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DYNAMIC EFFECTS OF FISCAL POLICY SHOCKS ON OUTPUT IN UGANDA

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ABSTRACT

Several studies world over have indicated varying effects of fiscal policy on economic growth in different countries. In this paper, we sought to establish the dynamic effects of fiscal policy shocks on output in Uganda, using SVAR analysis. We assumed that the steady state effect of aggregate demand shocks on output and tax revenue in Uganda is zero and, the contemporaneous effect of fiscal policy shocks on government spending in Uganda is zero. Our results indicated that fiscal policy shocks have a positive and permanent effect on output in Uganda and, the same shocks are the major drivers of variance in Uganda's output. These results ratify Uganda's choice to use fiscal policy, mainly investment in infrastructure development, as a tool to achieve economic growth.

Keywords: Fiscal, GDP, SVAR, Economy, Expenditure

1. INTRODUCTION

1.1 Overview

In many developing countries, fiscal policy is used as an economy stimulating tool in both the short-run and the long-run. The effectiveness of using fiscal policy differs from country to country depending on the structures of their economies. Various studies have made contradicting conclusions regarding the impact of fiscal policy on output. While one group of scholars claims that positive fiscal policy such as increase in government expenditure tends to have positive long run effects on output, another group argues that an increase in government expenditure may cause crowding out of private investment, which could have a negative long run effect on the economy.

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Uganda is a developing country which uses fiscal policy as one of its major tools for boosting output. Despite the slowdown in Uganda's real GDP growth in recent years, the country's economic performance has remained fairly strong and is projected to reach 5.9% in 2018, up from 4.8% in 2017 and 2.3% in 2016. Public expenditure on infrastructure is expected to be one of the main drivers of increase in economic growth in 2018 (African Development Bank 2018).

In this paper, we aimed at establishing the dynamic effects of autonomous fiscal policy shocks, particularly autonomous government spending shocks, on output in Uganda. Our study employed the structural vector autoregressive (SVAR) approach that was used by Blanchard and Quah (1989). The results show that in Uganda, autonomous fiscal policy shocks have a positive and permanent effect on output and, they are the biggest drivers of variance in the country's output. This finding is consistent with Uganda's reality since the Government of Uganda spends a significant portion of its budget on infrastructure development projects, which aim at influencing the supply side of the economy. On the other hand, the results indicated that fiscal policy shocks have a negative effect on tax revenue in both the short run and the long run. Our results endorse Uganda's choice to use fiscal policy, particularly investment in infrastructure development, as tool to achieve economic growth.

The paper is organized as follows: Section 1.2 discusses literature review, referring to some studies that were conducted with a purpose similar to ours. Section 1.3 provides an overview of fiscal policy in Uganda. Section 2 and Section 3 describe our methodology and empirical findings respectively. Section 4 gives the conclusion of our paper.

1.2 Literature Review

Several researchers have conducted studies similar to ours. To estimate the effect of fiscal policy shocks on different facets of various economies, many of the past studies employed the SVAR approach that was used by Blanchard and Perotti (2002). The following paragraphs summarize the key findings of selected previous studies.

In their paper, Blanchard and Perotti (2002) did an empirical characterization of the dynamic effects of changes in government spending and taxes on output. They particularly checked the effects of shocks in government spending and taxes on economic activity in the United States during the postwar period by using a structural VAR approach. Their results showed that positive government spending shocks have a positive effect on output, while positive tax shocks have a negative effect on output. They also found that, both increases in taxes and government spending have a strong negative effect on investment spending.

Mahrous (2016) analyzed the dynamic impacts of changes in government spending on economic growth in Kenya using a structural VAR Analysis. He found that, the effect of government spending on output in Kenya appears to be weak and non-persistent. The author justified his results by citing the presence of high government debt to GDP ratio, high debt servicing and, high marginal propensity to import in Kenya.

Burriel et. al. (2010) did an empirical assessment of fiscal policy shocks in the Euro Area and the US. Using a standard SVAR framework, they studied the impact of aggregated and disaggregated government spending and net-tax shocks. Their key findings were: expansionary fiscal shocks have a short term positive impact on GDP and private consumption, with government spending shocks producing, in general, higher effects on economic activity than (net) tax reductions; output multipliers to government expenditure shocks are of a similar size in the Euro Area and in the US; the persistence of fiscal spending shocks is higher in the US than in the Euro Area, which appears to be related to military spending in the US and; fiscal multipliers have increased over the recent past in both geographical areas.

Ocran (2011) examined the effects of fiscal policy associated with increases in government expenditure, tax revenue and the budget deficit on the South African economy. His results suggested that the various fiscal policy instruments have different effects on output and interest rates. The effect of fiscal policy on output appeared to be quite modest but persistent; however, the response of interest rates was temporary and substantial in most cases. On the other hand, Jouste et. al. (2013) also analyzed the effects of fiscal policy shocks on the South African economy and found that output responds positively to government spending and negatively to tax revenue in the short run.

1.3 Fiscal Policy in Uganda

Uganda is a small open economy which has made remarkable achievements during the last few decades, with its economic growth averaging at 8 percent per annum during the period between 1992 and 2010 (International Monetary Fund 2017). Even though the country has been experiencing a slow down in economic growth in recent years, the growth projections remain positive. Similar to many other developing countries, its policy makers acknowledge the great importance of public investments for stimulating economic growth and, therefore, fiscal policy is one of the main tools used for providing development incentives to Uganda's economy. Public investments are mainly concentrated on infrastructural projects that aim at strengthening the supply side of the economy and enhancing higher productivity growth. Among other ventures, these projects include construction of roads that are expected to facilitate development of the oil sector and have the potential to generate a high multiplier effect on economic growth. However,

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the size of the impact of public policies largely depends on the funds available to the government for financing infrastructural and other growth-enhancing projects.

In Uganda, fiscal policy is conducted by the Ministry of Finance, Planning and Economic Development. The Ministry is responsible for effective tax revenue collection and efficient allocation of resources through government expenditure. Although highly important, government expenditure remains low in Uganda, which limits the impact of public policies on the economy. The main reason for this is the fact the country has had a persistently low tax to GDP ratio for several years, averaging at 13 percent over the last decade (Ministry of Finance, 2017). This is one of the lowest tax to GDP ratios in the world.

According to the Ministry of Finance (2016), the country's development expenditure constituted roughly 50 percent of total government expenditure during the last few years, which highlights the significance of public policy for economic development in Uganda. Tax revenue, grants and debt financing are the three broad sources explored for mobilizing the budget resources that are needed for financing public projects in the country.

Tax revenue amounted to 86.2 percent of total revenue in the fiscal year 2016/2017, and an additional 10.6 percent of total revenue was generated through grants (Ministry of Finance, Planning and Economic Develop, National Budget Framework Paper FY 2017/18 - FY 2021/22 2016). On the other hand, the fiscal deficit has averaged at around 4 percent since 2010 (International Monetary Fund 2017). The share of external financing has been increasing over the years and recently amounted to 88.3 percent of total debt financing, thus being an important source of funding for the government. The government also acknowledges the importance of independent monetary policy and projects its future fiscal policy to be less dependent on domestic borrowing. Even though future projections indicate divergence from domestic borrowing, its historical share in total debt financing cannot be neglected. In addition, given the pace of increase in infrastructure spending and tight fiscal space, future need for debt financing from the central bank in Uganda may be inevitable (International Monetary Fund 2017). These factors make a good argument for domestic borrowing also being an important source of government expenditure in Uganda.

Consequently, we can argue that, government expenditure in Uganda depends on the following variables: tax revenue, grants and, external and domestic debt financing. Therefore:

$$G = f(T, g, d_f, d_d)$$

Where T is tax revenue, g is grants, d_f is external debt financing and d_d is domestic debt financing.

2. DATA AND METHODOLOGY

2.1 Data Description

We performed our analysis using Uganda's quarterly GDP, government spending and tax revenue data for 80 quarters, from 1997 to 2017. The data was obtained from the Ministry of Finance, Planning and Economic Development and the Uganda Revenue Authority. Since tax revenue and government spending figures were in nominal form, for purposes of consistency, we used nominal GDP figures rather than real GDP figures. We did seasonal adjustment to the quarterly tax revenue and government spending figures in order to eliminate the effect of their seasonality on our analysis (Refer to the appendix for graphs of the data in its original form and in its de-seasonalized form). All the three variables (GDP, tax revenue and government spending) were analyzed in natural logarithm form.

Considering the nature of our variables, it is intuitive that they should all be non- stationary. However, to confirm this, we performed a unit root test using the Augmented Dickey- Fuller test. Considering the variables in levels, the test verified that all three were non-stationary, while using the first-difference approach transformed them into stationary variables. Plotting the data in levels and in first-difference format further confirmed this indication. (Refer to the appendix for the graphs and unit root test results). To perform our analysis therefore, we first differenced our data to convert it to a stationary form.

2.2 Empirical Strategy

To investigate the effect of fiscal policy shocks on GDP, we applied Structural VAR analysis. We used tax revenue and government spending as control variables, and the accompanying structural shocks were aggregate supply shocks and other aggregate demand shocks.

We achieved identification by imposing long-run SVAR identification restrictions (following the approach used by Blanchard and Quah, 1989) and a short-run SVAR restriction on the relationship between the structural shocks and the variables under consideration. We used the AIC criteria to determine the appropriate number of lags.

The variables used in the analysis included:

$$Z_t = \begin{bmatrix} T_t \\ Y_t \\ G_t \end{bmatrix} \qquad \Delta Z_t = \begin{bmatrix} \Delta T_t \\ \Delta Y_t \\ \Delta G_t \end{bmatrix} \quad \varepsilon_t = \begin{bmatrix} \varepsilon_t^{AS} \\ \varepsilon_t^{FP} \\ \varepsilon_t^{AD} \end{bmatrix} \qquad \mu_t = \begin{bmatrix} \mu_t^{T} \\ \mu_t^{Y} \\ \mu_t^{G} \end{bmatrix}$$

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Where T refers to tax revenue; Y refers to GDP (output); G refers to government expenditure; ε^{AS} refers to aggregate supply shocks; ε^{FP} refers to autonomous fiscal policy shocks (particularly autonomous government expenditure shocks); ε^{AD} refers to other aggregate demand shocks; μ^T, μ^Y and μ^G and represent reduced form shocks for tax revenue, GDP and government expenditure respectively and; t is a time index representing quarterly intervals.

2.2.1 Structural Identification

In order to achieve our objective, we had to estimate values for $\hat{A}(L)$ and $\hat{\varepsilon}_t$ of the VMA equation below:

$$\Delta Z_t = A(L)\varepsilon_t \quad \text{(i)}$$

Using OLS, we first estimated values for $\hat{R}(L)$ and $\hat{\mu}_t$ corresponding to the VAR equation below:

$$\hat{R}(L)\Delta Z_t = \mu_t \quad \text{(ii)}$$

$\hat{F}(L)$ was obtained by inverting $\hat{R}(L)$

$$\hat{F}(L) = \hat{R}(L)^{-1} \quad \text{(iii)}$$

Estimating $\hat{\varepsilon}_t$ from $\hat{\mu}_t$

There are two different ways to describe ΔZ_t, i.e. $\Delta Z_t = A(L)\varepsilon_t$ and $\Delta Z_t = F(L)\mu_t$, implying that:

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$\Delta Z_t = F(L)\mu_t = A(L)\varepsilon_t$ ……………………………………………………………………………(iv)

$F(0)\mu_t = A(0)\varepsilon_t$, but $F(0) = I_3$

Therefore, $\mu_t = A(0)\varepsilon_t$ ……………………………………………………………………… (v)

And, $\varepsilon_t = A(0)^{-1}\mu_t$

This implies that if we uncover A(0), we can convert $\hat{\mu}_t$ to $\hat{\varepsilon}_t$.

Estimating $\hat{A}(L)$ from $\hat{F}(L)$

Substituting for μ_t in $F(L)\mu_t = A(L)\varepsilon_t$ (from equation (iv)) using $\mu_t = A(0)\varepsilon_t$ (equation (v)) gives:

$F(L)\,A(0)\varepsilon_t = A(L)\varepsilon_t$

$A(L) = F(L)\,A(0)$……………………………………………………………………………………... (vi)

We therefore had to obtain A(0) in order to estimate $\hat{\varepsilon}_t$ and $\hat{A}(L)$

Following Blanchard and Quah (1989)'s approach, we estimated A(0) by assuming that $\Omega_\varepsilon = I_3$.

$\Omega_\mu = E(\mu_t\,\mu_t')$, but from equation (v), we know that $\mu_t = A(0)\varepsilon_t$

$\Omega_\mu = E\,[A(0)\varepsilon_t \quad \varepsilon_t' A(0)']$

$\Omega_\mu = A(0)\,E[\varepsilon_t \;\; \varepsilon_t']\,A(0)'$ But $\Omega_\varepsilon = E[\varepsilon_t \;\; \varepsilon_t'] = I_3$

$\Omega_\mu = A(0)\,A(0)'$ ……………………………………………………………………………(vii)

Ω_μ was estimated using $\hat{\mu}_t$, but equation (vii) yielded a set of six unique equations with nine unknowns. Therefore, we needed three extra identification restrictions in order to obtain A(0) and ultimately estimate $\hat{\varepsilon}_t$ and $\hat{A}(L)$.

Identification Restrictions

We used a combination of two long-run restrictions and one short-run restriction.

The short-run restriction is:

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- The contemporaneous response of government spending to fiscal policy shocks is zero i.e. $A(0)_{32} = 0$

In matrix form, this is represented as:

$$\underset{\Delta Z^C}{\begin{bmatrix} \Delta T^C \\ \Delta Y^C \\ \Delta G^C \end{bmatrix}} = \underset{A(0)}{\begin{bmatrix} . & . & . \\ . & . & . \\ . & 0 & . \end{bmatrix}} \underset{\varepsilon_t}{\begin{bmatrix} \varepsilon_t^{AS} \\ \varepsilon_t^{FP} \\ \varepsilon_t^{AD} \end{bmatrix}}$$

where superscript C stands for "contemporaneous".

The long-run restrictions are:

- The steady state response of output to aggregate demand shocks is zero i.e. $A(1)_{23} = 0$
- The steady state response of tax revenue to aggregate demand shocks is zero i.e. $A(1)_{13} = 0$

In matrix form, these are represented as:

$$\underset{Z^*}{\begin{bmatrix} T^* \\ Y^* \\ G^* \end{bmatrix}} = \underset{A(1)}{\begin{bmatrix} . & . & 0 \\ . & . & 0 \\ . & . & . \end{bmatrix}} \underset{\varepsilon_t}{\begin{bmatrix} \varepsilon_t^{AS} \\ \varepsilon_t^{FP} \\ \varepsilon_t^{AD} \end{bmatrix}}$$

From equation (vi) we know that A(L) = F(L) A(0)

Therefore, A(1) = F(1) A(0)   (viii)

Using equation (viii) we deduced that since $A(1)_{13} = 0$ and $A(1)_{23} = 0$,

$[\hat{F}(1)\ A(0)]_{13} = 0$ and,

$[\hat{F}(1)\ A(0)]_{23} = 0$

With these two extra equations and the aforementioned short-run restriction, we obtained A(0)

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and successfully estimated $\hat{\varepsilon}_t$ and $\hat{A}(L)$.

2.2.2 Validation of the Identification Restrictions

The contemporaneous response of government spending to fiscal policy shocks is zero: This restriction was based on the argument that a fiscal policy shock (an announcement of unanticipated change in forthcoming government expenditure) would probably have an immediate ripple effect on several other economic variables, but not on contemporaneous government expenditure as this would comprise a value predetermined by the government. It would take a while for government expenditure to respond to such policy announcements.

The steady state response of output to aggregate demand shocks is zero: Our basis for imposing this restriction - which was also imposed by Blanchard and Quah (1989) - is the internal balance economic theory which suggests that aggregate demand shocks would only alter output in the short-run. In the long-run, the endogenous variables (real interest rates and real exchange rates) would adjust and restore output to its steady state position.

The steady state response of tax revenue to aggregate demand shocks is zero: This restriction is founded on the assumption that the long-run response of output to aggregate demand shocks is zero. Since tax revenue is directly derived from output, it is only logical to assume that if the long-run effect of aggregate demand shocks on output is zero, then the long run effect of the same shocks on tax revenue is zero. Two rational questions are likely to arise in relation to this restriction.

The first question is: Besides output, aren't there other tax influencers that are affected by aggregate demand shocks? We explain this as follows: There are several factors that affect tax revenue, but they all do so through affecting output; therefore, if their net long-run effect on output is expected to be zero, their net long-run effect on tax revenue is also expected to be zero. Take for example a scenario in which an aggregate demand shock causes an increase in the real interest rate; this would cause a reduction in consumption and investment and a subsequent decline in the taxes derived from these variables, but in the long-run, in order to restore internal balance, the real exchange rate would depreciate and cause an increase in exports and consumption of domestic goods, resulting in an increase in taxes. The latter increase in taxes would offset the former decline. We assume that the difference in the upward and downward tax movements, if any, would be negligible. In the long-run therefore, output remains unaffected and the changes in tax revenue offset each other, leaving tax revenue unaffected as well. The internal balance equation below further illustrates these dynamics.

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$$\bar{Y} = \underset{+}{\Phi(Q)}\,C(\underset{-}{r},\bar{Y}^{d},...) + I(\underset{-}{r},...) + G + E(\underset{+}{Q})$$

Where $\bar{Y}$ is the steady state / potential output, C is consumption, I is investment, G is government expenditure, E is exports, r is the real interest rate, Q is the real exchange rate, Φ is the share of consumption spent on domestic goods and, $\bar{Y}^{d}$ is the disposable income in the steady state.

In summary, our primary argument is that taxes are ultimately levied on output; even though in the short-run aggregate demand shocks might affect tax revenue (through affecting different components of output), if in the long-run output remains unaffected, tax revenue will remain unaffected as well.

The second question is: If the steady state response of tax revenue to aggregate demand shocks is restricted to be zero, why isn't the steady state response of government expenditure restricted to be zero as well, yet government expenditure is ideally derived from taxes? We respond to this as follows: In developing countries, a significant portion of government expenditure is derived from sources other than tax revenue. In Uganda for example, tax revenue ordinarily funds around 70 percent of the national budget, and the remaining part is funded through borrowing, grants and other sources. Hence, even though we assume that in the long-run aggregate demand shocks would not affect government expenditure through altering tax revenue, we recognize that they could affect it through impacting other sources of funds for government expenditure. Therefore, we could not impose a zero restriction on the steady state response of government expenditure to aggregate demand shocks.

3. EMPIRICAL RESULTS AND DISCUSSION

3.1 Impulse Responses to Fiscal Policy Shocks

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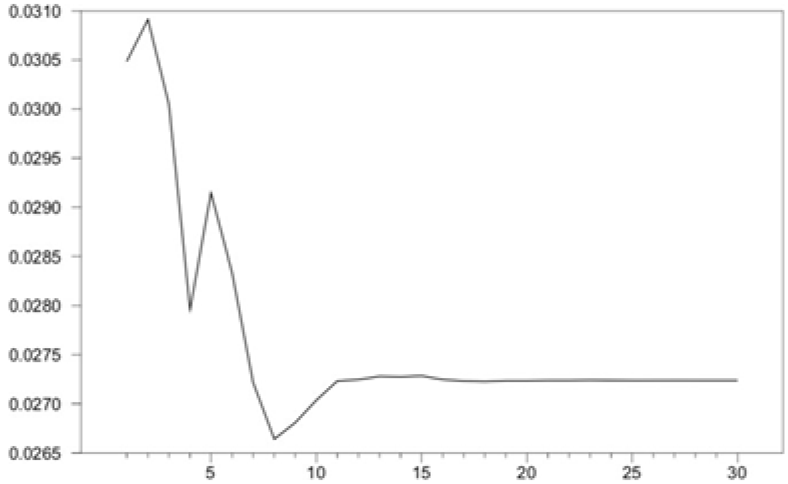
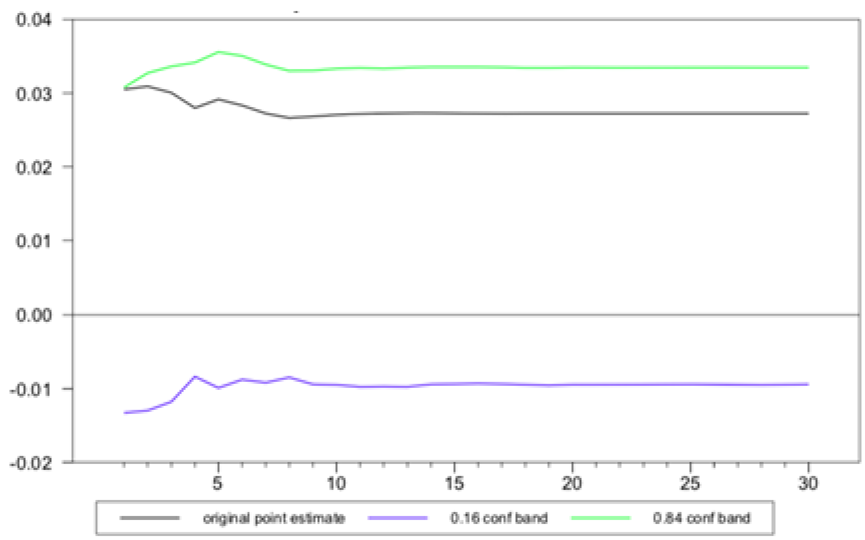
Figure 1: Response of Output to Fiscal Policy Shocks



Y axis: lnY, X axis: Quarters



Autonomous fiscal policy shocks have a positive initial impact on output which peaks in quarter two. Starting from quarter three, the response declines, reaching its minimum in quarter eight. It then rises slightly and stabilizes at a positive steady state level in quarter eleven. This result is consistent with Uganda’s reality. The Government of Uganda spends a significant portion of its budget on public investments, particularly infrastructure projects, which aim to influence the supply side of the economy; hence, the long run response of output to fiscal policy shocks is expected to be positive and permanent.

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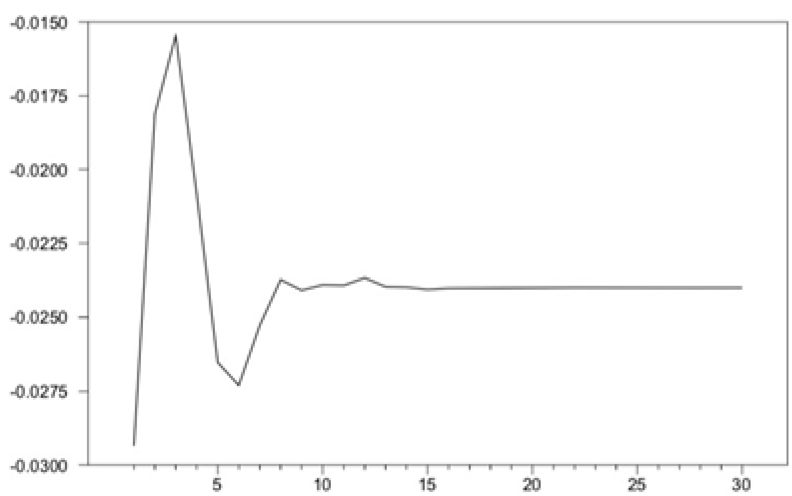
Our results have implications for fiscal multipliers in Uganda. The fiscal multipliers (if we convert logs into levels) are slightly greater than one both in the short run and the long run; they are relatively larger in the short-term compared to the long-term horizon. While literature studying the effects of fiscal policy on output in Low-Income Countries (LIC) is limited, the general view is that small open economies with no capital or foreign exchange restrictions are expected to have fiscal multipliers close to or less than one. According to Shen, Yang and Zanna (2015), external borrowing particularly matters for fiscal policy in LIC; it creates additional sources of financing for public investments that boost output, while preventing crowding-out of private investments. However, free capital mobility contributes to appreciation of the currency leading to reduction in output due to loss in competitiveness. Consequently, we can argue that external borrowing in Uganda is not at its optimal level and the crowding-out effect may still be an issue; the country does not have capital restrictions which may prevent loss of competitiveness. These factors combined justify the magnitude of fiscal multipliers in Uganda and highlight the importance of improving public policies that can help to further increase the magnitude of fiscal multipliers.

Figure 2: Response of Tax Revenue to Fiscal Policy Shocks



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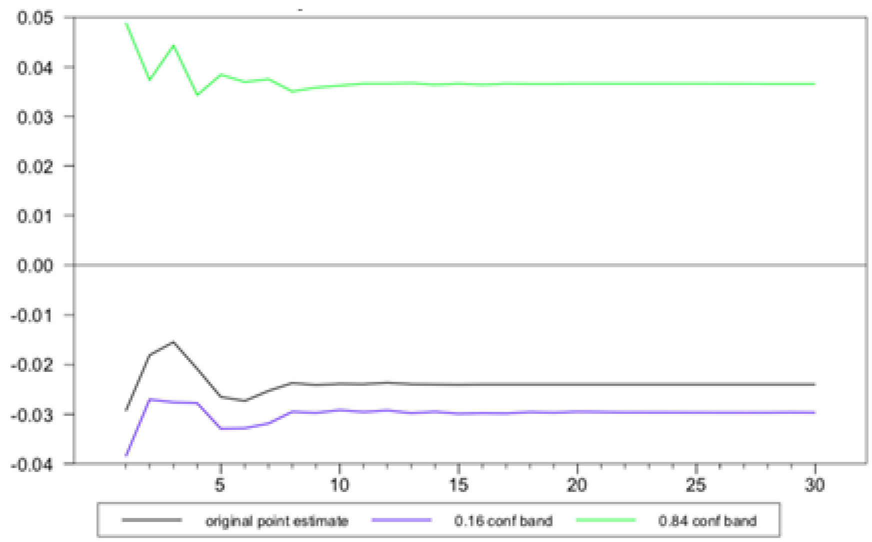
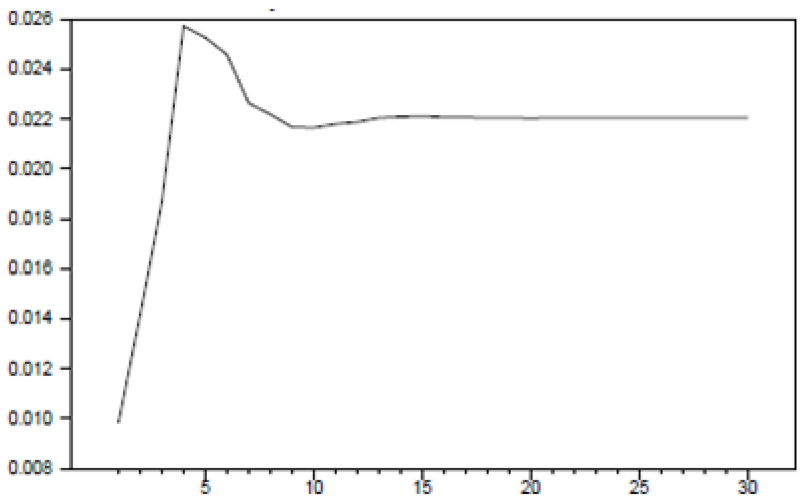


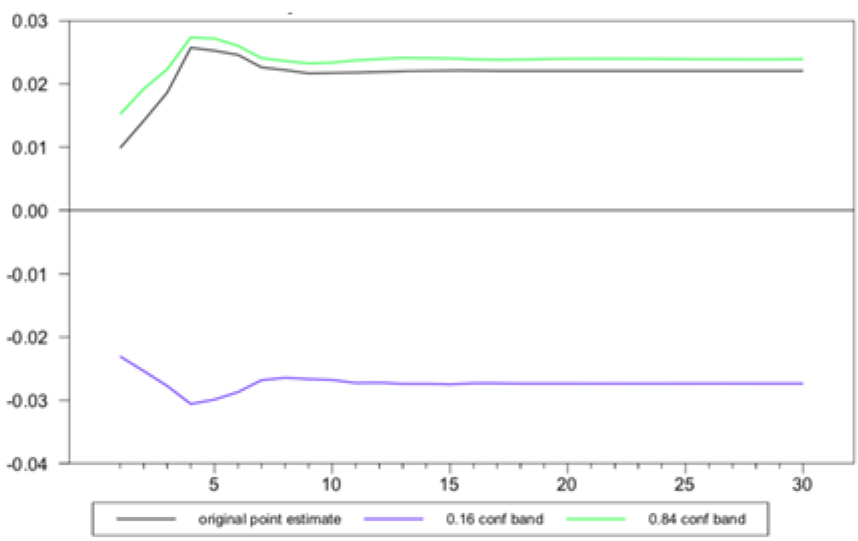
The response of tax revenue to fiscal policy shocks in Uganda is negative. The effect hits its maximum magnitude in the first quarter and its minimum magnitude two quarters thereafter. While it is volatile in the short run, the effect swiftly stabilizes to a negative steady state level after the eighth quarter. Among other reasons, this negative effect could be due to the fact that some government infrastructure projects in Uganda come along with tax exemptions; for example, at times the government offers VAT exemptions (usually referred to as deeming of VAT payment) to all suppliers of materials to specific public infrastructure development projects.

3.2 Impulse Responses to Aggregate Supply Shocks

Figure 3: Response of Output to Aggregate Supply Shocks

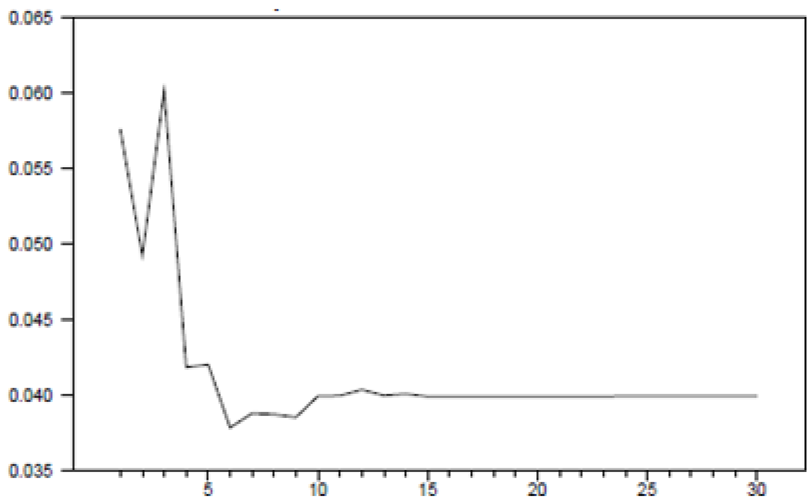


Y axis: lnY, X axis: Quarters

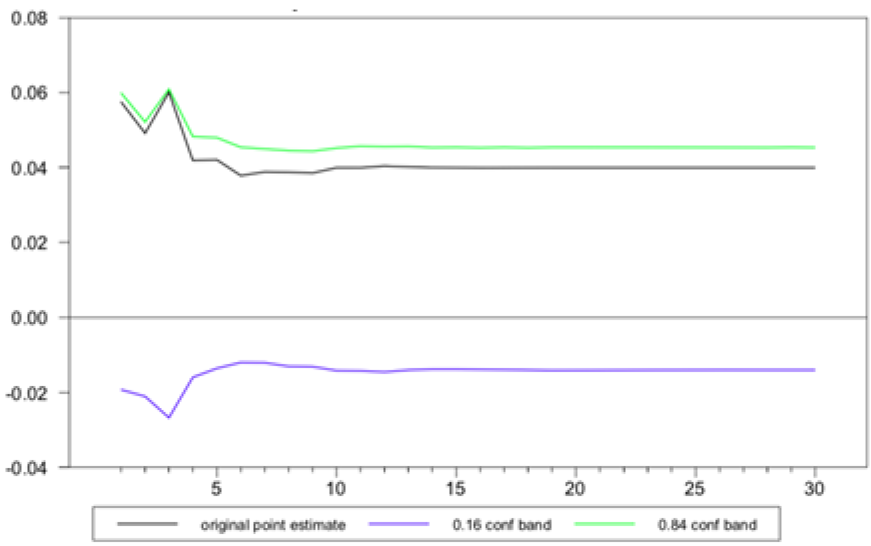


The response of output to aggregate supply shocks is positive and permanent. It sharply rises in the short-run and reaches its peak in the fourth quarter after the shock. It then slightly declines to a positive steady state position after quarter nine. This is in line with the findings of several other researchers who have conducted similar studies in the past. Among these is Blanchard and Quah (1989)'s finding that aggregate supply shocks have a positive effect on output that cumulates steadily in the short-run, declines slightly thereafter, and settles to a positive steady state position.

Figure 4: Response of Tax Revenue to Aggregate Supply Shocks



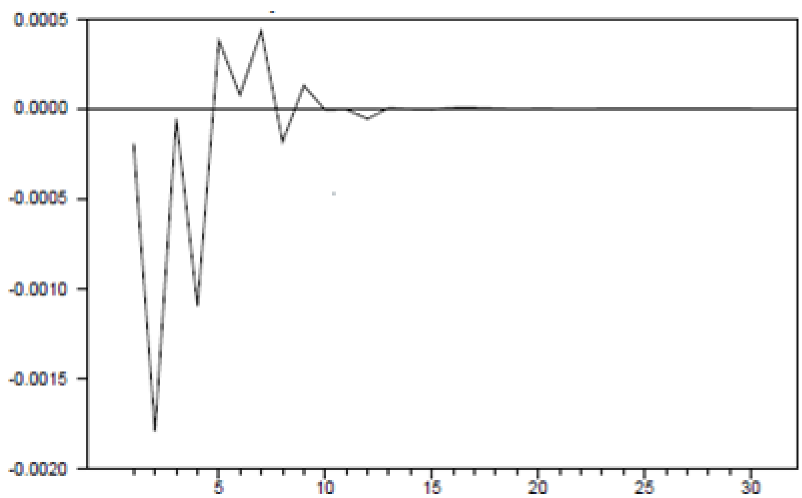
Y axis: lnT, X axis: Quarters



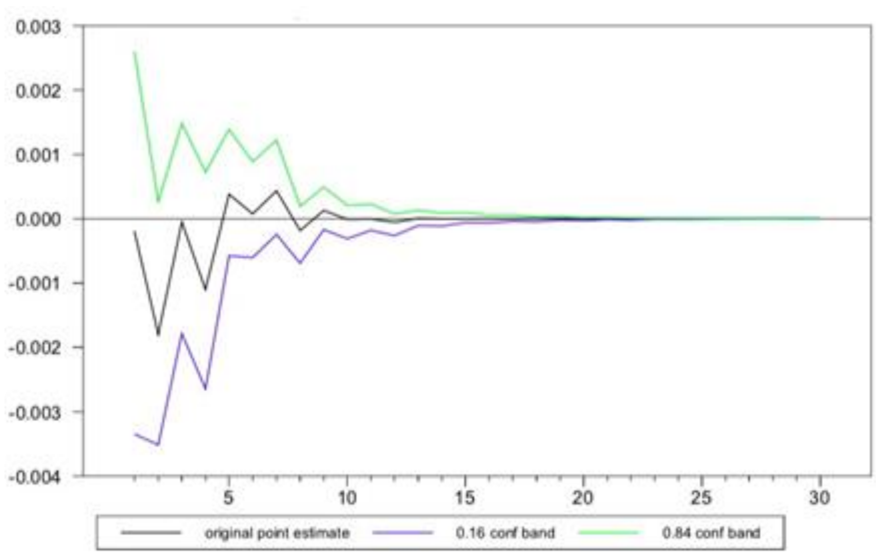
Not surprisingly, similar to the effect of aggregate supply shocks on output, the effect of the same shocks on tax revenue is positive and permanent. The effect starts out high, reaching its maximum in quarter three, and declining to a positive steady state position in quarter ten.

3.3 Impulse Responses to Aggregate Demand Shocks

Figure 5: Response of Output to Aggregate Demand Shocks

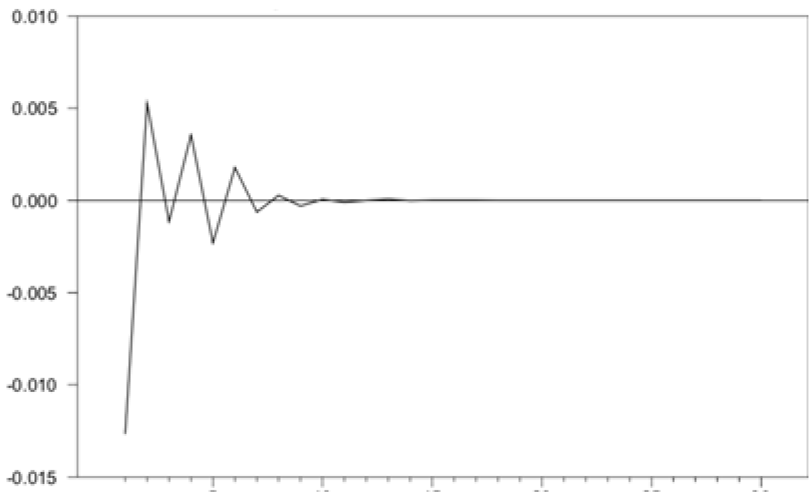


Y axis: lnY, X axis: Quarters

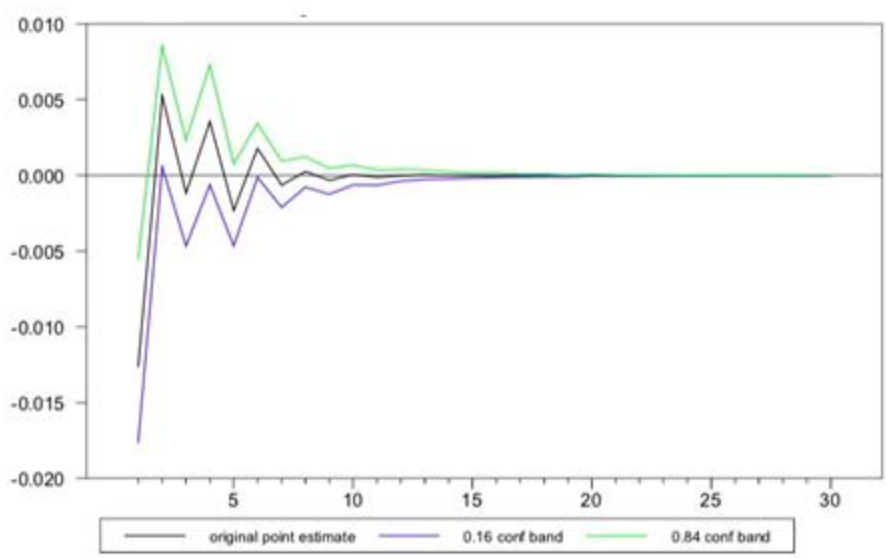


In the short-run, output has a turbulent response to aggregate demand shocks. It starts out negative, hitting its bottom in the second quarter following the shock (at its maximum magnitude), and unstably rises to its peak in quarter seven. Thereafter, it declines to its zero steady state position in the thirteenth quarter. However, the zero steady state response occurred by default due to the restriction we made i.e. that the steady effect of aggregate demand shocks on output is zero.

Figure 6: Response of Tax Revenue to Aggregate Demand Shocks



Y axis: lnT, X axis: Quarters



The contemporaneous effect of aggregate demand shocks on tax revenue is negative. The effect changes direction in quarter two, reaching its maximum positive value. While it is turbulent in the first eight quarters, the effect slowly stabilizes to a steady state value of zero in the long run. Note, however, that the long run effect is zero by default, because we imposed a restriction that the long-run effect of aggregate demand shocks on tax revenue is zero.

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3.4 Variance Decompositions

Table 1: Percentage of Variance in Tax Revenue, Output and Government Spending due to Aggregate Supply (AS), Fiscal Policy (FP) and Aggregate Demand (AD) Shocks

Quarters	Tax Revenue			Output			Government Spending		
	AS	FP	AD	AS	FP	AD	AS	FP	AD
1	76.44	19.86	3.70	9.45	90.55	0.00	2.97	-	97.03
2	69.73	20.35	9.92	11.06	88.69	0.25	1.92	0.01	98.08
3	69.79	19.81	10.41	12.66	86.81	0.53	2.77	0.12	97.11
4	71.00	18.93	10.07	16.48	82.92	0.60	9.03	4.23	86.74
5	70.14	19.29	10.58	16.44	82.77	0.79	13.29	4.63	82.08
6	70.01	19.18	10.81	16.47	82.74	0.79	13.90	4.67	81.42
7	69.89	19.21	10.90	16.73	82.47	0.80	13.87	4.68	81.45
30	69.85	19.24	10.91	16.75	82.41	0.85	14.02	4.86	81.11

The results in Table 1 above suggest that:

The biggest percentage of variance in Uganda's tax revenue is due to aggregate supply shocks, followed by fiscal policy shocks and finally aggregate demand shocks. Aggregate supply shocks contribute 76.44% of the variance in the first quarter, and in the long-run, their contribution reduces to 69.85%.

Fiscal policy shocks contribute the biggest percentage of variance in output in Uganda. In the first quarter, they contribute 90.55% of the variance and aggregate supply shocks contribute 9.45%. Aggregate demand shocks do not contribute to the variance in the output in the initial quarter. In the long-run, the contribution of fiscal policy shocks reduces to 82.41% (still being the highest) and the contribution of aggregate supply shocks increases to 16.75%. Aggregate demand shocks contribute only 0.85% of the variance in the long-run.

The biggest contributor to variance in government spending is aggregate demand shocks. These contribute 97.03% of the variance in the initial quarter, and aggregate supply shocks contribute 2.97% in the same quarter. Due to our restriction of a zero contemporaneous effect of fiscal policy shocks on government spending, fiscal policy shocks don't contribute at all to the variance in government spending in the first quarter. In the long-run, the contribution of aggregate demand shocks reduces to 81.11%, still remaining the highest. (Refer to the appendix for variance decomposition graphs).

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4.0 CONCLUSION

In recent years, Uganda has consistently devoted a large proportion of its national budget to infrastructure development, in an effort to increase economic growth. The results of this study suggest that this is a step in the right direction for the country. Our analysis indicates that fiscal policy shocks have a positive and permanent effect on output in Uganda and, they are the major drivers of variance in the country's output. On the other hand, the same shocks have a lasting negative effect on tax revenue in the country. Therefore, while Uganda's government is justified in its massive public investment venture to achieve output growth, its policy makers ought to take precaution of the accompanying negative effect of fiscal policy shocks on the country's tax revenue in both the short-run and the long-run.

In conclusion, based on the different facets of our analysis, we recommend that among other strategies, Uganda should continue and further strengthen the use of fiscal policy as a tool to achieve economic development, through investment in development projects.

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APPENDIX

Figure 7: Variables of Interest in Levels

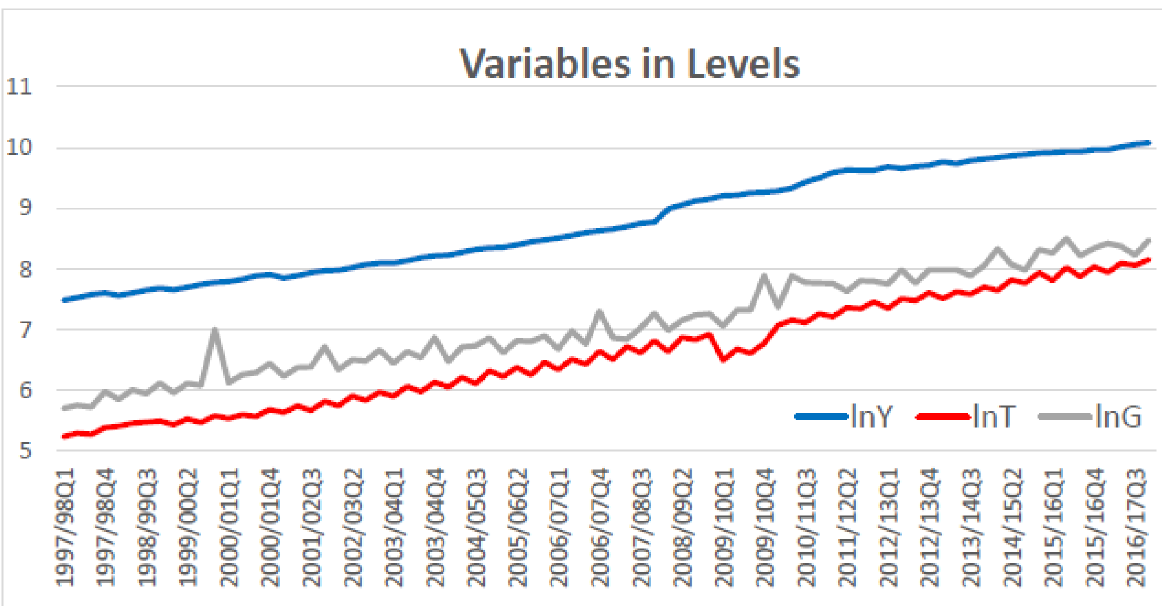

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Figure 8: De-seasonalized Variables of Interest in Levels

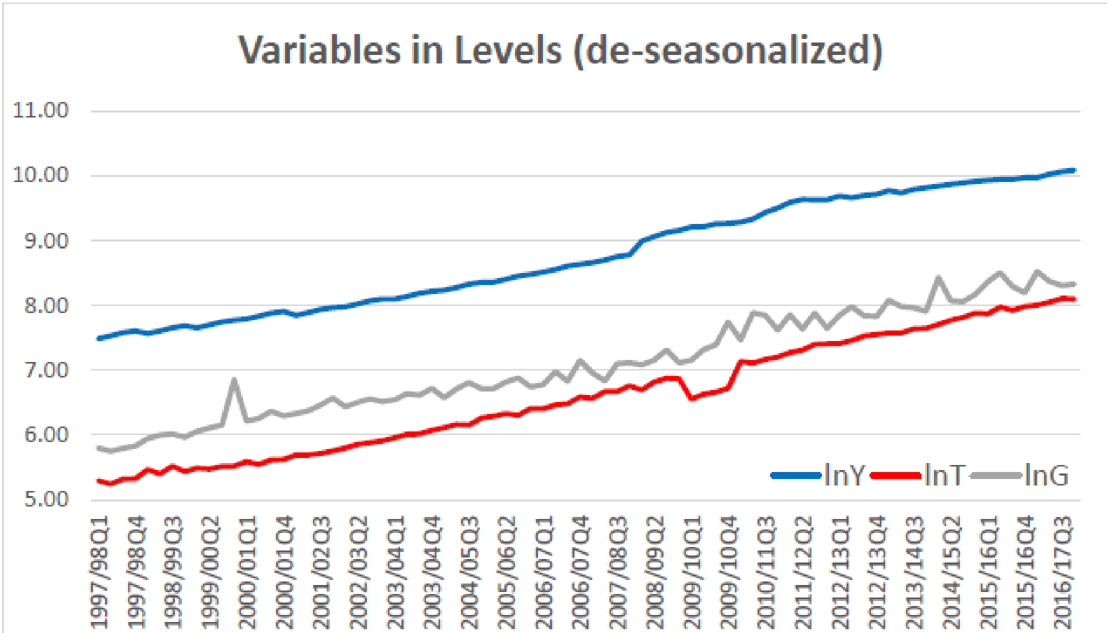

Figure 9: Variables of Interest in First-Difference Form

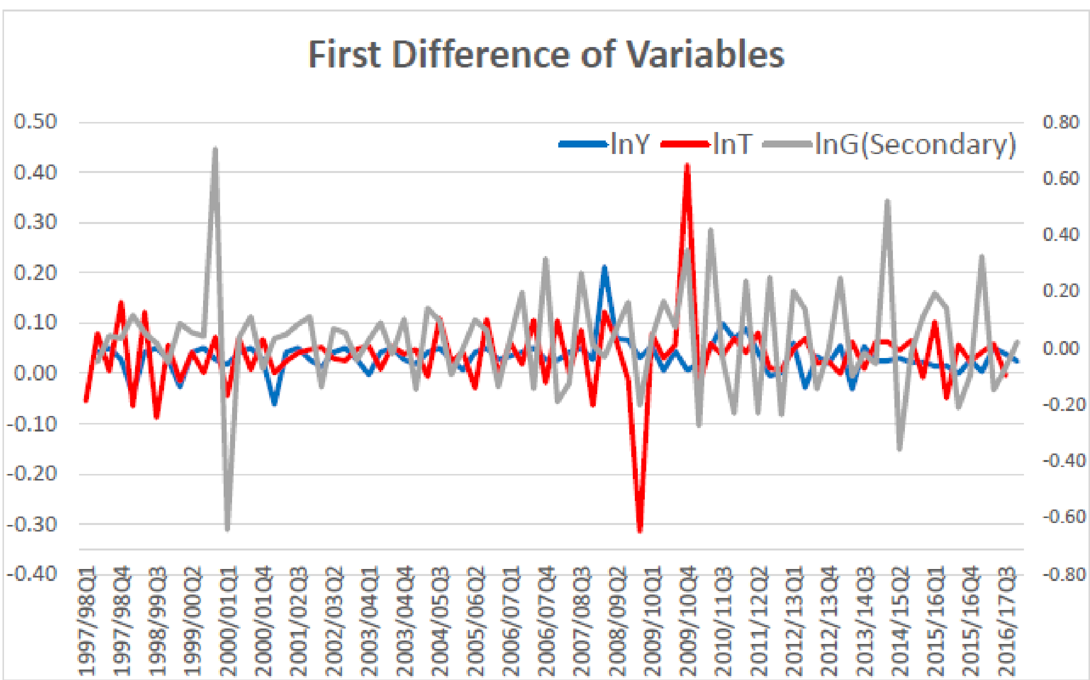

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Table 2: Unit Root Test Results

	Variable	P-Value	Stationarity
Levels	T	0.9657	No
	Y	0.9465	No
	G	0.8470	No
First Difference	T	0.0000	Yes
	Y	0.0000	Yes
	G	0.0000	Yes

Figure 10: Variance Decompositions