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THE MACROECONOMICS OF FOREIGN AID TO ETHIOPIA: Project Aid versus Government Budget[*]

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Abstract

Foreign aid recipient fiscal response in developing countries is studied using utility/welfare maximization principle. The underlying assumption of this function (utility/welfare can be maximized by narrowing the deviations of the actual values from their desired values subject to the constraints of finance) doesn't capture the interplay between project aid inflows and the adjustment process of the government budget. This paper proposes an alternative framework in conceptualizing the recipients fiscal response. This was possible due to the special feature of this paper that aid is disassociated from foreign capital inflow and also identified by its usage which is not the case in other similar studies. This makes one of the strong point and hence the advantage of this paper. Ethiopia in the pre-EPRDF regimes received project aid. The alternative conceptual framework is that project aid is an investment support which pays only for foreign exchange cost component of the investment program. This kind of aid requires the recipient government to generate local resource in order to finance the local currency component of the investment cost and recurrent costs to keep the created capacity running. In this context the change in investment will be greater than the change in project aid inflow. Hence, domestic savings will increase and government tries to improve both tax collection effort and rate and in the context of burgeoned public sector, the government will also try to raise its non-tax revenue through public enterprises surplus transfer (this has never been an issue of the fiscal response literature) to finance the difference. The results were entirely contrary to the conventional claims. Project aid has no 'displacement effect'. Government was responding positively to project aid by improving both tax collection effort and tax rates and by increasing its non-tax revenue. In the absence of real savings, the government, however, finances the local currency component of the investment cost by domestic bank borrowing: transferring private resources and printing money. It is argued that transferring of resources from private budget surplus to the public sector was carried out through distorted preferential domestic credit policies by crowding-out private investment and depressing personal consumption. Distorted domestic credit policies (rationing with preferential treatment to public sector) was, therefore, unintended outcome the fiscal adjustment to the aid inflow, generating the local fund for local currency costs of the aid-financed public investment in excess of real public savings.

1. Introduction

Most studies on the macroeconomics of aid did not pay attention to the definition of aid, different forms of it, and its sectoral drawings. The current account deficit has been considered as a `homogenous good' and taken as a proxy for aid. However, current account deficit, which consists not only of aid but also non concessional long-term loans, short-term loans, foreign direct investments, suppliers' credits, use of IMF credits, change in international reserves, and errors and omissions, can in no way be a proxy for aid. Aid itself is not homogenous. There are different forms of aid whose impact on and transmission mechanisms to government budget are different. Aid flows basically consist of two forms: project aid and programme aid. Project aid is an investment support which is only meant for the payment of the import component (foreign exchange cost) of that investment. Programme aid, unlike project aid, 'consists of all contributions made available to a recipient country for general development purposes' (OECD, 1991 as quoted in White, 1999:7) and is usually attached to economic reform programmes, for instance structural adjustment programmes agreed upon with IMF and the World Bank.[1] In this paper aid is disassociated from other capital inflows based on the 'grant element' that each capital inflow has.[2]

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[1] Programme aid includes financial and non-financial aid (basically programme food aid). The financial one includes balance of payments support and budget support. While the former consists of debt relief and import support in which the recipient gets foreign currency or commodities (mostly recurrent imports); the latter comprises general budget support and sectoral budget support in which the government receives foreign exchange for sale to raise local currency to support the government budget. For details see White (1998a and 1999).

[2] We applied the 'grant element' concept to identify aid from other capital inflows on the data collected from the Ministry of Finance (MoF), our source of data. The concept of 'grant element' is a measure of concessionality (or softness) of a loan depending on its financial terms: interest rate, maturity and grace period. According to OECD definition, a loan whose grant element is ≥ 25 percent is identified as concessional loan or aid. A grant element (GEL) is

The history of aid in Ethiopia goes back to the immediate post World War II period. Project related assistance, as Shiferaw (1995:50) pointed out, was "... mainly from Sweden and the United States, which averaged about 2.8 million Birr between 1945 and 1949".[3] Despite the long history of foreign capital inflows, no meaningful review can be made before 1968 as there are no recorded data.

Foreign capital inflows to Ethiopia were largely aid. Except in the early times of the revolution where aid inflows accounted for 74.4 percent and early segment of the six annual development campaign plans (1979-84) towards the recovery of the economy (1980-81) where aid accounted for 77.5 percent, aid has consistently accounted for more than 90 percent out of the total net inflows. With the exception of the immediate Ethio-Italian war (1935-41), the type of aid Ethiopia has been receiving was basically project aid.[4] It should also be noted at the outset that historically, aid-supported investment projects fall under the public sector. In Ethiopia the state undertook a major share of investment and project aid was drawn solely by the state, particularly in the post-revolution period. Therefore, as far as the period under study is concerned, capital inflows to the private sector were almost nil. In 1968, 1969 and 1970, for instance, there were 7.6, 6.2 and 1.5 million Ethiopian Birr disbursements to the private sector respectively. On the average it was only 3.0 percent of the total disbursement for the period 1968-70.

Among several macroeconomic ramifications of project aid, this paper is particularly concerned with fiscal response of the government. The rest of the paper is organised as follows. While section 2 reviews the fiscal response literature and discusses the alternative framework, section 3 discusses the fiscal response of Ethiopian government to project aid. Section 4 outlines the modelling of the relationship and section 5 discusses the econometric methodology and results. Section 6 summarises the paper.

2 The Fiscal Response Literature: Overview and the Alternative Framework

The early optimists about aid argued that all aid will go directly to investment and that there would be a one-to-one relationship between aid and investment, i.e., the change in aid is equal to the change in investment. Among the Radicals, Griffin (1970) suggested, however, that little of it goes to investment. The radicals argued that the availability of resources made possible by aid would reduce the recipient government's effort to collect/levy taxes and would even induce the government to reduce tax. It is also argued that aid inflow might encourage the government to increase its consumption. Hence, aid is a substitute for domestic savings particularly that of the government. As a result of this, eventually there is likely to be a less than one-for-one increase in investment, i.e., the change in aid is greater than the change in investment. These aspects of the macroeconomic impact of aid have been revolving around what is known in the aid literature as, following White (1992), the `fiscal response'.

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calculated as a ratio of the grant equivalent to the face value of the loan (FV). The grant equivalent is defined as a difference between the face value of the loan and the present values of future payments, i.e., contractual debt services (amortisation and interest) which is the one in bracket in the numerator of the following equation. Algebraically, the grant element is given as follows:

$$GEL = \frac{FV - [\sum_{t=1}^{n} (P_t + I_t) * (1+i)^{-t}]}{FV}$$

Where P, I and i respectively stand for principal payment of the loan, interest payment of the loan, and the rate of interest by which present values of future repayments are going to be discounted. Based on OECD's definition, a 10 percent interest rate (a proxy for an internal rate of return of investment) is used to calculate the present value of future repayments. This method is applied to Ethiopia's long-term foreign loans to disassociate aid inflows from other kind of inflows.

[3] For the history of foreign aid in Ethiopia, see Shiferaw J., 1995:49-50 and Luther, 1958:65-67.

[4] It should be noted, however, that Ethiopia has been receiving food aid related to emergency relief. Since 1994, the current regime is reforming the economy under the structural adjustment programme and hence qualified to receive programme aid.

Heller's (1975) seminal contribution to the subject modelled the impact of foreign capital inflow (loan and grants) on government expenditure and taxation assuming that government maximises a utility function.[5] He (1975:440-1) found that foreign loan not only increases investment, but also facilitates a reduction in taxes and the resource made available by aid reduces domestic borrowing. The reduction in tax was, however, considerably smaller than the reduction in borrowing.[6]

One of the criticisms of Heller's model, to which White (1993 and 1994) attempted, is the so-called 'feedback' effect, i.e., the indirect positive effect of aid on taxes through its alleged positive effect on output which is not factored in Heller's model. By reformulating Heller's model, in a demand-driven oriented framework, White (1993) argued that even though aid reduces taxes in the current period, the result no longer needs to hold if the indirect effects of aid were considered.

The main drawbacks of the fiscal response literature are related to its conceptual framework. The underlying assumption of utility (Heller 1975) and welfare (Mosley et. al 1987) function does not capture the interplay between aid inflows and the adjustment process of the government budget. To come to grips with how the recipient government budget adjusts to the aid inflows, one needs to consider the following factors: (i) the structure of government budget, (ii) the forms and purpose of aid the country under study has been receiving, and (iii) the decision framework of financing expenditure in view of the inflow of specific form of aid.

The structure of government budget can provide different avenues through which one can conceptualise the fiscal response to aid inflow. Different categories of government revenue may respond differently to the same form of aid inflow. Foreign trade tax, for instance, may respond negatively due to relative price effects of aid on exports (Dutch disease for instance) and government incentives on import and export duties to promote investment. The structure of government expenditure also gives an entry point to investigate the fiscal response. This could possibly be done by cross examining the structure of government development expenditure and its consumption, i.e., in which sub-sector government development expenditure concentrates and the characteristics of the corresponding structure of government consumption.

With regard to the forms of aid, it is clear that aid is not homogenous. As noted in the introduction of this paper, the type of aid Ethiopia has been receiving for the period under study was project aid. In project aid whose purpose is only to support the foreign exchange cost component of the investment, the arrangement between donors and recipient government is that the government has to generate fund locally to finance the local currency component of the investment cost and related recurrent costs. I presume that this form of aid inflow has a character of creating pressures on the government to raise its revenues. Furthermore, as Molla (1991) argued, especially in the Ethiopian context where project aid is disbursed directly to government or public enterprises, project aid-financed investments are expected to increase government's recurrent revenue through public enterprises' surplus transfer. Thus, it is hypothesised that project aid will be positively associated with government recurrent revenue.

The decision framework of government welfare (Mosely *et al*, 1987) or utility maximisation (Heller, 1975) used in the fiscal response maintained that the welfare/utility function can be maximised by narrowing the deviations of the actual values from their desired values subject to the constraints of finance (see Mosely *et al*, 1987:618-620). This decision framework, as Alemayehu (1998:218) argued, does not reflect how decisions are made in less developing economies in view of foreign capital inflows. This decision framework is even more problematic in view of a specific form of aid, project.

As mentioned before, for every inflow of project aid there will be an obligatory condition on the recipient government to raise local fund for the local cost component of the investment programmes in the same

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[5] The model was a cross-section analysis of eleven African countries including Ethiopia based on the assumption that the decision-makers maximise utility. By taking the variables as a deviation from their targeted values, the utility function is operationalised by a functional form, which ensures diminishing marginal utility from each of the choice variable.

[6] Indeed, in his findings more tax reduction comes from grants as it has a more stimulative impact on consumption Gang and Khan (1991) also found an empirical support for the negative association of aid and taxes.

period and related recurrent costs in the subsequent period. In this context, the decision is not governed by the utility/welfare maximisation principle. The government has simply two choices with the targeted expenditure: either it tries to generate the required local fund through various means or it simply ignore the generation of the required local fund. I presume most governments take the former choice. The government of Ethiopia is not an exception to this. To raise this fund the government will be confronted with two or (depending on the size of the public sector) three possible alternatives. The first one will be tax revenue designed to improve the collection effort and/or raise the rate. The second one may be non-tax revenue, surplus transfer from public enterprises to the treasury. If tax revenue (non-tax revenue too) fails, possibly due to the narrow tax base of the economy, the third alternative will be domestic borrowing from the banking system.[7] The choice of these alternative mechanisms moves recursively from the first to the third, depending on the government's capacity (and domestic economy) to raise tax revenue.

Put otherwise, it is the chain of causation that runs from the growth drive to the government effort (the working out of the mechanisms for mobilising local resources for local currency component of the investment cost and recurrent costs) that governs the aid recipient fiscal response and not the utility/welfare maximisation principle.

My point of departure emanates from this conceptualisation of the interplay between project aid and government budget. I suppose, at the outset, that for an inflow of project aid there will be an attempt by the government to raise its local revenue (both tax and non-tax) to follow suit. I would also like to suppose that in the absence of real savings, the available domestic options for financing government expenditure are net transfer of resources from the private sector through various means (usually borrowing from commercial banks) and inflationary mechanism (borrowing from the national bank). In this context one can suggest that there could be a possibility of ended up with crowding out effect on private investment via the financial market (rising interest rate) or administered domestic credit allocation (rationing).

3 Fiscal Response to Project Aid in Ethiopia
3.1 Project Aid and Government Revenue: Are they Complementary or Substitutable?

The most important insight that has come out from the balance sheet of our theoretical discussion in the preceding section is that the local resource needs to finance the local cost component of development projects is expected to increase tax rates and improve the efforts to collect taxes. Before I go to have a close look at the data it is worth exploring others' work on the issue. Unfortunately, most studies are on the aid-savings debate and did not consider the government budget. Molla (1991) was the only available work in this respect.

His underlying assumption is in line with the 'feed back effect' argument. He (1991:40) argued that in the context where all aid inflows are disbursed directly to the central government or public enterprises, foreign financed development projects are expected ultimately to contribute to government either through increased tax revenues or surplus transfers. His regression analysis, however, was based on regressing taxes including non-tax domestic recurrent revenue on current account deficit. He (1991:51 and Annex 4.2:vii) found a significant positive relationship between the two for the period 1971-88.[8]

In the Ethiopian data, as Figure 1 reveals, although there is hardly any indication for negative association between aid and total tax revenues, there seems to be no strong positive association either. Project aid has not been exerting strong pressure on the government to collect/levy taxes particularly during the aid boom period.

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[7] Grants could also be considered as one possible source. In the Ethiopian data, however, it is insignificant in terms of volume and trend relative to the pattern of both development and recurrent government expenditure. The trend in grants was deteriorating specially following the boom in the aid-financed investment period. The yearly average share of the recurrent support grants in total government expenditure for the period 1968-91 was 7.3 percent ranging from 14.4 percent in 1968 to 0.3 percent in 1978.

[8] The effect of aid on taxes was higher than that of its effect on recurrent expenditure, which implies that the net effect of aid on government savings is positive. It should be noted, however, that the DW statistics in both equations is very low implying a possibility of spurious regression.
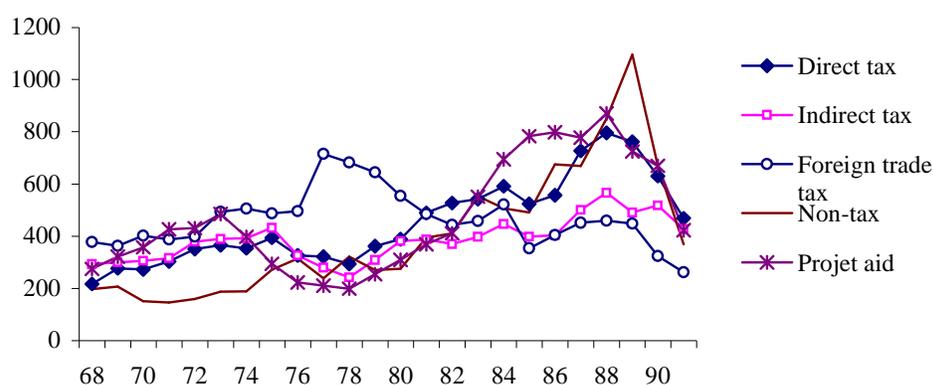
Figure 1: Tax revenue and project aid: 1968-91 (millions of Eth. Birr)[9]
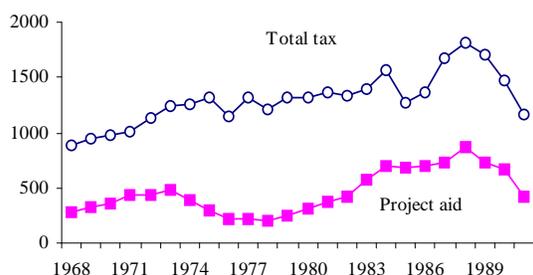
Source: Annex 1 and 2

It then seems logical to disaggregate taxes and explore the pattern. Figure 2 graphs different kinds of tax revenues along with project aid.

Figure 2 Government revenue and project aid: 1968-91 (millions of Eth. Birr)[10]

Source: Same as Figure 1.

After observing the above figure, it is now very clear why the relationship between total tax revenue and project aid seems weak. Disaggregating taxes supports our contention in a more complex form. In both regimes, for an inflow of project aid there was a continuous effort to raise revenue from direct and indirect taxes. The rise in levels of direct and indirect taxes along with project aid inflow could at least witness the improvement of government's tax collection effort. As it is mapped out in the figure, there seems to be no systematic relationship between foreign trade tax and project aid in the long-run. The interesting point is that in the aid boom period foreign trade tax revenue has exhibited an opposite pattern to the movement of project aid despite the fact that project aid financed imports.[11]

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[9] All variables in this paper are given at 1981 price unless and otherwise specified. Recurrent revenues, recurrent expenditure and domestic credit are deflated by CPI. Investment and aid are deflated by import price index.

[10] All variables are given at 1981 price unless and otherwise specified. Recurrent revenues, recurrent expenditure and domestic credit are deflated by CPI. GDP is deflated by GDP deflator and investment and aid are deflated by import price index.

[11] This pattern might be due to the following two factors. The first one is that there was a tight import control regime and a total ban on certain goods which the government characterised as luxury items. There was also a complete ban on the acquisition of import licenses in the 1980s. The combined effect of this on the volume of tax that could be collected from import duties was negative. This policy was a product of a shortage of foreign exchange. The government, by pursuing this policy, was encouraging consumers to use domestically produced goods in a bid to lessen the foreign exchange supply constraint to the economy. One example of this is that all public employees, all party affiliates, leaders of co-operatives and other mass organisations from the national to the lowest local level were forced to dress locally produced textile clothing at least in weekdays. Secondly, the volume of exports has been deteriorating significantly in the 1980s, which adversely affected the tax revenue that could be generated.

The other aspect of the government budgetary interplay with the project aid inflow, which has never been an issue in the fiscal response literature, is non-tax revenue. In the Ethiopian context where the public sector was dominant in the formal economic activity, non-tax revenue could also constitute a considerable place in government recurrent revenue through transfer of surplus from public enterprises to state treasury. Hence, in the absence of enough tax revenue to finance its expenditure, the aid recipient government may tap this potential effectively to raise its recurrent revenue. What happened in Ethiopia during the aid-financed investment boom (in the 1980s) was that public enterprises were forced to transfer almost all of their net profit to government.[12] This was not the case in the Imperial period where public enterprises were not dominant in the economy. Although public enterprises are forced to transfer their net profit, this has to also be seen as a contribution of aid (feed back effect) through the state-led aid-financed investment projects and as a pressure posed on government by project aid.

3.2 Project Aid, Government Expenditure and Financing
3.2.1 Aid and Government Consumption

Project aid is expected to exert an upward pressure on government recurrent expenditure through the government commitment to cover the recurrent costs. Any increase in project aid, therefore, is expected to be followed by a subsequent rise in change in recurrent expenditure.[13] The scatter plot in the following figure gives some suggestive data analysis in this regard.

Figure 3 Change in recurrent expenditure and project aid: 1968-91 (millions of Eth. Birr).
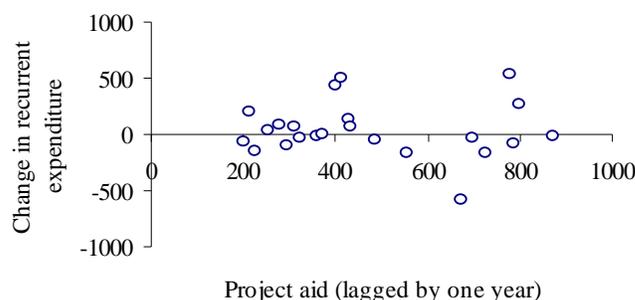
Source: Same as Figure 1

As can be observed, the scatter plots of change in real recurrent expenditure against real project aid suggests that there is no relationship at all between the two. The next question will be why no correlation exists between these variables. I will examine this from two avenues: (i) what constrains recurrent expenditure in general and (ii) the structure of recurrent expenditure. This is because much of aid is drawn by specific sector and recurrent expenditure is expected to increase in this specific sector. With regard to the first one the main factor that constrained recurrent expenditure is recurrent revenue.

As can be observed from Figure 4, the level in recurrent expenditure has walked hand-in-hand with the level of recurrent revenue. The slope coefficient is equal to 1.0 and insignificantly different from one.[14] This suggests that recurrent expenditure is principally constrained by recurrent revenue.

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[12] "Public enterprises," as Befekadu (1992:35) noted, "are expected to transfer their net profit, retaining only 10 percent annually, until this fund equals 30 percent of their capital. Thereafter, they are required to transfer 100 percent of their net profit."

[13] As a considerable part of the recurrent expenditure, like for instance wages and salaries, is related with the stock of capital, i.e., you keep on paying for the previous investment, government development expenditure/project aid is associated with subsequent additional recurrent expenditure (e.g. wages and salaries for additional/new employees). In this context, the level of recurrent expenditure is associated with the stock of investment. Thus, it is the subsequent change in recurrent expenditure that should be related with project aid.

[14] The slope coefficient is from a simple regression of recurrent expenditure on recurrent revenue.

Figure 4 Government recurrent revenue and expenditure
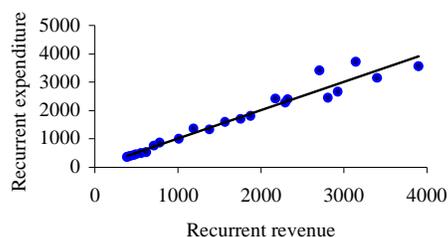
Source: Same as Figure 1

What then constrained recurrent revenue? As Doriye and Wuyts (1992:21) argued, in the context of an import substituting industrialisation strategy government revenues revolve around the growth of industrial output. However, in Ethiopia the industrial sector was stagnating and even at times declining. Besides, its share from GDP is very low, between 12 and 18 percent.[15] The growth of the overall economic activity was also stagnating. Hence, recurrent revenue is constrained by the poor performance of the overall economic activity.

The second avenue is more interesting. The major share of government capital expenditure has been drawn by the so-called economic sectors. For the whole period under study (1968-1991) while, on the average, industry, agriculture and transport and communication have drawn around 84 percent of the government capital expenditure, it was only 6.8 percent of the total recurrent expenditure that was allotted to these sectors. It is wise, therefore, to examine the correlation between the prior government capital expenditure (project aid) and the subsequent change in recurrent expenditure in these sectors.

Curiously, however, no correlation exists between either government capital expenditure which was financed by project aid and subsequent change in recurrent expenditure or project aid and subsequent change in recurrent expenditure in these sectors, all in real terms. Regressing the subsequent change in recurrent expenditure on both yields a coefficient of determination equal to 0.9 for the former and 2.5 for the latter. Our next interest then lies on looking at the structure of government consumption in order to see allocations made across sectors and investigate the factors that are governing resource allocations across sectors. While the economic sector forms the single most important category of capital expenditure they were left at the margin from the allocation of recurrent outlays. In this context the required local fund for recurrent expenditure depends not only on the level of recurrent revenue but also on the structure and patterns of government consumption.

Neither economic sectors nor social sectors took up the overwhelming share of recurrent expenditure; it was the general service that enjoyed the lion's share of the recurrent expenditure. Within this category the only important sector was defence. Relative to the government effort to raise tax revenue, the record for military expenditure showed a remarkable growth. Table 1 presents this phenomenon.

Table 1 Defence expenditure.

	As % of recurrent expenditure	As % of tax revenue
1962-64	26	28
1965-69	26	32
1970-74	20	21
1975-79	39	51
1980-84	44	58
1985-89	41	57
1990-91	50	85

Source: Annex 1

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[15] Calculated from current prices.

As can be observed, the share of defence from total recurrent expenditure and tax revenue in the early 1990s was doubled and tripled, respectively from what it was in the 1960s. This implies that the requirement for the military effort has been increasing at a rate faster than that of total recurrent expenditure, revenue, and the overall economy.

Given the meagre resources, these high rates of growth have been sustained or could only be accomplished by crowding out spending on other sectors, particularly, economic sectors. The fiscal response of the government, therefore, was not 'pure' so to say but affected by the war and the government compromised its recurrent expenditure in economic sectors by preferring to solve the internal conflict by military means.

3.2.2 Project Aid and Fiscal Deficit Financing

Our next interest lies on how the government finances the local currency component of the investment cost. The deficit created by project aid in the post-Imperial period grew substantially implying that the government has to look for domestic bank borrowings. The starting point is to set out how fiscal deficit (FD) is financed. From the basic macroeconomic identity, we can define the fiscal balance as the counterpart of current account balance and private sector balance as follows:

$$Ig - Sg = M - X + Sp - Ip \tag{1}$$

where I, S, M and X stand for investment, savings, import and export respectively, and the subscript g and p stand for public and private, respectively.

From the above equation, it is apparent that while M-X constitutes external financing (which is the sum of project aid, other flows and errors and omissions), Sp-Ip makes up the net resource transfer from the private sector to the public sector (domestic bank borrowing including other transfers). Hence, financing fiscal deficit after aid is redefined as follows:

$$(Ig-Sg)-(M-X)=\Delta DCg+\Delta Ortpg \tag{2}$$

where DCg and Ortpg stand for domestic credit to the public sector and other resource transfer from private sector to the public sector and Δ stands for change. [16]

As shown in Equation 2, the only alternative available means of meeting the requirement of project aid, in the absence of real savings, is domestic bank borrowing. Table 2 presents the level of public domestic bank borrowing and its composition.

Table 2 Composition of net public domestic borrowings (millions of Eth. Birr)

	$\Delta DCgnb$	$\Delta DCgcb$	Sg	ΔDeposits*
1968	86	19	68	71
1971	-16	11	98	53
1974	-102	84	197	308
1977	-33	158	12	245
1980	28	465	-18	112
1983	196	371	-226	241
1986	127	128	260	266
1989	24	330	238	138
1991	339	206	-397	96

Source: Annex 2

DCgnb, DCgcb and Δ stand for domestic credit to the public sector from national bank, domestic credit to the public sector from commercial banks and change respectively.

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[16] Ortpg including the statistical discrepancies constitute other net domestic resource transfer to the public sector and will be the balancing item in the fiscal deficit equation as follows:

$\Delta Ortpg = Ig - Sg - \Delta DCg - Fs$

* includes net demand deposits, saving deposits and time deposits.

As can be observed, domestic bank borrowing made a visible shift from a stable and very low level in the Imperial period to a substantial volume in the post-Imperial period. This shift has been accompanied by a considerable change in its composition. The increasing demand for domestic bank borrowings was met by a relative shift from non-interest bearing borrowings (printing money) to interest bearing borrowings (commercial banks). The share of borrowings from the national bank has, on average, declined from its 75 percent share at the end of the 1960s to 40 percent in the 1970s and to 30 percent in the 1980s. It should be noted, however, that there are years when borrowings from the national bank increased tremendously. A close look at the table and Annex 1 reveals that this happened when there was either a considerable recurrent budget deficit or overall low deposits in money banks or both. The budget deficit for these years is more or less driven by the civil war and the Ethio-Somali war demonstrated by high military spending and at the same time, low tax revenue. Although borrowings from the national bank for some years seemed to be driven by war total domestic borrowing, as argued previously, was driven by the required local fund. In this context, one would expect a positive relationship between domestic bank borrowing by the government and project aid and this is empirically supported (see regression results Equation 15).

This method of financing deficits has some macroeconomic consequences. As I pointed out, domestic bank borrowing constitutes borrowing from commercial banks and national banks. The former comes in two forms, through a formal market or through financial repression. The latter is printing money. In a supply constrained economy, the growing and considerable size of borrowings from commercial banks will crowd out private investment, and thus reduces output growth, in both the formal market (by putting upward pressure on real interest rates) and financially repressed economies (by lessening the available credit to private sector, i.e., rationing credit with priority given to the public sector). As described by Equation 1, resources have to come from net private sector surplus either by increasing savings (decrease consumption) and/or by depressing investment.

In Ethiopia, especially in the post-Imperial period, price and quantity controls were pervasive. Therefore, the interest rate was administratively fixed. Under this arrangment, credit is not only rationed but also distributed on a priority basis; priority is given to public enterprises and co-operatives with favourable interest rate and terms.[17] Thus, the government, by way of non-price rationing of domestic credit, was able to transfer resources from private sector. As I argued earlier, this resource has to be made available either by depressing private consumption and/or private investment. Both variables have deteriorated significantly. The whole process was that the fiscal adjustment to the aid inflow, generating the local fund for local currency component of the aid-financed public investment costs in excess of real public saving, was borne by transferring resources from private savings to the public sector. This was achieved through distorted domestic credit policies, by depressing personal consumption and crowding-out private investment. Figure 5 graphs the evolution of private consumption and Table 3 presents the share of change in private (ΔDCp) and public sector (ΔDCg) domestic credit from change in total net domestic credit and private (Ip) and public (Ig) investment from total investment.

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[17] The rate of interest was fixed at different levels for each sector and institutions. The rate for private sector is always higher than that of public enterprises and co-operatives. In the case of credit to industry, for instance, through September 30, 1992, the rate was 6 percent for co-operatives, 8 for public enterprises and 9 for private sector (National Bank of Ethiopia).

Figure 5 Real private consumption (in millions of Eth. Birr)
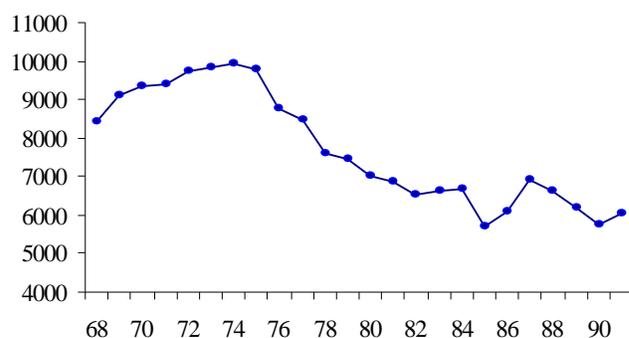
Source: Annex 3

Table 3 Share domestic credit and investment (in %, period average)

	ΔDCp	ΔDCg	Ip	Ig
1968-74	87	13	78	22
1975-78	17	83	32	68
1979-88	-7	107	16	84
1989-91	1	99	11	89

Source: Annex 2

Hence, the credit policy made available resources to the public sector by directly controlling the quantity of the flow of credit available to private sector. This distorted credit policy, therefore, is an unintended outcome of the growth strategy in view of the following chains of causation; from project aid-financed state-led investment to the requirement for the local currency component of the investment cost to domestic borrowing requirement and given the supply constrained economy to credit rationing. The robust relationship between public investment and project aid (see Equation 14) and project aid and domestic credit to the public sector (see Equation 15) give empirical support to this contention. It is worth mentioning that the requirement of the military effort had also driven the government for high domestic bank borrowings.

4. Modelling the Relationship
Aid and revenue

As has been argued in section 3.1, the government to raise local fund for the local currency component of the investment cost in the same period and recurrent costs in the subsequent period will be confronted with three possible alternatives: tax revenue, non-tax revenue and domestic bank borrowings. The choice of these alternative mechanisms moves recursively from the first to the third depending on the government capacity (and domestic economy too) to raise tax revenue. From the point of view of Ethiopia, inflow of project aid is exogenously determined but does pressurise government to cope with its implications. Thus an econometric model framed in a recursive way is a relevant technique of estimation. Following this approach I specify here the project aid-government revenue relationship.

Each kind of tax revenue (Td-direct tax, Ti-indirect tax, Tf-foreign trade tax) is modelled as a function of project aid (PAID) and its own tax base (GDP-gross domestic product for Td, NAVA-non-agricultural value added for Ti, and XM-sum of Ethiopian's import and export for Tf). Since, indirect taxes are mostly imposed on privately consumed commodities, private consumption is also considered as a determinant factor. As discussed in section 3.1, non-tax revenue (NTR) may also driven by project aid. To control the influence of the civil war on tax and non-tax revenue, we examine two aspects of it (see Fitzgerald, 1997:47). On the one hand, as Fitzgerald argued, the civil war tend to reduce output and taxable profits in the modern sector which will deteriorate the revenue base and hence the tax pressure to fall. On the other hand, however, the government may be on pressure to exploit the remaining tax base such as non-essential

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imports, and other that are relatively easy to control administratively. We, therefore, consider defence expenditure (DEF) to affect all kinds of government revenue.

$$Td = \alpha_1 + \beta_{11}GDP + \beta_{12}PAID + \beta_{13}DEF \qquad (3)$$
$$Ti = \alpha_2 + \beta_{21}NAVA + \beta_{22}PAID + \beta_{23}DEF \qquad (4)$$
$$Tf = \alpha_3 + \beta_{31}XM + \beta_{32}PAID + \beta_{33}DEF \qquad (5)$$
$$NTR = \alpha_4 + \beta_{41}PAID + \beta_{42}DEF \qquad (6)$$

where $\beta_{11} > 0$, $\beta_{12} > 0$, $\beta_{13} > 0$; $\beta_{21} > 0$, $\beta_{22} > 0$, $\beta_{23} > 0$; $\beta_{31} > 0$, $\beta_{32} > 0$, $\beta_{33} > 0$ and $\beta_{41} > 0$, $\beta_{42} > 0$

Aid, government expenditure and financing

Government recurrent expenditure (RE) is principally constrained by its recurrent revenue (RR). Like the conventional argument I hypothesise that it will be positively related to project aid. But the point of our departure is the transmission mechanism. Since this aid supports public investment (Ig), I do not add it to government revenue as a budget constraint for consumption. It has no direct link with government consumption. It affects government consumption through its implication for the demand it placed on government to finance the recurrent costs of the investment programmes. Hence, the effect of aid goes through public investment. As discussed in section 3.2.1, there was no correlation between development expenditure (project aid) and change in subsequent recurrent expenditure. Thinking the hypothesised relationship between public investment (project aid) and subsequent recurrent expenditure has been affected by paying for the war, it is hypothesised that the rhythm of government consumption is determined by the movement of military expenditure. The lagged value of the dependent variable is also considered to portray persistence of previous patterns of expenditure. Public investment is defined to be determined by project aid inflows. The government had very little recurrent budget surplus. In this context and in the absence of non-bank borrowing, the final resort for government is to use bank borrowings to finance the local cost component of the aid-financed investment programmes. Since this relationship is governed by the pattern of real savings, the simple correlation between project aid and domestic bank borrowing does not tell the whole story. In empirical analysis one has to take care of the linear influence of government savings on both project aid and domestic bank borrowings.

The closure is given by a fiscal deficit (FD) equation (Equation 2) where net transfer of resources from the domestic private sector to public sector (Ortpg) is a balancing item.

$$RE = \alpha_5 + \beta_{51}RR + \beta_{52}Ig(-1) + \beta_{53}RE(-1) + \beta_{54}DEF \qquad (7)$$
$$Ig = \alpha_6 + \beta_{61}PAID \qquad (8)$$
$$\Delta DCg = \alpha_7 + \beta_{71}PAID + \beta_{72}Sg \qquad (9)$$

where $\beta_{51} > 0$, $\beta_{52} > 0$, β_{53}, $\beta_{54} > 0$; $\beta_{61} > 1$; $\beta_{71} > 0$; $\beta_{72} < 0$

5 Econometric Methodology

To reach at robust results, before estimation each series is tested for stationarity using the DF/ADF unit root test and followed by a cointegration test among the hypothesised relationship using Engle and granger and CRDW for bivariate cases and Johansen (1988) methodology for mutivaraite cases.[18] According to the ADF test results, the level of integration of the variables are presented in Table 4. From the table it follows that all variables are non-stationary at levels.

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[18] It should be noted, however, that both stationary and cointegration test "… are really only valid for large samples, so that their application on small sample size is dubious" (Mukherjee, White and Wuyts, 1998:352)They (1998:356) specifically pointed out that the application of the procedure for observations less than 25 is not strictly valid. The basic shortcoming of our data is the limited number of observation. We have only 24 observations which are very few to treat this issue properly.

Table 4 A Unit Root Analysis

Symbol of variables	Levels of integration	Symbol of variables	Levels of integration
Cp	I(1)	RR	I(1)
DEF	I(1)	Td	I(1)
GDP	I(1)	Ti	I(1)
Ig	I(1)	Variables that are not transformed	
NAVA	I(1)	DCg	I(1)
NTR	I(1)	Ig	I(1)
PAID	I(1)	PAID	I(1)
RE	I(1)	Sg	I(1)

Source Annex 3

Given the results of the unit root analysis, the next step is to apply the cointegration procedure in order to identify whether there is a long-run relationship or not among the hypothesised relationship. For this purpose we employ Engle-Granger methodology[19] and the Cointegration Regression Durben Watson (CRDW) test.[20] This is for bivariate regressions. Although one may apply the Engle and Granger methodology for multivariate cases, this has some problems.[21] In this case, we use the Johansen mutivariate cointegration method.[22] Results of these tests are presented in Table 5 and 6.

Table 5 Engle-Granger and CRDW cointegration test: a bivariate analysis

Equation	DW	T-statistic	Engle and Granger critical value (5%)*	Philips and Ouliaris critical value (5%)*	CRDW	Engle and Granger critical value (5%)*
NTR	1.8	-4.07	-3.37	-2.76	1.73	0.386
Ig	1.86	-4.96	-3.37	-2.76	2.09	0.386

* Mukherjee, White and Wuyts 1998:402

Table 6 Johansen Cointegration test: a multivariate analysis

Equation	Lag length	Johansen likelihood ratio	Mackinnon critical value (5%)
Td	2	47.6	29.68
Ti	1	49.4	47.2
RE	2	29.95	29.68
DCg	3	82.5	29.68

As can be observed, the results in the table indicate that the null hypothesis of no cointegration is rejected at 5 percent level for all models. This implies that the variables specified in each of these equations are cointegrated and hence there is a long-run relationship among the hypothesised relationship. This allows us to run OLS estimation at levels.[23]

We have used Hendery's general to specific methodology to arrive at parsimonious specifications of the hypothesised relationships.[24] Finally, all variables are in real terms and since all variables are transformed to its natural logarithms, the coefficients obtained are elasticities.[25]

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[19] This is testing for stationary of the residuals from the levels regression which is carried out by DF/ADF test.

[20] The DW statistic of the cointegration regression is simply the DW from the levels of OLS regression. The CRDW test compares CRDW with the Engle and Granger critical value (d) of 0.386 (for 5 percent). The null hypothesis (there is a unit root in the residuals and hence the variables are not cointegrated) is CRDW<d. (Seddighi H.R., K.A. Lawler, A.V.Katos, 2000:287 and Mukherjee, White and Wuyts 1998:402). If Engle and Granger approach (ADF test) and CRDW test produce different results, we would accept the former (see Mukherjee, White and Wuyts, 1998:402)

[21] See Seddighi H.R., K.A. Lawler and A.V.Katos, 2000: chapter 7, section 6.

[22] The Johansen test for cointegration is performed with allowance for a deterministic trend in the data. The null hypothesis is no cointegration relationship.

[23] We did not use the error correction model due to the limitation of data to lend itself to lag structure.

[24] For the detailed account of the discussion on this concept see Mukherjee, White and Wuyts 1998: Chapter 1.

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6. Estimation Results

The estimation of different tax and non-tax revenues is pursued by first examining the general model of equation 3 to 6. Defence expenditure, however, was found to be superfluous through formal hypothesis testing. The estimations are reported below.

$$Td=-10.3+0.29PAID+1.62GDP-0.24D91 \tag{10}$$
$$(-10.4)^* \quad (6.9)^* \quad (12.9)^* \quad (-3.09)^*$$
$$\bar{R}^2=0.96 \qquad DW=1.94 \qquad Period:1968-91$$

$$Ti=-8.9+0.95NAVA+0.19PAID+0.69Cp+0.18D68+0.15D75-0.18D78] \tag{11}$$
$$(-3.2)^* \quad (5.7)^* \quad (4.2)^* \quad (3.8)^* \quad (2.2)^{**} \qquad (2.02)^{***}$$
$$\bar{R}^2=0.90 \qquad DW=2.05 \qquad F=37 \quad Period:1968-91$$

$$NTR=-0.76+0.73PAID+0.87D7591+0.41D68 \tag{12}$$
$$(1.27) \qquad (7.4)^* \qquad (8.7)^* \quad (1.76)^{***}$$
$$\bar{R}^2=0.87 \qquad DW=1.73 \qquad F=51 \qquad Period: 1968-91$$

*, ** and *** imply significance level of, respectively, 1, 5 and 10 percent.

As can be observed, the empirical investigation of the fiscal response of the government was in line with the discussion we had in section 3.1. Our alternative argument, the functional properties of project aid requires a different arrangement in such a way that the aid recipient government has to commit itself to raise its tax and non-tax revenue to cope with the requirement of the inflow of project aid, is supported empirically. Direct taxes and other indirect taxes have statistically significant positive elasticity with respect to project aid.

In estimating government expenditure and financing, we used the same approach: from general model to specific to reach at parsimonious result. Following the principle of testing downwards, public investment and lagged recurrent expenditure in government consumption estimation become superfluous. Results are reported below,

$$RE=1.6+0.59RR+0.22DEF+0.15D75+0.12d90+0.11D91 \tag{13}$$
$$(4.3)^* \quad (8.0)^* \quad (6.5)^* \quad (3.2)^* \quad (2.53)^{**} \qquad (2.14)^{**}$$
$$\bar{R}^2=0.97 \qquad DW=2.06 \qquad F=172 \qquad Period:1968-91$$

$$Ig=-389+1.7PAID+504D7591+195D68 \tag{14}$$
$$(-10.9)^* \qquad (27.1)^* \quad (16.9)^* \qquad (2.93)^*$$
$$\bar{R}^2=0.98 \qquad DW=2.09 \qquad F=448 \qquad Period:1968-91$$

$$\Delta DCg=-75.9+0.43PAID-0.65Sg+258D7591+524D79 \tag{15}$$
$$(-1.2) \qquad (3.04)^* \quad (-4.07)^* \qquad (4.02)^* \quad (4.05)$$
$$\bar{R}^2=0.80 \qquad DW=1.82 \qquad F=23 \qquad Period:1968-91$$

*, ** and *** imply significance level of, respectively, 1, 5 and 10 percent.

Public investment, which was propelled by project aid, has not been followed by subsequent recurrent expenditure. For curiosity I regressed government consumption against project aid. The regression result yields a very low coefficient which implies no theoretically meaningful relationship. The result implies that capacity creation in public sector was not followed by capacity utilisation. Although the strong constraint to government consumption comes from its recurrent revenue (the elasticity being 0.59), defence expenditure has also its own pressure on recurrent expenditure.

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[25] The t-statistics are given in parentheses immediately below each estimation. It tests the hypothesis $H_0: \beta_j = 0$.

The estimation in public investment involves both transformed (transformed to natural logarithms) and non-transformed variables. Judgement for selection should lie on the R^2 as the dependent variable is not the same.[26] In both estimation, however, the coefficient of determination is the same. So, our judgement lies on the DW statistic. DW statistic in the transformed variables lies in zone of indecision while that of non-transformed passes the formal hypothesis testing of no autocorrelation. The result significantly supports our previous argument that the relationship between project aid and investment is more than one-for-one, i.e., a one dollar increase in project aid will be followed by a more than one dollar increase in public investment. As discussed above, government tried to raise its revenue to finance the local currency component of the investment cost. In most cases, however, there was neither recurrent budget surplus nor non-bank borrowings. Hence, government used, as a last resort, domestic bank borrowing to finance its deficit by transferring resources from private sector via distorted domestic credit policy, rationing.

7 Summary

Project aid, unlike the usual claims of the response of government budget to aid inflows, forced the government to raise its revenue. Although aggregate tax does not seem to increase along with project aid, direct and indirect taxes have a significant positive relationship. Furthermore, the efforts to generate the required local fund has also exerted pressure on the government to raise its non-tax revenue particularly by transferring public enterprises' net surplus to the central treasury of the state. In the context where the state takes a leading role in the economic activity, it seems that non-tax revenue constitutes a considerable share in government efforts to raise the required local funds.

Although the government has managed to raise its recurrent revenue, project aid-financed capacity creation was not followed by a subsequent recurrent expenditure. Even though total recurrent expenditure was constrained by total recurrent revenue (i.e., financing of recurrent expenditure is limited to available recurrent revenue), the unexpected observed pattern between project aid and recurrent expenditure could not be ascribed only to the pattern of recurrent revenue. Instead, it was the preference of the government to solve the internal conflict by a heavy and protracted war, which absorbed a considerable amount of recurrent revenue and which explains the absence of simultaneous growth in recurrent expenditure. This process has led the economy, particularly the industry sector to forgo full utilisation of created capacity, which in its turn, constrained the tax revenue that could have been released.[27]

It is also proved that in the absence of real savings the government resorted to domestic bank borrowings. Hence, the fiscal adjustment to the aid inflow, generating the local fund for local currency component of the aid-financed public investment cost in excess of real public savings, was borne by transferring resources from private savings to the public sector through distorted preferential domestic credit policies by crowding-out private investment and depressing personal consumption. Distorted domestic credit policies (rationing with preferential treatment to public sector), therefore, was endogenous to systematic relationship existed between project aid and government budget.

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[26] See Mukherjee, White and Wuyts 1998:149-53.
[27] In MEDaC (1999:229) report, for instance, it was pointed out that industry has been operating below 30 percent of its capacity in the second half of the 1980s.

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