.786
1987	9823.470	10352.47	851.9891	877.1487	2864.303	3174.271
1988	10323.61	10900.65	867.7607	895.2633	3214.655	3552.769

obs	G	ZG	CYP	ZCYP	R	ZR
1971	1026.254	726.1126	744.8782	749.4297	494.0585	501.4871
1972	967.6176	614.0244	256.4281	265.9996	510.6290	534.1534
1973	774.9108	504.8244	244.1670	253.5758	511.3344	550.0739
1974	825.3793	579.7509	-31.07182	-23.42237	517.2557	568.4283
1975	1279.942	678.6058	-58.65821	-47.36133	538.2168	609.8864
1976	1196.966	608.7081	217.0898	232.6647	559.2216	659.5945
1977	1200.233	677.4368	14.65478	27.55517	588.5381	715.2688
1978	1339.808	735.1778	40.50382	50.66699	636.8414	789.8312
1979	2000.512	719.2888	142.6132	161.1438	676.5973	873.9285
1980	2004.971	701.0056	132.3535	158.2822	701.4497	959.4035
1981	1993.589	704.5746	4.066405	24.35594	727.5037	1044.870
1982	2145.935	786.3418	-106.3433	-89.24911	760.5922	1137.107
1983	2157.639	785.1818	14.74854	29.07563	799.0065	1234.896
1984	2233.382	821.7111	-42.33691	-30.01615	838.5169	1333.072
1985	2195.050	773.9109	79.75001	91.08094	874.3846	1426.744
1986	2267.350	783.2490	206.3093	227.5629	910.2144	1520.411
1987	2629.443	858.8266	113.3192	134.3406	958.9370	1634.048
1988	2939.631	901.6422	166.3207	188.3953	1018.783	1770.537

obs	KV	ZKV	S	ZS	I	ZI
1971	9935.136	10084.49	542.6004	848.7240	1024.809	1330.932
1972	10268.28	10741.39	596.8742	969.2598	646.1519	1018.535
1973	10282.50	11061.55	776.7296	1078.534	404.2289	706.0324
1974	10401.60	11430.61	945.6721	1233.719	862.5684	1150.616
1975	10823.08	12264.30	737.1690	1396.350	1035.887	1695.067
1976	11245.47	13263.91	877.5855	1544.902	906.3279	1573.643
1977	11835.00	14383.45	1126.281	1746.106	1420.483	2040.308
1978	12806.34	15882.84	1230.372	1946.344	1747.595	2463.567
1979	13605.81	17573.97	708.9232	2126.637	1164.776	2582.489
1980	14105.56	19292.80	827.5501	2303.263	1212.786	2688.498
1981	14629.48	21011.45	864.9818	2354.080	1264.002	2753.100
1982	15294.86	22866.28	840.0172	2423.685	1554.857	3138.525
1983	16067.34	24832.71	839.3251	2456.003	1549.685	3166.363
1984	16861.86	26806.95	825.4251	2498.627	1676.877	3350.078
1985	17583.13	28690.61	811.7346	2510.249	1478.561	3177.076
1986	18303.64	30574.21	1044.167	2834.433	1747.061	3537.326
1987	19283.41	32859.33	1086.844	3192.591	2081.651	4187.398
1988	20486.86	35604.01	1142.784	3546.383	2302.964	4706.563

Appendix 4.7.5 Scenario Five:Simulation run when F is increased by 25% and W declines by 25%.

obs	Q	ZQ	SP	ZSP	T	ZT
1971	6724.403	6730.652	698.0539	696.3245	870.8080	916.2438

1972	6919.853	6934.823	729.1551	727.0100	835.3325	848.3720
1973	7097.998	7114.364	758.0636	759.2512	793.5767	770.9005
1974	7272.582	7288.434	774.9066	777.5816	996.1451	998.2349
1975	7464.505	7487.620	776.2159	776.8782	1240.896	1280.315
1976	7710.780	7744.164	782.8941	782.8666	1291.657	1313.708
1977	7964.793	8007.008	794.0418	794.1807	1532.472	1582.692
1978	8239.517	8292.735	799.4627	798.1444	1770.719	1846.704
1979	8498.367	8567.660	808.3128	806.4496	1901.126	1981.215
1980	8727.148	8815.550	821.8079	820.9349	2010.713	2095.885
1981	8747.530	8851.115	831.1395	831.3970	2027.432	2122.690
1982	8780.502	8899.335	829.7750	829.6559	2156.177	2287.727
1983	8808.834	8942.513	825.7382	824.8693	2171.226	2311.090
1984	8834.815	8982.180	823.4725	822.3857	2235.335	2395.441
1985	8853.783	9013.448	824.3039	823.7958	2182.480	2333.797
1986	9332.705	9511.542	835.9180	836.7210	2475.599	2641.278
1987	9823.470	10022.36	851.9891	852.6346	2864.303	3067.020
1988	10323.61	10544.72	867.7607	867.3848	3214.655	3444.714

obs	G	ZG	CYP	ZCYP	R	ZR
1971	1026.254	997.4369	744.8782	701.3806	494.0585	498.7448
1972	967.6176	900.0884	256.4281	302.0659	510.6290	521.9699
1973	774.9108	696.7830	244.1670	285.3780	511.3344	523.4431
1974	825.3793	770.8748	-31.07182	-59.14405	517.2557	528.8273
1975	1279.942	1179.010	-58.65821	-92.04240	538.2168	555.3937
1976	1196.966	1081.175	217.0898	247.7782	559.2216	584.3175
1977	1200.233	1114.717	14.65478	-6.817372	588.5381	621.0138
1978	1339.808	1252.360	40.50382	24.11136	636.8414	679.8951
1979	2000.512	1773.773	142.6132	155.9108	676.5973	734.7975
1980	2004.971	1769.112	132.3535	147.9303	701.4497	777.0946
1981	1993.589	1761.613	4.066405	9.719729	727.5037	819.9460
1982	2145.935	1920.285	-106.3433	-129.7095	760.5922	871.9160
1983	2157.639	1929.126	14.74854	22.00544	799.0065	931.1502
1984	2233.382	2006.159	-42.33691	-49.60945	838.5169	992.0088
1985	2195.050	1953.983	79.75001	103.1612	874.3846	1048.517
1986	2267.350	2016.026	206.3093	211.6535	910.2144	1103.851
1987	2629.443	2339.710	113.3192	94.46882	958.9370	1175.576
1988	2939.631	2607.127	166.3207	160.6245	1018.783	1263.584

obs	KV	ZKV	S	ZS	I	ZI
1971	9935.138	10029.34	542.6004	615.1306	1024.809	1217.891
1972	10268.28	10496.37	596.8742	675.2936	646.1519	736.8893
1973	10282.50	10525.98	776.7296	833.3690	404.2289	367.7434
1974	10401.60	10634.26	945.6721	1004.942	862.5684	901.0638
1975	10823.08	11168.48	737.1690	878.1835	1035.887	1251.581
1976	11245.47	11750.10	877.5855	1015.402	906.3279	1051.332
1977	11835.00	12488.06	1126.281	1262.156	1420.483	1629.909

1978	12806.34	13672.08	1230.372	1392.489	1747.595	2039.019
1979	13605.81	14776.12	708.9232	1013.893	1164.776	1583.710
1980	14105.56	15626.67	827.5501	1147.708	1212.786	1629.253
1981	14629.48	16488.41	864.9818	1192.474	1264.002	1691.249
1982	15294.86	17533.45	840.0172	1197.100	1554.857	2090.651
1983	16067.34	18724.63	839.3251	1206.829	1549.685	2094.779
1984	16861.86	19948.44	825.4251	1211.667	1676.877	2275.983
1985	17583.13	21084.75	811.7346	1203.614	1478.561	2037.148
1986	18303.64	22197.46	1044.167	1461.974	1747.061	2340.593
1987	19283.41	23639.79	1086.844	1579.945	2081.651	2823.456
1988	20486.86	25409.56	1142.784	1704.971	2302.964	3155.197

BIBLOGRAPHY.

Adelman,I.,and Chenery,H.B.(1966),'Foreign aid and economic development: the case of Greece' The Review of Economics and Statistics, Vol. XLVIII,No.1.

Ahmad, S. (1990), Foreign capital inflow and Economic Growth: A two-gap model for the Bangladesh Economy', Bangladesh Development Studies, Vol. XVIII, March.

Ahmad, S. (1983), 'The Dominant Constraint on Growth in Bangladesh', in Bangladesh Development Studies, Vol. XI, December.

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.

Bruton, H.J. (1969), 'The two-gap approach to aid and development: comment', The American Economic Review, Vol. 58, September.

Cashel-Cordo, P., and Craig, S.G. (1990), 'The Public Sector Impact of International Resource Transfers', in Journal of Development Economics, Vol. 32.

Chenery, H. and Syrquin (1975), Patterns of development: 1950-1970, World Bank, London, Oxford University Press.

Chenery,H. and Strout, A.M. (1966),'Foreign assistance and economic development', The American Economic Review, Vol. LVI, September.

Chenery,H.B. and MacEwan,A. (1966), 'Optimal patterns of growth and aid: the case of Pakistan' in Structural change and Development Policy, World Bank(1979), New York, Oxford University.

Chenery,H.B. and Bruno, M. (1962), 'Development alternatives in an open economy: the case of Israel', The Economic Journal, Vol.72,March.

Chole, E. (1988), The Ethiopian Economy, International Institute for Relief and development (Unpublished.).

Chole, E. (1989), The impact of War on the Ethiopian economy, (Unpublished).

Degefe, B. (1990), Growth and Foreign Debt: the Ethiopian Experience, 1964-86, may, (unpublished).

Desai, P. (1979), 'The productivity of foreign resource inflow to the Soviet economy', The American Economic Review, Vol. 69. No.2.

Findlay, R. (1973), International Trade and Development Theory, New York, Basic Books.

Findlay, R. (1984), 'Growth and Development in Trade Models', Chapter 4, in: R.W. Jones and P. Kenen, eds., Handbook of International Economics, Vol. 1, Elsevier Science Publishers B.V., Amsterdam.

Gang, I.N. and Khan, H.A. (1991), Foreign aid, taxes, and public investment, in the Journal of Development Economics, vol. 34, pp. 355-369.

Griffin,K. and Enos, J.L. (1970), 'Foreign assistance and consequences', Economic Development and Cultural Change, No. 18, April.

Griffin,K.(1970), Foreign capital, domestic savings and economic development', Bulletin of Oxford University Institute of Economics and Statistics, Vol.32, No. 2, May 1970, and reply in Vol, 33, No. 2, May.

Gupta,K. and Islam, M.A. (1983), Foreign Capital, Savings and Growth: An International Cross-Section Study, Dordrecht-Holland, Reidel Publishing Company.

Hayter, T. and Watson, C. (1985), Aid: Rhetoric and Reality, London and Sidney, Pluto Press.

Houthakkar,H.S., 'On some determinants of saving in developed and underdeveloped countries', in Problems in Economic Development, ed. E.A.G. Robinson (London: International Economic Association,1965).

Katz, J.M. (1969), Production Functions, Foreign Investment and Growth: a Study Based on the Aggregate Manufacturing Sector 1946-1961, Amsterdam, North-Holland publishing Co.

Levy, V.(1984), 'The savings gap and the productivity of foreign aid to a developing economy: Egypt'. The Journal of Developing Areas,Vol.19.

Lipton, M.(1986), 'Aid effectiveness, prisonors' dilemmas and country allocation', IDS Bulletin ,Vol.17, No.2, April.

Luxton, P. (1979), A new look at the two-gap approach to economic development; The Indian Journal of Economics, Vol. 59, January.

Meller, P.S. (1975), 'A model of Public Fiscal Behaviour in Developing Countries: aid, investment and taxation, in The American Economic Review, Vol. 65, pp. 429-445.

Millikan, M.F. and Rostow, W.W. (1975), A Proposal: Key to an Effective Foreign Policy, New York, Harper and Brothers.

Mosely, P., Hudson, J. and Horell, S. (1987), 'Aid, the Public Sector and the Market in Less Developed Countries', in The Economic Journal, Vol. 97, September, pp.616-641.

Mosely, P.(1980),'Aid, savings and growth revisited', Oxford Bulletin of Economics and Statistics, Vol. 42,No.2, May.

Nurkse, R. (1953), Problems of Capital Formation in Underdeveloped Countries, Oxford, Blackwell.

Office of the National Committe for Central Planning (ONCCP, Ethiopia) (1984), The Ten-Year Perspective Plan 1984/85-1993/94,(Addis Ababa: Bole PP), September.

Papanek, G.F.(1973), 'Aid ,foreign private investment, saving and growth in less developed countries', The Journal of Political Economy, No. 81.

Papanek,G.F.(1972),'the effect of aid and other resource transfers on savings and growth in less developed countries', The Economic Journal , Vol.82,No. 327, September.

Quibria, G. (1981), 'Two-gap models of foreign aid: a survey', Journal of Economic Development, Vol. 5., No. 1.

Rahman, M.A. (1968), 'Foreign capital and domestic saving: a test of Haaveelmo's Hypothesis with cross-country data', in Review of Economics and Statistics, No. 50.

Riddle, R.D. (1988), Foreign Aid Reconsidered, Baltimore, Johns Hopkins University Press.

Robinson, S. (1989), Multi-Sectoral Models', in Handbook of Development Economics' Vol. II, ed. H. Chenery and T.N. Srinivalan, North-Holland, Elsevier Science Publishers B.V.

Studenmund, A.H. and Cassidy, H.J. (1987), Using Econometrics, A practical Guide, Boston; Little, Brown and Company.

Tait, A.A. and Gratz, W.L. (1979), International Comparisons of taxation for selected developing Countries, 1972-76, IMF Staff Papers, Vol. 26.

Todaro, M. (1989), Economic Development in the Third World, Fourth ed. New York, Longman.

Weisskopf, T.E.(1972), 'An econometrics test of alternative constraints on the growth of underdeveloped countries', Review of Economics and Statistics,Vol.54,February.

Weisskopf, T.E. (1972), 'The impact of foreign capital inflow on domestic savings in underdeveloped countries',Journal of International Economics,Vol.2.

Wijnbergen, S.V. (1986), Macroeconomic Aspects of the Effectiveness of Foreign Aid: on the two-gap model, home goods disequilibrium and real exchange rates mismanagement, in Journal of International Economics, Vol. 21, pp. 123-136.

Wood, R.E. (1986), From Marshall Plan to Debt Crisis: Foreign

Aid and Development Choices in the World Economy, Baltimore, John Hopkins University Press.

World Bank (1987), Ethiopia: Recent Economic Developments and Prospects for Recovery and Growth, February.

World Bank (1989), World Debt Tables, 1990-91: External Debt of Developing Countries, Vol. I. Analysis and Summary Table.

World Bank (1989), Sub Saharan Africa: from Crisis to Sustainable Growth.

World Bank (1990), World development Report, Oxford University Press.

World Bank (1988), World Development Report, Oxford University Press.

World Bank (1990), 'World Tables' and World Debt Tables', 1989-90, Diskettes.

Zellner and Theil (1962), 'Three Stages Least Squares: Simultaneous Estimation of Simultaneous Relations, Econometrica, pp. 54-78.