

Fiscal Effects of Foreign Aid Flows in Ethiopia: Evidence from Econometric Analysis

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Abstract

This paper investigates the fiscal effects of foreign aid flows in Ethiopia for the sample period of 1974 – 2014 using annual data. The paper used Cointegrated Vector autoregressive (CVAR) methodology to investigate dynamic relationship in long run as well as in the short run among the variables: aggregated government expenditure, revenue, domestic borrowing, aid grant and aid loan. The paper also used descriptive analysis for brief exploration of fiscal performance in Ethiopia. The econometric analysis indicates three cointegrating long run relationship among variables. The main findings of the econometric analysis result suggest that aid components have positive and significant effect on total expenditure in long run as well as short run; and aid loan is the adjusting variable in this relation. Because it is the loan variable that adjusts to the equilibrium when the expenditure relation out of the steady state. Also it is found that aid components have positive and significant effect on revenue, with aid grant having strong effect. On the other hand the study found that aid grant has a positive and significant effect on domestic borrowing in the long run but there is found ‘substitution’ effect of grant on domestic borrowing in short run. On the other hand aid loan have found insignificant effect on domestic borrowing both in long run and short run. The policy implication for this finding is that the government policy makers have to adopt and implement appropriate strategy to reduce expensive domestic borrowing. It can be done by emphasizing on domestic resource mobilization like mobilizing domestic saving and deeply reforming and mobilizing taxation revenue rather than borrowing.

1. INTRODUCTION

Developing countries are constrained with domestic savings and foreign exchange earnings. In countries constrained by such resource gap, foreign aid is an optimal means to break the poverty circle and serve to supplement these gaps simultaneously Chenery and Strout (1966).

Ethiopia, being one of the underdeveloped countries, characterized by the problem of insufficient domestic resources (savings-investment gap, foreign exchange gap and fiscal gap) to reveal the target development objectives. In the last five decades Ethiopian economy experienced continuously increasing resource gaps. The savings-investment gap on average was 1.79 percent of GDP during the Imperial period (1960/61-1973/74) which also increased to 6.18 percent of the GDP during the Dergue period (1974/75-1990/91) then jumped to 13.8 percent of the GDP in the EPRDF (1991/92- 2014/15). Similarly trade related gap, hence inadequate availability of foreign exchange reserve inherently practiced, it has been widening from 1.79 percent of GDP on average during 1960/61-1973/74 to 5.28 percent of GDP during dergue and then rose to 14.04 percent of GDP in the EPRDF (1991/92- 2014/15) [author’s computation from MOFED data].

Bacha (1990) and Taylor (1994) introducing fiscal constraint as a third gap in their (three gap model) argued that those governments of the developing countries face great challenges in mobilizing domestic revenue raising capacity. Which also result in a gap between what they could collect and what they actually collect to cover a desired level of expenditure, hence leading to fiscal gap. Ethiopian economy is also challenged by such binding constraint, it was on average 2.3 percent of GDP during Imperial era. This fiscal constraint (gap) annually widen to 6.5 percent of GDP and 6.95 percent of GDP on average in Dergue period and EPRDF (1990/91 to 2013/14) respectively [author’s computation from MOFED data]. This fiscal constraint (the short fall of domestic revenue mobilization effort ably to finance targeted expenditure levels) is similar with either savings or foreign exchanges gap, it may be a host of constraint in a wide range of public spending.

Hence, the three gap model predicts that foreign aid can supplement savings, foreign exchange and fiscal gap. So it serves to manage the domestic resource gap, which is considered to be an important ladder for accelerating growth and ultimately to ensure self-capacitated development without aid in the long run in highly-indebted developing countries (Bacha, 1990).

Furthermore, the subject of foreign aid effectiveness has become also a concern in attaining the Millennium Development Goals (MDG) and in improving the welfare of the public through a channel of fiscal policy variables in developing countries. However, its effectiveness sometimes argued based on its components. Brautigam, 2000, Gupta et al., 2003, Benedek et al., 2012, argue that loans are more effective than grants. This is because loans are expected to be paid back hence the need for repayment motivates governments to spend on development programmes while on countries highly dependent on aid, grants tend to have lower levels of tax effort, suggesting that large amounts of aid may serve to reinforce inadequate revenue collection efforts as it is politically cheaper source of revenue.

On the other hand, Rogoff (2003), argued that “it is vital that massive aid increases come mainly in the form of grants, not loans” that continuous flow of aid in the form of loan may lead to massive debt accumulation (debt overhang) in many developing countries hence failing to touch targeted development objectives. This issue has risen with calls for donors to turn from loans to grants since such an approach would also avoid worsening debt sustainability outlook of these countries.

In general, aid should be expected to have impact on fiscal behavior, especially on the level of government spending, revenue mobilization and domestic borrowing particularly in the low-income countries that receive large amount. However, the flow of these finance mainly given to the government, hence the overall economic impact of these inflows will be smoothened (mediated) by government behavior especially, fiscal responses of recipient countries McGillivray and Morrissey (2001).

Finally, the flow of foreign finance from rich to poor countries has been increasing, so this paper investigate how exactly aid works and which aid component is the most efficient in helping Ethiopia; and how the government should respond fiscally to challenges hosted by increasing flows of foreign finance.

1.1 Research questions

Ethiopia, in general least developed countries in Africa are characterised by high dependency on foreign finance to support the expenditures that is essential to improve the living standards of the poor and to maximize their desires of expenditure plans. These foreign finance flows are directly given to the recipient country governments, hence it is expected to have either positive or negative effect on the fiscal policy instruments which are the transmission channels through which aid affects the economy of the recipient country. Which is also core and controversial issue among researchers raising the question of aid effectiveness. Departing from this core point of view the paper was interested to get answer for the following questions.

- i. Does foreign aid increase spending? This interest of question in this paper is to investigate the effect of foreign aid on Government spending or interested to answer either foreign aid flows increase or decrease public spending, which is expected to have positive relation among the two variables.
- ii. Does foreign aid inflow negatively affect government’s incentive to mobilize domestic revenue? This is also another interest of the paper to investigate either foreign aid inflows negatively affect governments incentive to mobilize domestic revenue. From the view point of aid effectiveness it is expected to have positive and significant effect of aid on revenue.
- iii. Does inflow of foreign aid displace domestic borrowing? This is the third interest of question designed to be answered in this paper either foreign aid displaces domestic borrowing or not in Ethiopia. When the flows of foreign aid are volatile or when it fail to come as expected, the government may wish to smooth its spending by domestic borrowing. In this case, aid flows and domestic borrowing can be expected to have negative relation or the increasing flow of aid should reduce domestic borrowing. When this result is found they are considered as ‘substitutes’.

These potential questions are the core points in which this paper is interested to considering as a corner stone from the view point of aid effectiveness in developing countries, especially in Africa, in our case in Ethiopia.

1.2 Objective of the study

The main objective of this paper was empirically analyzing the effect of aid components on Revenue mobilization effort, public spending and domestic borrowing in Ethiopia

2. DATA SOURCE AND METHODOLOGY

2.1 Data Source

The data sources for this study include secondary data from the Ministry of Finance and Economic Development (MOFED), Ethiopian Revenue and Custom Authority (ERCA), National Bank of Ethiopia (NBE). The data on aid obtained represent actual flow of aid finance through government budget.

There are different forms of foreign aid flows to the country such as technical assistance, emergency food aid and donor implemented projects. These forms of aid flows do not come directly through the central government treasury and hence are not known (reported) in the fiscal budget. Hence, the central government is not rational about the donor activities and aid flows through these programs, therefore there is no influence on the fiscal decision of the government Martins, 2010. For this reason this paper used aid flow that pass through the central government’s budget treasury which directly influences fiscal decision of the government.

Gupta et al., 2003; Benedek et al., 2012, indicated that aid components have different effects on government fiscal decision. As we consider aid through budget, this paper have used disaggregate budget aid in to aid grant and aid loan. With the aim to minimize degrees of freedom and complications in the analysis this paper also used aggregated form of public spending, revenue and domestic borrowing. The term public spending and government expenditure are used interchangeably throughout this paper and data on this variable is obtained from MOFED and NBE and aggregate form (sum of recurrent expenditure and capital expenditure) is used for

econometric analysis. Another variable is revenue the data also obtained from MOFED, NBE and ERCA. The variable is used in aggregate form which includes the revenue collected domestically from tax revenue and non tax revenue. The other variable used is domestic borrowing the data was obtained from MOFED and NBE. It includes the borrowings of the government from domestic sources (from bank sources and non bank sources). All the variables are measured in millions of birr, and GDP deflator is used to transform data in econometric analysis.

2.2 Methodology of the Study

Both descriptive¹ and econometric analysis is used in this paper to briefly explore fiscal performance and aid flows and its effect in Ethiopia. For this purpose the 40 annual data observation of the sample period of 1974/75 – 2013/14 for the econometric time series analysis has used.

This paper employed Cointegrated Vector autoregressive (CVAR) model for empirical analysis. In a technique of CVAR model all variables are modeled as endogenous, in the sense that dependent variables are allowed to be influenced with a past values of a variables including their past values (or with a number of lags) as well as past realizations of other variables and deterministic components (Juselius, 2005; Martins, 2010).

As a model of time series econometric methods, it helps to present a long-run equilibrium (cointegrating) relationship in fiscal aggregates (revenues, spending and borrowing), and aid avoiding estimating target variables. It also allows a distinction in estimating the long-run equilibrium and short run adjustment to the equilibrium relationships between the variables (Martins, 2010); and also important in the analysis of dynamic process in that it does not require a priori specification (a-theoretical); hence it allows data to speak freely in the dynamics that drive the process (Hendery and Juselius, 2000).

The CVAR is a preferable method over the other for analyzing time series data that have the behavior of trending and unit root that give rise to Cointegration (stationary combination of the system variables). The variables included in a VAR model are found to be non-stationary, integrated of the same order I (1), and cointegrated; they can be represented by a vector error-correction model (VECM). A characteristic feature of the model is the inclusion of both differences (Δz_t), and levels (z_t) in the same model, allowing us to investigate both short-run and long-run effects in the data.

2.2.1 The Cointegrated VAR representation of the Model

This paper estimated a model with a maximum of five variables at a time. The variables included in the model are disaggregated aid components (aid grants and aid loan), revenue, aggregated government spending and domestic borrowing.

¹ Available in request of the author

$$\begin{pmatrix} \Delta \text{TOTEXP}_t \\ \Delta \text{REVENUE}_t \\ \Delta \text{DBORROW}_t \\ \Delta \text{loan}_t \\ \Delta \text{grant}_t \end{pmatrix} = \begin{pmatrix} \alpha_{11} & \alpha_{12} & \alpha_{13} & \alpha_{14} & \alpha_{15} \\ \alpha_{21} & \alpha_{22} & \alpha_{23} & \alpha_{24} & \alpha_{25} \\ \alpha_{31} & \alpha_{32} & \alpha_{33} & \alpha_{34} & \alpha_{35} \\ \alpha_{41} & \alpha_{42} & \alpha_{43} & \alpha_{44} & \alpha_{45} \\ \alpha_{51} & \alpha_{52} & \alpha_{53} & \alpha_{54} & \alpha_{55} \end{pmatrix} \begin{pmatrix} \beta_{11} & \beta_{12} & \beta_{13} & \beta_{14} & \beta_{15} \\ \beta_{21} & \beta_{22} & \beta_{23} & \beta_{24} & \beta_{25} \\ \beta_{31} & \beta_{32} & \beta_{33} & \beta_{34} & \beta_{35} \\ \beta_{41} & \beta_{42} & \beta_{43} & \beta_{44} & \beta_{45} \\ \beta_{51} & \beta_{52} & \beta_{53} & \beta_{54} & \beta_{55} \end{pmatrix} \begin{pmatrix} \text{TOTEXP}_{t-1} \\ \text{REVENUE}_{t-1} \\ \text{DBORROW}_{t-1} \\ \text{LOAN}_{t-1} \\ \text{GRANT}_{t-1} \end{pmatrix} \\
 + \begin{pmatrix} \Gamma_{11} & \Gamma_{12} & \Gamma_{13} & \Gamma_{14} & \Gamma_{15} \\ \Gamma_{21} & \Gamma_{22} & \Gamma_{23} & \Gamma_{24} & \Gamma_{25} \\ \Gamma_{31} & \Gamma_{32} & \Gamma_{33} & \Gamma_{34} & \Gamma_{35} \\ \Gamma_{41} & \Gamma_{42} & \Gamma_{43} & \Gamma_{44} & \Gamma_{45} \\ \Gamma_{51} & \Gamma_{52} & \Gamma_{53} & \Gamma_{54} & \Gamma_{55} \end{pmatrix} \begin{pmatrix} \Delta \text{TOTEXP}_{t-k+1} \\ \Delta \text{REVENUE}_{t-k+1} \\ \Delta \text{DBORROW}_{t-k+1} \\ \Delta \text{LOAN}_{t-k+1} \\ \Delta \text{GRANT}_{t-k+1} \end{pmatrix} + \begin{pmatrix} \delta_1 \\ \delta_2 \\ \delta_3 \\ \delta_4 \\ \delta_5 \end{pmatrix} \begin{pmatrix} \text{constant}_t \\ \text{trend}_t \\ \text{dummy}_t \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ \varepsilon_{3t} \\ \varepsilon_{4t} \\ \varepsilon_{5t} \end{pmatrix} \\
 \Delta \mathbf{z}_t = \Pi \mathbf{z}_{t-1} + \sum_{i=1}^{k-1} \Gamma_i \Delta \mathbf{z}_{t-i+1} + \delta D_t + \varepsilon_t$$

where \mathbf{z}_t is a 5 dimensional vector of endogenous variables described as Expenditure, Revenue, Grant, Loans and domestic borrowing. D_t is a vector of deterministic components (such as constant, deterministic trend, and dummy variables) with a vector of coefficients δ ; k denotes the selected lag length; and ε_t is a 5×1 vector of unobservable error terms, that are assumed to be identically independently normally distributed over zero mean and time invariant variance, $\varepsilon_t \sim \text{iidN}(0, \Omega)$, Δ is the first difference operator, $\Pi = \alpha\beta'$ where α and β are $p \times r$ coefficient matrices (with $r < p$), $\beta'z_t$ defines the stationary long-run cointegrating relations ($r \times 1$) or can be interpreted as long-run economic steady-state relations and are therefore of considerable economic interest and α denotes the adjustment coefficients to the equilibrium error (Juselius, 2005).

Deterministic components in a Cointegrated VAR

Constant, Trend and Dummy Variables

In the system, the cointegrating relation cancels stochastic trends hence the resulting Cointegration relation is detrended even if the variables in individual series are trending but the deterministic trend left. Hence, this accounted to include a linear trend in the Cointegration space to achieve stationarity Hendry and Juselius (2000). In the system of cointegrated VAR model specification, the deterministic components (constant terms, trends and dummy variables) are influential components in the analysis. If we incorporate non zero mean in the system, the model appears with a constant term and the presence of it in the short run relations, i.e. $E(\Delta z_t) \neq 0$ implies the linear trends in the variables do not cancel in the cointegrating relations, i.e. our model contain 'trend-stationary' variables or trend-stationary cointegrating relations.

As far as concerning the justification and inclusion of dummy variables, in Ethiopia between 1974/75 and 2013/14 there is a shift in politics and economic structure in 1991, which is likely to influence the analysis due to the radical shift in the policies between regimes. Therefore, it is important to include shift dummy corresponding to the political regime change of 1991. Hence, taking into account of using regime shift dummy, our statistical analysis and results become appropriate because it is used as a control for the shocks of policy shift on the variables; and it is designed to take value 1 after 1991 and zero otherwise.

The inclusion of dummy variable is limited on a political regime change because including many

dummy for every fluctuation of data to correct outlier will create a spuriously delayed effect which is likely to bias the estimates and the empirical model often exhibits residual autocorrelations hence, it causes to violate the independence assumption of the model Juselius(2005).

Stationarity and Unit root tests

The regression out put for the unit root test by using Augmented Dickey Fuller(ADF) test below table 4.1 indicates that the hypothesis of variables are I(1) with drift and trend are not rejected at 1%, 5% and 10%.

Table: 4.1 Stationarity and unit root test

Variables in level				Variables in 1 st diff.			
Variable	intercept	Trend and constant	Order of Integration	Variable	intercept	Trend and constant	Order of Integration
TOTEXP	2.3	0.36	I(1)	ΔTOTEXP	-3.3**	-4.1**	I(0)
REVENUE	2.6	0.93	I(1)	ΔREVENUE	-2.63**	-3.41***	I(0)
DBORROW	-1.53	-2.51	I(1)	ΔDBORROW	-4.2**	-4.1**	I(0)
LOAN	-1.3	-1.9	I(1)	ΔLOAN	-5.03**	-4.99**	I(0)
GRANT	-0.56	-1.84	I(1)	ΔGRANT	-4.02**	-4.06**	I(0)

Note: *, ** and *** indicate 1%, 5% and 10% significance respectively

Lag length selection (determination)

There are different types of tests to determine significant lag length of the model.

$AIC = \ln |\Omega| + (p^2k) \frac{z}{T}$ where, $|\Omega|$ is the determinant of residual covariance matrix,

$SBIC = \ln |\Omega| + (p^2k) \frac{\ln T}{T}$ T is significant observations, p is number of variable,

$HQIC = \ln |\Omega| + (p^2k) \frac{2 \ln \ln T}{T}$ k is number of lags

All of these information criterias are based on the maximal value of the LL function with an additional penalizing factor related to the number of estimated parametres. Their calculated value differ according to the length of penalty associated with the additional parametres as a result of including more lag. Hence, the choice of the significant lag(k) determined based on the obtained smallest value of information criteria.

Depending up on the above reseanings this paper examined five dimensional system of fiscal dynamics with a maximum of three lag lengths.

Table: 4.2 Lag length determination test result

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-917.933				4.2e+15	50.1585	50.312	50.5939
1	-806.97	221.93	25	0.000	4.1e+13	45.5119	46.0491*	47.0357*
2	-779.299	55.341	25	0.000	3.9e+13	45.3675	46.2885	47.9798
3	-745.749	67.099*	25	0.000	3.2e+13*	44.9054*	46.2101	48.6061

* indicates significant lag length of the system

Finally, a maximum lag is determined based on the information criteria ,SBIC and HQIC indicates a significant lag length of one while LR, FPE and AIC indicates a significant lag length of three. The correct lag is determined based on lowest value of information criteria accordingly the lag length of three is selected.

Determination of cointegration rank: Johanson test for cointegration rank

The existence of Cointegration among the variables in the system implies a linear combinations of the variables of the vector process that are integrated of lower order than the process itself. Similarly when two or several variables have common stochastic and deterministic trends, they will show a tendency to move together in the long-run. The test result below table at 5% significance level indicates that there are three cointegrating relations hence Π has reduced rank i.e. $0 < \Pi(r) < p$.

Table: 4.3 Cointegration rank determination test(trace test) result

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.920228	198.9049	88.80380	0.0000
At most 1 *	0.823174	107.8762	63.87610	0.0000
At most 2 *	0.598709	45.50295	42.91525	0.0269
At most 3	0.184376	12.63247	25.87211	0.7663
At most 4	0.136792	5.295600	12.51798	0.5545

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

3. ESTIMATION RESULTS AND DISCUSSION

As discussed before three cointegrating equilibrium relations are identified, namely the relation ship between Government expenditure and foreign aid components, the cointegrating relation between Revenue and foreign aid components and the cointegrating relation between domestic borrowing and foreign aid components.

Each cointegrating relation achieved just(exactly) identified structure automatically by statistical software package Eviews version 7 with two zero restrictions and one normalization the other two aid components unrestricted to identify the effect of aid components on the normalised variable which eases economic interpretability and simplify to understand the effect.

The matrix of normalization and restriction imposed cointegrating relations and the matrix of adjustment coefficients are presented in table 4.6 below. A variable in adjustment coefficient matrix is said to be adjusting to the equilibrium when it has significant t-ratio(coefficients with a t-ratio greater than 2.08 are considered significant by OLS).

The equilibrium correction relation explores how the process is pulled towards equilibrium position(steady state) with the force of adjustment coefficients which activates immediately when the process exits equilibrium position($\beta' z_t - \beta_0 \neq 0$) due to internal and external shocks. When this condition happens the adjustment coefficients may force the process back towards the equilibrium position with the velocity of adjustment depending on the length of adjustment coefficient and size of equilibrium error. The cointegrating relation equation describes a system at rest(steady state) or stationary when there is 'no economic adjustment forces(incentive) to change the system to a new position'(Jusilius, 2005). These error correction term or cointegrating relations represent stationary linear combination of the cointegrated variables.

The result in cointegrating equation(1) indicates the long run effect (relationship) of aid components on total expenditure. The cointegrating equation is just identified by normalising on TOTEXP(total expenditure) and by imposing zero restriction on REVENUE and DBORROW(domestic borrowing) and aid components remaining unrestricted and is stationary relation.

Table: 4.4 Long run result of cointegrated vector autoregressive model

3 Cointegrating Equation(s):		Log likelihood	-624.0574		
Normalized cointegrating coefficients (standard error in parentheses)					
TOTEXP	REVENUE	DBORROW	LOAN	GRANT	@TREND(75)
1.000000	0.000000	0.000000	-3.002316 (0.30134)	-5.584322 (0.47368)	3.799420 (2.44129)
0.000000	1.000000	0.000000	-1.896031 (0.19263)	-3.185126 (0.30279)	-1.688462 (1.56056)
0.000000	0.000000	1.000000	-0.082518 (0.06090)	-0.631752 (0.09573)	-0.570541 (0.49336)
Adjustment coefficients (standard error in parentheses)					
D(TOTEXP)	0.002302 (0.39046)	0.656694 (0.52537)	-1.222810 (1.18208)		
D(REVENUE)	-0.146167 (0.25005)	1.182732 (0.33644)	-0.523574 (0.75700)		
D(DBORRO)	-0.177323 (0.10172)	0.131576 (0.13687)	-1.245943 (0.30796)		
D(LOAN)	0.891169 (0.16554)	-1.082644 (0.22274)	0.411515 (0.50116)		
D(GRANT)	-0.117565 (0.07346)	0.417856 (0.09884)	1.323470 (0.22239)		

The results of long run equilibrium relation indicates that both aid components (aid loan and aid grants) have positive and significant effect on total expenditure, the aid grants having more strong effect than the aid loan both in terms of magnitude and significance. When we look at the adjustment coefficients, if aid grants are failed to come as expected or suddenly stopped causing total expenditure relation out of the steady state, the government should increase loan to adjust equilibrium relation. This is because it is the loan equation that significantly adjust to expenditure disequilibrium.

As expected, the existence of long run positive effect of both components of foreign aid on total expenditure implies that foreign aid is a key source of financing for the government of Ethiopia in both political regime of the sample period and it is effective. It diverts and eases domestic sources of revenue to finance non productive expenditure and to finance the deficit. The adjustment of expenditure equilibrium relation by aid loan has an interesting interpretation. The receipt of loan is based on the interest of the recipient government and it comes with less policy prescriptions attached to it. Hence, the government of Ethiopia sets her expenditure plans based on her interest adjusting by loan followed by domestic source of financing when unexpected short fall occurs on the aid grant.

The result of long run cointegrating equation (2) confirms the relationship between revenue and aid components. The cointegrating relation is just identified by normalizing on REVENUE and imposing zero restriction on TOTEXP and DBORROW and remaining aid components unrestricted which also eases economic interpretability of the relation.

The normalization and restriction imposed long run cointegrating relation indicates that there is positive and significant effect of aid components on revenue, aid grant having more strong effect than loans both in terms of magnitude and significance. When we see the adjustment coefficients in this relation aid grant is significantly adjusting. For the given level of expenditure, when there occurs unexpected shocks (short fall) in budget equilibrium, donors are responsive to support budget through grants. Hence, this cointegrating relation might be used as a 'proxy' for a donors to deliver their aid finance. This may also indicate donors intention to support government commitment to improve tax administration system and to make reforms in tax policies before they disburse aid funds to the budget. This may be taken as a donor 'aid conditionality' relation axis. This relation has given answer for the question does foreign aid flows negatively affect governments incentive to mobilize revenue effort in Ethiopia? Surprisingly, No!

The government of Ethiopia have been made various types of reforms like reducing excessive high tax rates, trade liberalization, improve tax administration as well as fiscal decentralization and institutional set up. These measures are the exalted role of aid policy associated with reform programmes. This may be suggested that positive effect of policy prescriptions attached to aid the government of Ethiopia to take policy reforms and measures aiming at raising and mobilizing domestic sources of revenue ably to finance desired expenditure needs in the long run without aid. Tax revenue should be the major source of government revenue and it should be the deriving force in insuring sustainable economic growth.

The third long run cointegrating equation confirms the relationship between domestic borrowing and

foreign aid and the relation also achieved just identified structure. It is found that there is positive and significant effect of aid grant on domestic borrowing while aid loan has insignificant effect. When we see the adjustment coefficients aid grants seem to be the most adjusting to the long-run disequilibrium followed by domestic borrowing. This adjustment order may imply that when donor countries and Ethiopian government are in a position of common interest and as result donors unexpectedly increases grant modality to support pro poor expenditures, the government keeps the level of expenditure by reducing domestic borrowing.

a. Short Run Results of Cointegrated VAR (VECM) Model

The short run government total expenditure equation shows that both forms of aid modalities (aid grant and aid loan) have statistically significant positive effect on expenditure. Domestic borrowing has also positive effect on total expenditure, this also suggests that domestic borrowing is to compensate for unexpected short fall in the flow of foreign finance. But revenue have found positive insignificant effect this may also suggest that the government is diverting the domestic revenue to debt servicing for the increase of aid flows.

From the revenue equation it is found that as expected both aid components and domestic borrowing have positive and significant effect on revenue. The mean shift dummy1991 has positive and significant effect on revenue i.e. it has positive mean shift. This implies that the 1991 change of structure in all the political and economic policy created good opportunity to improve revenue collection system to make significant and successful reforms in tax policy and administration.

The domestic borrowing equation also shows that the previous period borrowing has positive effect on current period. Aid grant has significant and negative effect on domestic borrowing while aid loan also have similar effect but insignificant. This also indicates effectively that aid displaces domestic borrowing in short run this result corroborates the finding of (Martins, 2010). The negative and significant coefficient on CointEq3 implies that domestic borrowing is adjusting to balance equilibrium for unexpected fluctuations in the flow of foreign finance. This finding suggests that in short run as expected foreign aid displaces domestic borrowing.

From the loan equation we see that loan and revenue have also positive relation, the previous period loan also having negative effect on current period loan. From the equilibrium error correction coefficient, the significant coefficients on CointEq(1) and (2) shows that loan is adjusting for the equilibrium error in short run.

The grant equation also indicates previous year loan and grant have positive effect on the aid grant but domestic borrowing have negative effect when significant. This finding also suggests aid grant and domestic borrowing are substitutes in short run and loan follows the path of grant. The mean shift dummy1991 has positive and significant effect on grant. This may imply that following the 1991 change of structure in all the political and economic policy donors are comforted with the change and they shifted the form of modalities to grant to support the change and reforms, this is also 'conditionality' relation to aid flows. This short run results corroborate the findings of long run relations except for the relation of domestic borrowing and aid grant, it found substitution effect in short run.

4. CONCLUSIONS AND POLICY IMPLICATIONS

4.1 CONCLUSION

This paper investigated the fiscal effects of foreign aid flows in Ethiopia for the sample period of 1974/75 to 2013/14 annual data. To do so the paper used a Cointegrated VAR (CVAR) methodology that is useful to explore the complex dynamics that occur in the government fiscal behavior. In the procedure of analysis all the basic assumptions tests of the CVAR model, such as multivariate normality test, stability test of the model, LM residual autocorrelation test (which is most sensitive test because once left over autocorrelation is found in the model it has a power to bias the estimates and invalidate test distributions), residual heteroscedasticity and stationarity of cointegrating relations in general pre-estimation tests (unit root test, lag length selection test and Cointegration rank determination test) and post estimation tests are performed and successfully satisfied, thus making this methodology suitable for the analysis of the data as well as allowing to draw valid and robust inferences.

The paper was interested to get answer for three hypothesised questions. The econometric, cointegrating relation determination and estimation results also suggested the presence of three empirical long-run relations. Also to investigate short run effect of the aid flow on fiscal policy variables, vector error correction model (VECM) is used.

The estimation results suggested that both aid components (aid grant and aid loan) have positive and significant effect on total expenditure in long run and short run equations this finding also corroborates Mascagni (2013) result of aggregated expenditure model. This effect is stronger for aid grant both in magnitude and significance. Domestic borrowing is compensating for unexpected short fall in the flow of foreign finance. From the adjustment of expenditure disequilibrium, the government of Ethiopia uses the loan to adjust for unexpected fluctuation or volatility of aid grants.

This adjustment has implication with the Ethiopia's history of independence; in her history Ethiopia

never raised her hands to foreigners among the African countries. Most of the time aid grants come with “do that we give this” policy prescriptions from multilateral donors, when donors come with this scenario without the political will of the government to implement their policy as a result they fail to disburse aid grant. When this is a case, the Ethiopian government keeps the expenditure equilibrium by increasing loan, since the receipt of loan is based on the interest of recipient with less policy winds. Hence, the government of Ethiopia set her spending plans and development targets according to her interest and willingness and then tries to find resources to finance these ‘agendas’ or programmes.

So, the strong relation between total expenditure and aid grants indicate that the causality runs from expenditure to foreign aid but not from foreign aid to expenditure i.e. donors follow Ethiopia’s spending and development plans to disburse aid funds but not Ethiopia wait for foreigners to set her ambitions plans. The receipt of foreign finance to Ethiopia is recently increasing because as noted by Martins (2007) ‘recent economic policies and performance have been praised by donor countries’ this also leads to the finding of Burnside and Dollar (2000) ‘good policies are rewarded by higher aid’. In general, we can conclude that aid has been effectively contributed to growth and poverty reduction because it has been associated with effective policies and institutional reforms and has supported the provision of public services relevant to sustain longer-term growth.

The econometric finding also shows that both aid components (grants and loans) have statistically significant positive effect on revenue in the long run as well as in the short run. It is found that aid grant has stronger positive effect than aid loan both interms of magnitude and significance. This finding disproves the argument of (Gupta et al., 2003; Benedek et al., 2012) for Ethiopia that suggests loans are more effective than grants in that grants have reducing effect on tax collection effort. Hence, both forms of aid modalities are effective in Ethiopia but inclining to grant.

The government of Ethiopia have been made various types of reforms in institutional set up of revenue collection systems such as modernizing tax administration, reforming tax policies, trade liberalization, introducing new tax systems like VAT in 2003 as well as fiscal decentralization. These reforms are supported by foreign aid since the reform of tax policy, administration and trade reform were a major components of structural adjustment reforms in the 1990s. It may be suggested that the positive effect of aid components on revenue may be aid advice that the government of Ethiopia to reform and improve tax policy and advance tax administration systems. This also indicates both donors and recipient are emphasised at raising and mobilizing domestic sources of revenue ably to finance desired expenditure needs in the long run without aid to sustaining longer-term growth. This is also recognition of the centrality of taxation revenue to growth.

Generally, the policy makers of Ethiopia are using aid flows to improve revenue collection efforts rather than substituting to make a country financially independent as a result the idea of substitution between aid and revenue is unwelcomed in the Ethiopian government. Hence, there is no adverse effect of foreign aid on revenue or there is not found disincentive of aid on Ethiopian government to increase revenue mobilization effort so aid to Ethiopia is a “beneficial policy” this finding also corroborates the finding of (Mascagni, 2013).

In general the findings of this study are encouraging. As expected, aid has been used to increase public expenditure and revenue in the long run as well as in the short run. But the effect of aid grant on domestic borrowing is not as expected negative in the long run but as expected there is displacement effect on domestic borrowing in the short run. However, aid loan has insignificant effect on domestic borrowing in the long run as well as in short run.

4.2 POLICY IMPLICATIONS

Foreign finance to developing countries is given with the intention of improving economic conditions of the poor recipients. It does this by supporting the development agendas through easing the financial constraints that the countries face in the development track and improve the living standard of the poor. This international community will of development can be achieved when there are good designed effective aid policies and the government expands the development oriented expenditures. Hence, the donors and government should give priority on financing capital expenditures which contribute to the enhancement of the economic development and welfare-improving for the recipient country.

Most of the time foreign finances come with the pressure to spend on the donor intended programs. On the other hand recipient government has its spending plans. When the recipient government fails to spend according to the donor interest, donors may renege to their promises and aid flows becomes subject to uncertainty (volatile). This suggests that aid is more uncertain than other sources of domestic revenues, and this may pose challenges for fiscal management or may have negative impact on the expenditure plans and aid management. Hence, the government should base spending plans on the domestic sources of financing or take into account in designing fiscal policy. This is because design of fiscal policy is under the control of the government, and it is better to rank financing source in the order of domestic revenue, foreign aid and domestic borrowing to finance expenditure plans.

Ethiopia, being underdeveloped country, is identified by its binding constraints (bottlenecks) to growth.

Hence to ensure self sustaining growth, donors and the government should adopt appropriate strategy and do more to build capacity to structural transformation of domestic economy. Also the government should prepare and implement appropriate strategy of reducing borrowing. This can be done by enhancing domestic resource mobilization to base expenditure and investment on domestic revenue and domestic savings to achieve self capacitated development and to reduce reliance on vulnerable foreign finance.

In generally, it is necessary donors to reduce aid uncertainty or increase the reliability and predictability of aid in order to improve fiscal planning and reduce the budget inefficiencies (to decrease expensive domestic borrowing and budget deficits). Finally, this paper used aggregated fiscal variables and disaggregated aid to investigate the effect of foreign aid on fiscal policy variables of Ethiopia. Hence, further research should be conducted to assess the fiscal impact of aid on disaggregated public expenditures and disaggregated revenues which would briefly shed light policy makers to understand which component is more responsive and properly to plan.

Post Estimation tests

Residual Autocorrelation test

The test of residual autocorrelation deviates from the assumption of uncorrelated residuals and it is important test in the CVAR model, because the test procedures of χ^2 and F-test are based on the uncorrelated residuals. The results (reported below) do not suggest any significant left-over autocorrelation for the given lag order 1 to 3. Hence, the model is correctly specified and the results are consistent and appropriate, so we can accept the results obtained without doubt.

Table: 4.14 Residual autocorrelation test

Lags	LM-Stat	Prob
1	29.59304	0.2399
2	30.65363	0.2007
3	21.66543	0.6550

Probs from chi-square with 25 df.

Test of Residual Heteroscedasticity

The test for residual heteroscedasticity (either residuals have constant variance or not) is the p^{th} order ARCH (Autoregressive Conditional Heteroscedasticity) test is used.

The test is approximately distributed as chi square (χ^2) with p degrees of freedom and the Null hypothesis (H0) of LM test for ARCH assumes no ARCH effect i.e. homoscedastic error terms. Table 4.14 below shows that the null of no ARCH effects at univariate level, as the null of homoscedastic errors or no heteroscedasticity can never be rejected.

Table: 4.15 LM test for ARCH effect (test of residual heteroscedasticity) result

Test	Equation	statistic	p-value
ARCH(3)	DTOTEXP	6.961	0.0731
ARCH(3)	DREVENUE	4.553	0.2076
ARCH(3)	DDBORROW	0.392	0.9418
ARCH(3)	DLOAN	5.409	0.1442
ARCH(3)	DGRANT	2.861	0.4135

H0: no ARCH effect vs H1: ARCH(p) distributed

Residual Normality test

The test result shows JB with $\chi^2(10) = 5.034918$ and p value of 0.8888 will not be rejected. The test of skeweness with p value of 0.5427 is accepted and the Kurtosis test with p value of 0.9635 is also accepted. Finally the results do not seem to suggest violations of the univariate and multi variate test of normality assumption. Hence, the test result proves the error terms follow a Gaussian (normal) distribution.

REFERENCES:

Bacha, E.L., (1990). "A Three Gap Model of Foreign Transfers and the GDP Growth Rate in Developing Counties". *Journal of Development Economics*, 32(2), 279-296.
 Benedek, D., Crivelli, E., Gupta, S., & Muthoora, P., (2012). Foreign aid and revenue. Still a crowding out effect? IMF working paper WP/12/86. Washington, DC: International Monetary Fund.
 Brautigam, D., (2000). Aid dependence and governance. Almquist & Wiksell: Stockholm, Sweden.
 Burnside, C. and D. Dollar, (2000). "Aid, Policies, and Growth". *The American Economic Review* 90 (4), 847-868.
 Clements, Benedict, Sanjeev Gupta, Alexander Pivovarsky, Erwin R. Tiongson, (2004). Foreign Aid: Grants versus Loans, Finance and Development.

- Giulia Mascagni, (2013). Fiscal Effects of Aid in Ethiopia: Evidence from CVAR applications. A University of Sussex DPhil thesis. Submitted for the degree of Doctor of Philosophy
Department of Economics, University of Sussex November 2013.
- Gupta, S., Clements, B., Pivovarsky, A., and E.R. Tiongson, (2003). Foreign aid and revenue response: does the composition of aid matter? IMF Working Paper WP/03/176: Washington DC.
- Gujirati, D., (2004). Basic Econometrics, Text Book. 4th Edition, The McGraw-Hills Companies, 2004.
- Hendry, D. F. and K. Juselius, (2000). Explaining cointegration analysis: Part II, Nuffield College, Oxford, OX1 1NF.
- Hollis B. Chenery and Alan M. Strout, (1966). Foreign Assistance and Economic Development. The American Economic Review, Volume LVI, Number 4, Part I, September 1966.
- Juselius, K., (2005). The Cointegrated VAR model. Methodology and Applications. Advanced Text in Econometrics.
Lance Taylor, (1994). "Gap Models". Journal of Development Economics, vol.45(1994)17-34. New School for Social Research, 65 Fifth Avenue, New York, NY 10003, USA.
- MacGillivray, Mark; Morrissey, Oliver., (2001). Fiscal effects of aid. WIDER Discussion Papers // World Institute for Development Economics (UNU-WIDER), No. 2001/61
- Martins, P. M. G., (2010). Fiscal Dynamics in Ethiopia: The Cointegrated VAR Model with Quarterly Data. Economics Departments Working Paper Series 2009-10, University of Sussex.
- Pedro, M.G Martins, (2007). The Impact of foreign aid on Government spending, Revenue and Domestic Borrowing in Ethiopia. International Poverty Centre. Working Paper, No.41.
- Peter S. Heller, (1975). A Model of Public Fiscal Behavior in Developing Countries: Aid, Investment, and Taxation. American Economic Review, June 1975.
- Rogoff Kenneth, (2003). Unlocking Growth in Africa: *Finance and Development*, Vol. 40, No.2, pp. 56-57.
- T. Bwire, O. Morrissey and T. Lloyd, (2013). The Fiscal Impact of Aid in Uganda: An Application of a Cointegrated Vector Autoregressive (CVAR) model. Working Paper No. 07/2013. School of Economics, The University of Nottingham, U.K March 2013
- Thomas E. Weiskopf, (1970). The Impact of Foreign capital Inflow on Domestic Savings in Underdeveloped Countries. Economic Development Report No. 156. July 1970.
- William Easterly, (1997). The Ghost of Financing Gap. How the Harrod-Domar Growth Model Still Haunts Development Economics. Policy Research Working Paper 1807. The World Bank Development Research Group, August 1997.
- World Bank (1998). Assessing aid, What works, what doesn't and why? A World Bank Policy Research Report: Oxford University Press.