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FISCAL POLICY CONSISTENCY AND ITS IMPLICATIONS FOR MACROECONOMIC AGGREGATES:

THE CASE OF UGANDA

ERIA HISALI

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EXECUTIVE SUMMARY

The relationship between growth in monetary aggregates and price changes continues to be a subject of considerable debate both in the academic and policy circles. Whereas the more 'conservative' policy makers hold that growth in monetary aggregates bear proportionately on prices, 'liberals' on the other hand suggest a fairly weak relationship and instead mainly attribute sustained price changes to other innovations (including structural weaknesses and poor productive capacity).

This study employed vector autoregression techniques (and its variants) to examine both short term as well as long term interactions between selected macroeconomic aggregates with particular focus on the relationship between money growth and price changes. Results from both the reduced form vector autoregression specification and the contemporaneous structural vector autoregression show a weak causation from growth in monetary aggregates to price changes, but the link between changes in monetary aggregates and prices becomes stronger in the long run. The results also point to a strong relationship between price changes on the one hand and exchange rate depreciation, and past inflation outcomes on the other. The results imply a potential for increased revenue from monetisation, at least up to some feasible as well as the need to focus on other possible sources of price variations.

In general, whereas it is possible for the relationship between prices and money to weaken, budget deficits beyond 'certain financeable limits' will clearly negate the possibility of attaining other objectives of macroeconomic policy. A natural concern that arises in such a context is one of sustainability and compatibility of the budget deficit with other macroeconomic targets. We also employed the government budget accounting framework to analyse sustainability of Uganda's current fiscal stance.

The results show that the consolidated deficit is consistent with attainment of target outcomes for other macroeconomic variables, most notably the rates of inflation and GDP growth rates. The inflation target has however, been achieved at the cost of an unsustainable domestic debt.

From a policy perspective, issuing domestic debt at such a high real interest rates will allow lower money growth but at the cost of future increases in debt service obligations and thus future budget deterioration.

JEL Classification: H62, H63, H69
Keywords: fiscal stance, macroeconomic aggregates, structural vector autogression, budget accounting approach

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1. INTRODUCTION

Central banks usually employ tools of monetary policy to ensure price stability. Attainment of stable price outcomes is considered to be a crucial goal of economic policy because it provides 'a conducive environment' for proper functioning of the economy[1], resulting in high rates of growth and, ultimately improved welfare. In a number of typical settings, the tools of monetary policy employed have their theoretical underpinnings in the classical dichotomy hypothesis.

A common practical tool of monetary policy involves determining the desired and appropriate level of growth in monetary aggregates that are required to support the market determined outcomes of GDP growth rates and levels of employment among others (Issing, 1997). In this case a stable money multiplier relationship is assumed to provide the link between monetary base and the broad monetary aggregates (Sriram 2001). The actual policy stance is then dictated by the nature and extent of the deviation.

The arguments contained in the classical dichotomy hypothesis clearly suggest a very weak link between monetary and real factors of the economy. Monetary policy only supports the growth process in an indirect way, in line with the classical thinking of perfect and well functioning markets (see Cochrane, 1998 and Swanson, 1998 for complete analyses of whether money matters). Hence, whereas there is no dispute that price stability is crucial for the proper functioning of the economy, it is possible that the process of monetary policy implementation might under certain circumstances[2] result in realisation of outcomes that are less than the economy's full growth potential.

It is this apparently weak transmission of monetary impulses to the real sector of the economy, together with a relatively weak private sector in much of the developing world that has tended to make governments faced with challenges of development and recovery to resort to pursuance of a more active fiscal policy. The counterpart to financing these expenditures in the face of a narrow domestic revenue base is the fiscal deficit (see for instance Haque and Montiel 1989; Corbo and Schmidt-Hebbel 1991). The public finance view of inflation suggests that it is recourse to money creation in the face of such deficits that explains episodes of sustained inflation (Sargent and Wallace 1981; Agenor and Montiel 1999).

In a bid to try and avoid negative consequences associated with monetisation of the deficit, many countries in the developing world have had to increasingly rely on foreign aid inflows (Adam, 2009). Unfortunately though, as the foreign resources are converted

[1] Highly variable prices increase risk and may impede long term planning and investment, among other negative effects.

[2] This may be the case, for instance, with a relatively weak private sector or even when the competition structure obtaining in a particular context is different than that of perfect competition that is assumed in the classical settings.

into local currency domestic money stock increases in excess of target levels which piles upward pressure on prices, with effects similar to those of monetisation (Brownbridge and Mutebile, 2006; Buffie et al., 2009). This comes at a cost and raises concerns about sustainability of deficits and management of other macroeconomic variables. Studies here (Berg et al., 2007; Foster and Killick, 2006) recount a cycle of confusion and frequent policy shifts aimed at minimizing macroeconomic costs. According to Buffie et al, (2009) typically the policy cycle starts with the central bank buying up large quantities of aid dollars in an effort to stabilize the exchange rate. The rapid increase in the monetary base and the boom in aid spending, however, create fears of higher inflation. Striving to reassert monetary discipline, the authorities sterilize capital inflows with bond sales only to see real interest rates and the cost of internal debt service rise sharply. So policy shifts again. To reduce the interest rates without losing control of money supply, the central bank suspends bond sales and withdraws from the exchange market. But this leads back to square one. In Uganda for example, evidence suggests that the cost of conducting monetary policy has been relatively (and probably inefficiently) high (Adam, 2009).

On the other side of the debate is the argument that the relationship between money supply and inflation may under certain circumstances become relatively weaker (Christensen, 2001 and Schonwitz, 2004). This may be the case during periods of recovery such that modest increases in money supply instead works to ease supply side constraints, in which case it may not necessarily have a proportionate bearing on prices. In addition, proponents of the somewhat weak money-price relationship point to the crucial role of other structural rigidities in driving prices and also argue that for economies operating below full employment, these increased resources might indeed improve the productive capacity of the economy. Sowa (1994) for instance studied the inflationary process in Ghana and concluded that inflation, both in the long run or short run, was influenced more by output volatility than by monetary factors. Kia (2006) on the other hand examined the internal and external factors that account for inflation rate in Iran for the period 1970 – 2002 and suggested that in the long run, exchange rate depreciations were the underlying causes of inflation. Roya and Darbhaa (2000) used data from India for the period 1970 to 1990 and established that structural factors, in addition to monetary factors, play an important role in generating and sustaining the process of inflation and fluctuations in economic activity. This led them to conclude that a simple monetary targeting without adequate 'supply side' measures may not be able to serve the objective of maintaining growth with price stability. Christensen (2001) in his analysis of the effect of real supply shocks on the money growth – inflation relationship for the US concluded that short run price changes were the result of global real supply shocks.

Clearly then, the precise and exact nature of the response of prices to money supply during periods of recovery and at levels below full employment can not be fully known a priori.

In general, whereas it is possible for the relationship between prices and money to weaken, budget deficits beyond 'certain financeable limits' will clearly negate the possibility of attaining other objectives of macroeconomic policy (van Wijnbergen, 1990). Sowa's (1994) analysis of fiscal sustainability in Ghana showed that fiscal policy was consistent in 1985 and 1989 whereas government did not maintain consistent fiscal deficits between 1986-1988, and inflation in these years was well above targets. Van Wijnbergen and Budina (2002) on the other hand analyse the consistency between fiscal deficits and inflation targets in Poland and show consistency between inflation targets and fiscal policy for the year 1992, but only on the account of low market interest rates on external debt. Buffie et al. (2009) show that deficit reduction results in lower inflation in the long run. A natural concern that arises then is one of sustainability and compatibility of the budget deficit with other macroeconomic targets.

It is in context of the foregoing that this study contributes to the literature. First, informs current debate whether there is room for increasing the fiscal space in view of macroeconomic costs. Second, provides evidence from Uganda on the relationship between monetary aggregates and price variability. And lastly, ascertains the health of Uganda's fiscal policy.

The rest of the paper is structured as follows. Section two provides a framework for analysing fiscal policy consistency. Section three formally analyses the consistency fiscal policy in Uganda, while section four uses a structural vector autoregressive approach (SVAR) to analyse the interaction of selected macroeconomic aggregates. Section five provides policy recommendations and concludes the paper.

2 A FRAMEWORK FOR ANALYSING CONSISTENCY OF FISCAL POLICY

There are two major formal approaches normally employed to ascertain sustainability of a given fiscal policy; the accounting and present value constraint approaches. The accounting approach is based on the government budget identity, and sustainability of a primary deficit or surplus is measured by its capability to generate a constant debt/GDP ratio given a growth target. The approach that we adopted to analyse fiscal policy consistency is based on the works of Anand and van Wijnbergen (1989) and Budina and van Wijnbergen (2001).

The thrust of this approach entails consolidation of 'other' public sector deficits with the central bank accounts to determine 'financeable' levels of the deficit, given existing targets of inflation and sustainable internal and external borrowing. As a starting point, this approach incorporates the central bank[3] into the basic public sector budget identity which shows both the financing requirements and the sources of financing.

$$D + iB + i^{*}\left(B^{*} - NFA^{*}\right)E = \dot{B} + \dot{B}^{*}E + \dot{D}C_{g} - N\dot{W}\,, \qquad 1)$$

where,

D	=	non-interest deficit
i	=	nominal domestic interest rate
i^{*}	=	nominal foreign interest rate
B	=	domestic debt stock
B^{*}	=	foreign debt stock
NFA^{*}	=	net foreign assets
E	=	exchange rate (domestic in terms of foreign units)
$\dot{B}$	=	change in domestic debt stock
$\dot{B}^{*}$	=	change in foreign debt stock
$\dot{D}C_{g}$	=	net credit to government
$N\dot{W}$	=	change in central banks net worth

The basic identity shows that the deficit can be financed by issuing domestic and foreign debt, and through central bank advances to government. In order to consolidate the central government and the central bank into the overall deficit, we incorporate a simplified central bank profit and loss account into the definition of the basic government budget constraint by deducting central bank profits from the financing requirements. The counterpart of this modification is the change in net worth which is reflected as part of the sources of funding. Since the central bank typically changes its net foreign assets to finance debt payment, changes in net foreign assets is also deducted from the right hand side[4],

[3] This is captured through a simplified profit and loss account of the central bank.

[4] Notice that it is also at the same time added back to maintain equality.

$$D + iB + i^*\left(B^* - NFA^*\right)E = \dot{B} + \left(\dot{B}^* - N\dot{F}A^*\right)E + \dot{D}C_g + N\dot{F}A^*E - N\dot{W} \; . \qquad 2)$$

Using the definition of changes in base money[5], $M = \dot{D}C_g + N\dot{F}A^*E - N\dot{W}$ this expression can equivalently be written as,

$$D + iB + i^*\left(B^* - NFA^*\right)E = \dot{B} + \left(\dot{B}^* - N\dot{F}A^*\right)E + \dot{M} \; . \qquad 3)$$

Adjusting for inflation and considering only real changes

$$d + rb + \left(r^* + \hat{e}\right)\left(b^* - nfa^*\right)e = \Delta b + \left(\Delta b^* - nfa^*\right)e + \Delta M/P \qquad 4)$$

where the lower case letters are the real counterparts of the nominal values, $\hat{e}$ is the changes in the exchange rate which is part of the cost of debt servicing and

$$\Delta M/P = \Delta m + \pi m \qquad 5)$$

This can be interpreted to mean that the real value of consolidated deficit should equal the financing from both domestic and foreign sources and revenue from inflation tax and seignorage. In order to calculate the financeable deficit, one has to take into consideration the dynamics of the debt process. A quite simple and commonly used debt strategy suggests that debt should not grow faster than the resources available for its financing,

$\Delta b = nb,$ and $\Delta\left(b^* - nfa^*\right)e = \left(n - \hat{e}\right)\left(b^* - nfa^*\right),$

This can be substituted into (4) to derive the consolidated financeable deficit.

$$d + rb + \left(r^* + \hat{e}\right)\left(b^* - nfa^*\right)e = \Delta b + \left(\Delta b^* - nfa^*\right)e + \Delta M/P \qquad 6)$$

The consolidated debt and real payments is defined as changes in the real value of domestic and foreign debt, plus revenue from seignorage and from inflation tax.

The consolidated 'financeable' deficit can then be obtained by incorporating the particular assumptions adopted about the debt strategy,

$$d + rb + r^*\left(b^* - nfa^*\right)e = nb + \left(n - \hat{e}\right)\left(b^* - nfa^*\right) + nm + \pi m \; . \qquad 7)$$

The 'financeable' deficit thus defines the level of consolidated deficit that is consistent with attainment of target outcomes for other macroeconomic variables, most notably the rates of inflation and GDP growth rates. Thus, if actual deficit exceeds sustainable levels, then one of the non fiscal targets would have to be abandoned or at the minimum fiscal policy would need to be adjusted.

[5] Base money may be issued to finance advances to government, to accumulate net foreign assets in so far as these are not already financed by the net worth of the central bank.

3. ANALYZING THE CONSISTENCY OF FISCAL POLICY

3.1 Introduction

This section employs the specification in equation (7) to calculate the financeable level of the deficit in Uganda. Estimates of the sustainable deficits are derived from the specification in (7) by holding constant the ratios of public liabilities to output for feasible values of the macroeconomic variables that determine market demands for public liabilities. In addition, we also undertake simulations of different macroeconomic policy scenarios and present their likely effects on the level of deficit financing.

In order to calculate the value of the consolidated financeable deficit, we start by undertaking an econometric estimation of demand for money. Parameters from the money demand specification are then used to calculate revenues from inflation tax and seigniorage. These are then used with values of other variables in the consolidated deficit equation to calculate the financeable deficit.

3.2 Definition and measurement of selected variables

Estimation of a money demand function requires careful selection of the appropriate definition of money to be used in analysing deficit finance and inflation tax revenue. Indeed, revenue derived from inflationary erosion of the private sector's deposits in the banking system that is offset by inflationary erosion of loans outstanding to the private sector does not increase net revenue. This rules out the possibility of using the broad definition of money (M2) since it has an 'inside money' component (see van Wijnbergen, 1990). The proper definition should instead include base money or 'outside money' (M2 less private sector claims). In Uganda, base money is defined as commercial banks' deposits at Bank of Uganda (BoU), plus currency issued and commercial banks' holdings of BoU securities (BoU, 2006). However, in practice central banks in many countries not only hold reserves from commercial banks but also lend to them. This requires adjustment in the definition of base money so that it coincides with the central bank's net liabilities to the private sector. This adjusted monetary base is the appropriate concept to use for calculations of consistency of fiscal deficits with levels of inflation tax (van Wijnbergen, 1990).

Using the adjusted monetary base definition of money has an important consequence for the measurement of the public foreign debt. If all the central bank's liabilities (base money) are construed as public liabilities, then the central bank's claims on nongovernmental agents, correspondingly, must be subtracted from the public sector's debt. Thus, public foreign debt needs to be measured net of the central bank's foreign assets.

In a steady state, the revenue from seignorage equals the economy's growth rate g times the adjusted monetary base m. The sum of revenue from inflation tax and

seignorage equals revenue from monetization. Outside the steady state there could be other sources of revenue from monetization including one-time changes in real money stock because of changes in inflation, interest rates, or financial innovations that shift money demand.
The other practical problem that arises is the choice of the appropriate interest rate on foreign debt. This is especially so because most of Uganda's debt is obtained on concessional terms. For instance, 80 percent of Uganda's foreign borrowing carries a 0.75 percent interest with a 40 year maturity and 10 year grace period, whereas the remaining 20 percent is borrowed at 2 percent interest over a 23 year period maturity with 6 years grace period. In addition, due to low absorptive capacity of loans committed, the country has paid a commitment penalty of 0.35 percent on World Bank and African Development Bank loans. Hence the appropriate interest rate variable should account for all these realities. However, for simplicity and data availability this study uses a calculated implicit average interest rate on foreign debt derived from actual interest payment.

A fairly recent development has been Uganda's qualification for the Heavily Indebted Poor Country (HIPC) Initiative in 1998 and 2000 which enabled the country to become eligible for debt write-offs. In 2006, the Multilateral Debt Relief Initiative (MDRI) saw Uganda receive a write off of 100 percent of eligible debt owed to the World Bank, the IMF and the African Development Bank (AfDB)[6]. This lowered Uganda's stock of external public debt from US$4.5 billion at end 2005/06 to US$1.5 billion at end 2006/07. The HIPC relief on average reduced actual principal and interest payments by 44.32 percent and 46.64 percent respectively during the period 2000/01 and 2007/08. The highest reduction of actual principal payments as a result of HIPC relief was in FY2002/03 while the lowest was in 2007/08. As for the interest payments, the highest reduction was realised in 2003/04 (Appendix Table 3).

3.3 Debt strategy and macroeconomic restrictions

Solvency considerations or other management objectives and macroeconomic policy objectives such as targets for inflation and real growth lead to restrictions on the sources of financing. The financeable deficit equals the maximum obtainable from the sources of financing given the restrictions.

The precise point where debt levels begin to threaten solvency is of course difficult to determine and anyhow willingness to pay may cut in earlier since (political) willingness to pay may be less than the ability to pay. A conservative approach would take current debt-output ratios as a benchmark. If at current levels the government still has access to capital markets, then at least the market's assessment is that at current levels the debt is within the limits set by ability and willingness to pay. It is moreover reasonable to take

[6] For the IMF and the African Development Fund, eligible debt comprised all outstanding amounts disbursed prior to 31st December 2004. The applicable date for IDA was 31st December 2003.

debt-output levels rather than absolute levels as a benchmark since capacity to generate tax revenue is clearly closely related to the aggregate level of output. In view of this, domestic and (net) foreign debt should not grow faster than the real resources available for its financing. This restriction yields:

$$\Delta\frac{dd}{gdp} = g * \frac{dd}{gdp} \qquad \text{and} \qquad \Delta\left\{\frac{(fd - nfa)}{gdp} er\right\} = g * \left\{\frac{(fd - nfa)}{gdp} er\right\}. \tag{8}$$

Equation (8) indicates the restrictions on debt issue if the conservative approach is chosen and debt–output ratios kept constant. This analysis can accommodate different debt strategies; however, for simplicity the study adopts this conservative approach. Hence with debt policy defined in terms of target debt output ratios, debt should not in real terms grow faster than real GDP growth rate *g*.

Uganda's macroeconomic management is geared to the goal of price stability and monetary policy is geared to attaining inflation of no more than 5 percent. For the exchange rate variable, government recognizes its impact on exports and the central bank usually intervenes in the market to ensure its orderly movement. The central bank also appears on the market to sterilize the effect of donor financing on money supply. Generally, it signals the direction of the market determined exchange rate in view of the fundamentals. Like the exchange rate variable, the interest rate variable is also market determined. However, the challenge for macroeconomic management has been the monetary policy effects through domestic borrowing on overall interest rates.

3.4 Analysis of fiscal policy consistency

3.4.1 Real Quasi-Fiscal Deficits

Table 1 presents calculations of the quasi-fiscal deficit consolidating government and central bank accounts for the 1993-2006 period. These deficits are calculated by excluding the inflationary component of all public sector liabilities, except for the change in monetary financing from nominal deficits. The real quasi-fiscal deficit for the central bank is accumulated either through an increase in its foreign currency liabilities or through an increase in base money. For analytical purposes, the period is subdivided into three and then the average covering the whole liberalization period is considered. The deficits were calculated from the financing side by considering increases in liabilities of the consolidated government. The average is used as a base case scenario for the analysis that follows.

Table 1: Real Quasi Deficits (% of GDP)

PERIOD	1993-1997	1998-2002	2003-2006	1993-2006
Primary Deficit	1.85	1.70	1.06	1.55
Deficit	3.27	2.59	2.27	2.74
Interest Payments	1.42	0.89	1.21	1.19
Real Domestic Interest Payments	0.06	0.36	0.53	0.32
Real Foreign Net Debt Interest Payments	1.37	0.54	0.68	0.87
Real Domestic Debt	1.35	4.39	9.51	4.77
Real Foreign Debt	68.38	51.81	57.67	59.40
Real Foreign Net Debt	69.72	44.96	44.13	53.56
Real Public Debt (Excl. NFA)	69.73	56.21	67.18	64.17
Net Real Public Debt	71.07	49.35	53.64	58.33
Real Domestic Interest	3.51	6.41	5.71	5.17
Real Foreign Interest	1.88	1.41	1.69	1.66
Domestic Debt Financing	0.55	1.79	1.52	1.15
Foreign Financing	1.83	-0.43	0.02	0.75
Monetization	0.89	1.23	0.71	0.91

Source: Computed

The figures suggest that for the period 1993-1997 domestic debt financing of the deficit stood at a dismal 0.6 percent of GDP; with the bulk of financing coming in from foreign sources. However, this trend changed over the 1998-2002 period where domestic financing peaked at about 1.8 percent of GDP. This has happened even in the face of the fact that starting 1993, Uganda suspended use of domestic debt as a source of financing, reserving it for purposes of liquidity management only. Hence the liquidity management pressures stemming from increased donor grant inflows on the sustainability of domestic debt are evident. Indeed, the need to mop up excess liquidity

has led to a fivefold growth in domestic debt from 1.4 percent of GDP for the period 1993-1997 to 9.5 percent of GDP in 2003-2006.

The real foreign debt on the other hand has declined from 68.4 percent in the 1993-1997 period to 57.7 percent during 2003-2006 reflecting an increase in grants and debt relief from the HIPC Initiative and the recent Multilateral Debt Relief International (MDRI).

Though the overall deficit excluding grants has increased, the real net operational deficit of government has actually reduced from 3.3 percent in the period 1993-1997 to 2.3 percent in the 2003-2006 period. This reduction has been due to increased foreign grant aid which has reduced the real deficit when net liability of the consolidated government is considered. Unfortunately though, increased reliance on donor support has complicated macroeconomic management. As a result for instance, real domestic interest rates have increased from an average of 3.5 percent in 1993-1997 period to peak at 6.4 percent for the 1998-2002 period. This provides a challenge to macroeconomic management in the face of providing a private sector investment friendly environment.

To assess whether these deficits have been compatible with inflation targets, the financeable deficit is derived and is compared with the calculated actual deficits. However, monetary financing is important in deriving the financeable deficit. Hence, to analyze monetary financing potential of the economy, the next sub-section analyzes the inflation Luffer curve based on the demand for money specification for Uganda.

3.4.2 Inflation and Revenue from Monetization

Using the estimated money demand coefficients (appended in annex 1 and 2), the impact of inflation on base money, seignorage and inflation tax revenues[7] is discussed. As a baseline case scenario the average during the period 1993-2006 is used in the simulated model. The aim here is to demonstrate the approximated limit macroeconomic management has in attaining revenue from monetization.

Table 2, summarizes the inflation Luffer curve shape of inflation tax and revenue from monetization. The Table presents the estimated base money, inflation tax, seignorage revenue and revenue from monetization for a given inflation rate. Any rise in the inflation rate (inflation tax rate) causes the real monetary base (inflation tax base) to fall. At low inflation rates an increase in the inflation tax rate increases revenue as a percentage of GDP. However, it reduces the tax base.

[7] It should be noted though that inflation tax revenue is as of now not a conscious objective of deficit financing in Uganda and when it occurs, it is mainly a side effect underlying in the policy framework.

Table 2: Inflation Luffer Curve

INFLATION (%)	BASE MONEY(% of GDP)	SEIGNORAGE REVENUE (% of GDP)	INFLATION TAX (% of GDP)	REVENUE FROM MONETIZATION(% of GDP)
0	5.39	0.34	0.00	0.34
5	5.36	0.34	0.25	0.59
7	5.34	0.34	0.26	0.60
10	5.34	0.34	0.48	0.82
50	5.15	0.33	1.69	2.01
150	4.69	0.29	2.74	3.03
180	4.55	0.28	2.84	3.12
240	4.27	0.26	2.92	3.18
300	3.99	0.24	2.88	3.12

Source: computed

The results show that inflation tax and real revenue from monetization as a percentage of GDP reach a maximum of 3.18 percent of GDP at an inflation rate of 240 percent. For higher inflation rates, the negative impact of rising inflation on base money more than offsets the direct effect of higher inflation rate on monetization. In as much as a real possibility exists to use this revenue for deficit financing, this is not an objective but rather a 'side accidental product' underlying in the policy framework. This is largely due to the importance government attaches to macroeconomic stability.

3.4.3 Inflation Target and Fiscal Stance

In view of the debt strategy described in the methodology and expected revenue from monetization, Table 3 shows the financeable deficit for a given inflation rate. The financeable deficit is then compared with the actual deficit to yield the required change. From the table, if the debt is to grow at most at the rate of GDP then the results indicate that real domestic financing should not exceed 0.33 percent of GDP, while real foreign financing should not exceed 2 percent of GDP.

Table 3: Financeable Deficit and Required Change

Inflation (%)	Domestic Debt Strategy(% of GDP)	Foreign Debt Strategy(% of GDP)	Monetization Revenue(% of GDP)	Financeable Deficit(% of GDP)	Actual Deficit(% of GDP)	Required Change(% of GDP)
0	0.33	2.05	0.34	2.72	2.74	0.02
5	0.33	2.05	0.59	2.97	2.74	-0.23
7	0.33	2.05	0.60	2.98	2.74	-0.24
10	0.33	2.05	0.82	3.20	2.74	-0.46
50	0.33	2.05	2.01	4.39	2.74	-1.65
150	0.33	2.05	3.03	5.41	2.74	-2.67
180	0.33	2.05	3.12	5.50	2.74	-2.76
240	0.33	2.05	3.18	5.56	2.74	-2.82
300	0.33	2.05	3.12	5.50	2.74	-2.76

Source: Computed

Given these restrictions and the country's macroeconomic management goal of having inflation at no more than 5 percent, then the actual deficit is consistent with the financeable deficit. Indeed during the liberalization period, on average the fiscal stance has been consistent with the inflation target. To attain the inflation target, however, domestic borrowing has been used in pursuing monetary policy of liquidity control.

Specifically, in assessing the different means of financing the deficit, consistency of the fiscal stance has been achieved at the cost of unsustainable domestic debt in relation to macroeconomic targets. While the consistent domestic debt strategy estimated is 0.33 percent of GDP, the actual domestic borrowing on average is 1.2 percent of GDP. But foreign debt financing and revenue from monetization were consistent with the overall strategy. This is because though Uganda relied more on foreign financing, the grant element of this financing was above 60 percent.

Hence, a more contentious question for macroeconomic management involves the domestic debt which has accumulated at an unsustainable rate, thus, increasing the domestic real interest rates. Issuing domestic debt at such a high real interest rates will allow lower money growth but at the cost of future increases in debt service obligations and thus future budget deterioration. According to van Wijnbergen (1989), a debt strategy that sacrifices future budget balance for current monetary restraint is likely to fuel inflationary expectations even if favourable external shocks allow a temporary decline in prices. This in turn will keep nominal interest rates high, fuelling a vicious circle of high interest rates, high public debt service, increasing budget deficits, high inflationary expectations, and back to high interest rates. Of course high interest rates then limit private sector investment (crowded out by government) which in turn deteriorates long term sustainable growth, thus, affecting the country's ability to service its liabilities; as discussed in the next sub-section.

3.4.4 The Impact of GDP Growth

The greater is GDP growth, the greater the debt that can be sustained by an economy. Table 4 shows the simulated results of the financeable deficit at 3, 6 and 9 percent real GDP growth. On average the economy has grown at about 6 percent over the past 15 or so years. Real GDP growth rates were high in the 1990s but stagnated around 5.5 percent in the early 2000s, recovering to above 6 percent in 2006/07. From the table, if GDP growth rates fall, then the financeable deficit declines making fiscal stance to become unsustainable, while if the growth rates rise then the economy is able to accommodate larger deficits without jeopardizing macroeconomic targets.

Table 4: Impact of GDP Growth

	FINANCEABLE DEFICIT(% of GDP)			
Inflation (%)	3% GDP Growth	6% GDP Growth	9 %GDP Growth	Actual Deficit
0	1.49	2.72	4.46	2.74
5	1.74	2.97	4.71	2.74
7	1.83	2.98	4.80	2.74
10	1.96	3.20	4.93	2.74
50	3.17	4.39	6.12	2.74
150	4.21	5.41	7.13	2.74
180	4.31	5.50	7.22	2.74
240	4.37	5.56	7.27	2.74
300	4.32	5.50	7.20	2.74

Table 5 shows the required deficit reduction for given GDP growth rates. At a growth rate of 3 percent, it takes an inflation rate target of above 10 percent, for the actual deficit to be consistent with the inflation target. While, at 9 percent GDP growth, the economy is able to accommodate higher real deficits and stay in line with the macroeconomic target. Thus the negative effects of the deficit on the economy need to be minimized.

Table 5: Required Deficit Reduction at a given GDP Growth and Inflation

	REQUIRED DEFICIT REDUCTION(% of GDP)			
Inflation (%)	3 %GDP Growth	6 %GDP Growth	9%GDP Growth	Actual Deficit
0	1.25	0.02	-1.72	2.74
5	1.00	-0.23	-1.97	2.74
7	0.91	-0.24	-2.06	2.74
10	0.78	-0.46	-2.19	2.74
50	-0.43	-1.65	-3.38	2.74
150	-1.47	-2.67	-4.39	2.74
180	-1.57	-2.76	-4.48	2.74
240	-1.63	-2.82	-4.53	2.74
300	-1.58	-2.76	-4.46	2.74
400	-1.37	-2.53	-4.22	2.74
500	-1.06	-2.20	-3.89	2.74

Source: Computed

However, just like long run sustainable GDP growth needs a conducive foreign exchange policy which favours exports; also the long term sustainability of deficits will be affected by the exchange rate movements. This is because the exchange rate will on one hand affect the cost of servicing foreign debt, while on the other hand it will affect the ability to service the debt.

3.4.5 The impact of Exchange Rate Movements

A challenge faced by the macroeconomic management is to convert foreign aid into local currency without increasing money supply to a level that is inconsistent with the price stability goal of the country. Owing to the underdeveloped nature of the financial market, though, only a limited range of instruments are available to the central bank in Uganda (Atingi, 2000). This has meant that in addition to using of foreign exchange sales to convert foreign aid into local currency, it has also been used as a tool of monetary policy. Indeed, there has been a remarkable increase in the foreign exchange operations with the net sales "…rising from 5 million dollars in 1998/99 to the programmed level of almost 254 million dollars in 2001/02" (Bank of Uganda, 2003, pg 12). This has been especially so in cases where issuance of treasury bills is deemed to exert upward pressure on domestic interest rates. Hence macroeconomic managers must balance the issue of domestic debt with foreign exchange trading in the market. Trading in the foreign exchange market at the margin will increase the amount of foreign currency available and thus appreciate the exchange rate. Table 6, shows the likely effect of exchange rate movements on the fiscal stance. An appreciation of the exchange rate is likely to reduce foreign indebtedness and interest payments of the country and vice versa. Indeed the results indicate that the deficit declines by 0.02 percent with a 10 percent appreciation while it increases by 0.04 percent with 10 percent depreciation. However, while this may sound appealing to debt managers, it has long term effects on sustainability of debt. This arises from the Dutch disease effect on exports and hence

the capacity for the country to repay its debt. Hence for long run sustainability a depreciation which favours exports, boosts the economy's capacity to repay its debt and leads to economic growth, should be sought.

Table 6: The Impact of Exchange Rate Movements

Movements	Real Foreign Debt(% of GDP)	Real Foreign Net Debt(% of GDP)	Real Foreign Net Debt Interest Payments(% of GDP)	Deficit(% of GDP)
A. Appreciation (%)				
10	50.40	44.11	0.73	2.72
30	39.20	34.31	0.57	2.69
50	28.00	24.51	0.41	2.64
B. Depreciation (%)				
10	61.60	53.92	0.89	2.79
20	67.20	58.82	0.97	2.81
30	72.80	63.72	1.06	2.84
50	84.00	73.52	1.22	2.88
C.Actual (%)				
0	59.40	53.50	0.87	2.74

Source: Computed.

For macroeconomic management, the challenge then is to trade in the foreign exchange market without exerting too much appreciation pressure on the market.

4. INTERACTION OF SELECTED MACROECONOMIC AGGREGATES: A STRUCTURAL VECTOR AUTOREGRESSIVE APPROACH (SVAR)

4.1 Model Specification and Identification of Restrictions

The standard framework to investigate the role of innovations on the economy and their possible determination is the structural vector autoregression (SVAR) model (Sims, 1982; 1986; Bernanke and Blinder, 1992; Shapiro and Watson, 1988; and Blanchard and Quah, 1989). Sims (1980) VAR framework made it possible to direct both relative meaning and the dynamic effect of various disturbances on macroeconomic variables. Its main criticism has been that is a largely theoretical identification mechanism with little economic foundation (see Cooley and Leroy, 1985). The SVAR methodology improves on the identification mechanism by imposing restrictions based on economic theory. The methodology is generally focused on how innovations to one endogenous variable affect other endogenous variables and the direction of instant correlation between innovation variables can be assessed. It is also possible to determine whether the shocks have temporary or permanent effects on the endogenous variables.

To this end, the empirical method applied in this study is a small open economy SVAR. The model is composed of a system of five equations representing five endogenous variables depicting the relationship between the main macroeconomic indicators of the growth rates of GDP (*ggdp*), prices (*gcpi*), nominal money supply (*gmny*) (M2), nominal interest rates (*gir*) and local currency movements (*gner*).

The process of estimating a SVAR involves a number of steps. First, a reduced VAR using OLS ensuring that an appropriate specification of the lag length is done to ensure no serial correlation from the residuals. Second, is the identification of the structural parameters of the model by imposing theory based restrictions. Third, in the case where shocks are assumed to have temporary effects the short run restriction SVAR model is used, however, where shocks are assumed to have permanent effects, the long run SVAR is employed. In the final step the orthogonalised and structural response function and forecast-error variance decomposition are analyzed.

Before, embarking on the econometric tests, an analysis of the time series properties of the series is undertaken. The unit root tests based on the KPSS and DF-GLS tests suggest that all the variables are stationary (Table 7).

Table 7: Unit Root Tests

Variable	KPSS	DF-GLS
ir	0.2028***	-1.6332
gir	0.0705***	-10.5634***
gmny	0.1948***	-14.7879***
gner	0.2575***	-10.7270***
gcpi	0.1147***	-10.4157***
ggdp	0.4824**	-2.8856***

Notes: The null hypothesis is that the series are non-stationary for the DF-GLS while the series are non-stationary for the KPSS. The symbols *** indicate that the null rejected at 1, 5 and 10 percent confidence intervals, while ** indicate only at 5 and 10 percent and * indicates at only 10 percent interval. The critical values are data based calculated by E-VIEWS-5 and differ depending on lags and whether the trend has been included.

Without imposing a number of restrictions, the SVAR cannot be identified both in the short run and the long run. Thus to identify the underlying structural model, restrictions are made based on economic theory. Table 8 shows the identifying restrictions of the short run model. The identification of the real sector (prices and GDP) is obtained by assuming that monetary sector variable affect the real sector with lag. In addition the real sector variables have no effect in identification of shocks in the monetary sector. We further assume that nominal exchange rate does not contemporaneously affect real GDP, real output does not contemporaneously affect prices, nominal variables have no contemporaneous effect on interest rate, and nominal interest rate has no contemporaneous effect on the exchange rate. Thus in identifying the short run model two over identifying restrictions are imposed.

Table 8: Contemporaneous Restrictions

Variables	gner	gnir	gmny	ggdp	gcpi
gner	1	0	0	0	0
gnir	0	1	0	0	0
gmny	B1	B2	1	0	0
ggdp	0	B3	B4	1	0
gcpi	B5	B6	B7	B8	1

Apart from identification of structural shocks by the short run parameter restrictions, there is an alternative approach of imposing restrictions on the long run parameters for the structural disturbances. The method of long run SVAR analysis introduced by Shapiro and Watson, 1988; and Blanchard and Quah, 1989 is based on the hypothesis that the long run effect of particular shocks on a particular variable is restricted. Table 9, provides the identifying restrictions for the long run model. It is assumed that money and interest rates influence GDP. In addition, exchange rate shocks affect both real and monetary variables in the long run. Stable prices are good for long run macroeconomic stability and thus economic growth. Thus the long run model is exactly identified.

Table 9: Long run Restrictions

Variables	gner	gnir	gmny	ggdp	gcpi
gner	C1	0	0	0	0
gnir	C2	C3	0	0	0
gmny	C4	C5	C6	0	0
ggdp	C7	C8	C9	C10	0
gcpi	C11	C12	C13	C14	C15

In estimating a reduced form VAR special attention needs to be put on ensuring an appropriate specification of the lag length so as to ensure no serial correlation from the residuals. Table 10 provides the lag length selection criteria. Based on the FPE, AIC and HQ criterion, the Table suggests an appropriate lag length of two.

Table 10: Lag Selection Criteria

Lag	LogL	FPE	AIC	SC	HQ
0	2403.825	2.44e-19	-28.66856	-28.48186	-28.59278
1	2528.963	7.35e-20	-29.86782	-29.21435*	-29.60259
2	2574.930	5.72e-20*	-30.11892*	-28.99869	-29.66424*
3	2593.554	6.19e-20	-30.04257	-28.45557	-29.39844
4	2609.516	6.93e-20	-29.93432	-27.88055	-29.10074
5	2614.045	8.91e-20	-29.68916	-27.16863	-28.66613
6	2648.162	8.07e-20	-29.79834	-26.81104	-28.58586
7	2669.518	8.54e-20	-29.75470	-26.30064	-28.35277
8	2678.236	1.06e-19	-29.55971	-25.63888	-27.96833
9	2686.348	1.32e-19	-29.35747	-24.96987	-27.57664
10	2696.349	1.63e-19	-29.17783	-24.32347	-27.20755
11	2711.763	1.90e-19	-29.06303	-23.74190	-26.90330
12	2741.633	1.87e-19	-29.12135	-23.33346	-26.77217

Thus the results of the estimated reduced form VAR with the appropriate 2 lags are provided in Table 11.

Table 11: Reduced Form VAR Results

	GNER	GIR	GMNY	GGDP	GCPI
GNER(-1)	0.214460	1.206755	-0.244208	0.006981	0.208996
	(0.07490)	(0.54556)	(0.20577)	(0.00922)	(0.05709)
	[2.86326]	[2.21195]	[-1.18681]	[0.75700]	[3.6608]
GNER(-2)	0.082118	-0.192929	-0.024997	0.002393	-0.020840
	(0.07505)	(0.79711)	(0.20617)	(0.00924)	(0.10730)
	[1.09423]	[-0.24203]	[-0.12125]	[0.25896]	[-0.19423]
GIR(-1)	-0.010824	0.078983	0.008154	-0.000165	0.004080
	(0.00521)	(0.07658)	(0.01981)	(0.00089)	(0.01031)
	[-2.07754]	[1.03140]	[0.41167]	[-0.18554]	[0.39578]
GIR(-2)	0.017235	-0.152537	-0.008886	-0.000188	-0.004592
	(0.00718)	(0.07627)	(0.01973)	(0.00088)	(0.01027)
	[2.40017]	[-2.0005]	[-0.45047]	[-0.21258]	[-0.44727]
GMNY(-1)	-0.052028	0.176608	-0.074280	-0.001972	0.011154
	(0.02525)	(0.26815)	(0.06936)	(0.00311)	(0.03609)
	[-2.06084]	[0.65862]	[-1.07100]	[-0.63460]	[0.30902]
GMNY(-2)	0.013775	0.106975	-0.450842	-3.84E-06	0.026908
	(0.02553)	(0.27113)	(0.07013)	(0.00314)	(0.03650)
	[0.53963]	[0.39456]	[-6.42903]	[-0.00122]	[0.73729]
GGDP(-1)	-1.060476	-2.151717	4.691375	0.472749	0.323753
	(0.46784)	(6.03132)	(1.55997)	(0.06991)	(0.81185)
	[-2.26675]	[-0.35676]	[3.00736]	[6.76238]	[0.39878]
GGDP(-2)	1.306885	-1.731869	-0.297255	0.455455	0.040093
	(0.57539)	(6.11153)	(1.58071)	(0.07084)	(0.82265)
	[2.27131]	[-0.28338]	[-0.18805]	[6.42949]	[0.04874]
GCPI(-1)	-0.100952	0.462380	0.030303	0.005018	0.093869
	(0.05432)	(0.57698)	(0.14923)	(0.00669)	(0.03766)
	[-1.85842]	[0.80138]	[0.20306]	[0.75038]	[2.49254]
GCPI(-2)	-0.029598	0.741729	0.110774	0.004894	-0.016842
	(0.05490)	(0.58310)	(0.15081)	(0.00676)	(0.07849)
	[-0.53915]	[1.27205]	[0.73451]	[0.72408]	[-0.21458]
Log likelihood		2706.152			

The results in Table 11 suggest a weak relationship between real GDP and price movements. The impact of real interest rates on prices is insignificant as well. Whereas changes in money would be expected to impact positively on the price level, the coefficients are found to be insignificant. Indeed the significant predictive power is expected from movements in the exchange rate market and the expected price level.

The results suggest a significant predictive power of developments in the exchange rate and feedback from past values of inflation. However, it is likely that better predictions could be achieved by imposing economic based restrictions to identify short run and long run models of the SVAR.

4.2 Contemporaneous structural model

Following the Sims and Zha (2002) procedure for estimation of short run parameters, a limited time-variation in the coefficients of the model is used in order to observe changes in monetary policy design and inflation targeting. Table 12 provides results of the contemporaneous model identified by applying some economic theory based restrictions (these are discussed earlier on). Note that the likelihood ratio test statistic for null hypothesis of over-identifying restrictions does not reject the restrictions implying that they are statistically valid.

The coefficients of the variables exchange rate, GDP and money are expected to have a positive effect on the price level in the short run while the variable interest rate is expected to negatively affect price changes. Unfortunately, the structural coefficients are statistically insignificant.

Table 12: Estimated Coefficients of Contemporaneous variables[8]

	Coefficient	z-Statistic	Prob.
C(3)	-0.038622	-0.186846	0.8518
C(4)	-0.003924	-0.201945	0.8400
C(6)	0.000871	1.003275	0.3157
C(7)	-0.003312	-0.986643	0.3238
C(9)	0.052129	0.488776	0.6250
C(10)	-0.004215	-0.419242	0.6750
C(11)	0.032715	0.841344	0.4002
C(12)	0.426978	0.491797	0.6229
C(1)	0.008511	18.81489	0.0000
C(2)	0.090538	18.81489	0.0000
C(5)	0.023405	18.81489	0.0000
C(8)	0.001045	18.81489	0.0000
C(13)	0.012075	18.81489	0.0000
Log likelihood	2674.204		
Chi-square(2)	0.642548	Probability	0.7252

4.3 Long run Structural Model

The long run SVAR model estimation shows the permanent effect of monetary and exchange rate policies as well as the contribution of real output to price level. The results of the long run structural model are provided in Table 13. All parameters in the price level equation are statistically significant and bear the expected signs. Money, GDP, exchange rate, interest rate and expected inflation have a positive permanent effect on the price level. However, the major variations in the price level are expected to come from inflationary expectations and exchange rate variations, since they have the highest parameter coefficients. With respect to growth targeting the results seem to support the classical dichotomy hypothesis showing a weak link between monetary aggregates and output.

$gner = c(1)u1$

$gnir = c(2)u2$

$gmny = c(3)gner + c(4)gnir + c(5)u3$

$ggdp = c(6)gnir + c(7)gmny + c(8)u4$

$gcpi = c(9)gner + c(10)gnir + c(11)gmny + c(12)ggdp + c(1)u5$

Table 13: Estimated Coefficients of Long run variables

	Coefficient	z-Statistic	Prob.
C(1)	0.012685	18.81489	0.0000
C(2)	0.022996	3.570735	0.0004
C(3)	-0.015177	-5.314660	0.0000
C(4)	-0.004695	-4.476003	0.0000
C(5)	-0.003627	-2.981958	0.0029
C(6)	0.084124	18.81489	0.0000
C(7)	0.002100	0.767156	0.4430
C(8)	0.000249	0.244221	0.8071
C(9)	0.002029	1.696394	0.0898
C(10)	0.036384	18.81489	0.0000
C(11)	0.012314	15.77806	0.0000
C(12)	0.008982	8.228573	0.0000
C(13)	0.005656	18.81489	0.0000
C(14)	0.003268	3.382163	0.0007
C(15)	0.012644	18.81489	0.0000
Log likelihood	2674.526		

4.4 Stability and Autocorrelation Tests

In order to improve on the reliability of the VAR/SVAR estimates one needs to ascertain whether the model satisfies the stability and autocorrelation conditions. Table 14 provides a stability check. The results suggest that the model satisfies the stability condition since no root lies outside of the unit circle (Figure 1).

In addition the Lagrange multiplier test for absence of serially correlated disturbances in the VAR and SVAR specifications is undertaken. Table 15 shows that the null of no serial correlation cannot be rejected.

Table 14: Eigenvalue Stability Test

Root	Modulus
0.953108	0.953108
-0.034638 - 0.661962i	0.662867
-0.034638 + 0.661962i	0.662867
-0.467258	0.467258
0.391822	0.391822
0.044639 - 0.336772i	0.339718
0.044639 + 0.336772i	0.339718
-0.024131 - 0.238764i	0.239980
-0.024131 + 0.238764i	0.239980
-0.064266	0.064266
No root lies outside the unit circle.	
VAR satisfies the stability condition.	

Figure 1: Stability Test

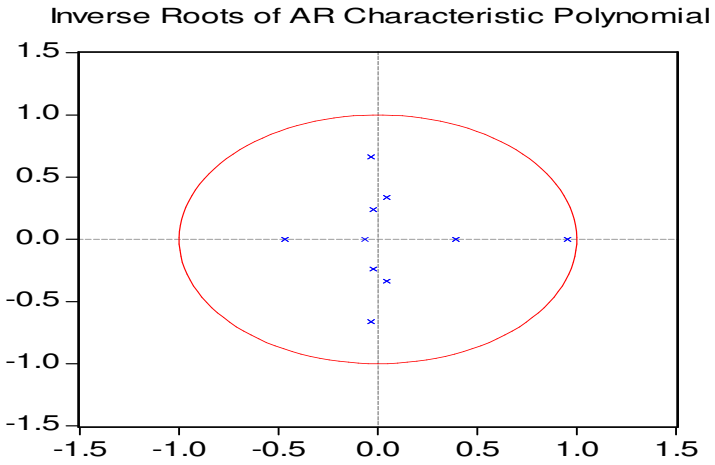

Table 15: VAR Residual Serial Correlation Langrage Multiplier Tests

Lags	LM-Stat	Prob
1	27.79136	0.3175
2	29.31158	0.2511

H0: no serial correlation at lag order h

4.5 Impulse Response Analysis

The impulse response analysis describes how innovations (shocks) to one variable affect another variable after a given period of time. The estimated orthogonolised and structural responses from both the short run and long run models are presented in Figure 2.

The graphs reveal results which are very similar to the models analyzed so far. It is shown that innovations in the exchange rate policy have a negative cumulative impact on the price level, while all other innovation impact positively on the price level. However, the largest shock is from inflationary expectation shocks. Considering innovations on output, exchange rate depreciation shocks output negatively, this could be due to the influence of imported capital goods on domestic production. In addition, interest rates shock output negatively, supporting the investment crowding out hypothesis.

4.6 Forecast Error Variance Decomposition

The forecast error variance decomposition (FEVD/SFEVD) provides information about the dynamic relationships among jointly analyzed VAR and SVAR system variables. They measure the relative importance of shocks arising from one variable in explaining

another variable. Table 16 provides the Cholesky forecast error variance decomposition results.

As expected the largest importance is placed on each variable in explaining itself. In the exchange rate model other than the importance of the variable itself, the interest rate and inflationary shocks are important in explaining the variation, these shocks stabilize after four periods. In the interest rate model, in addition to interest rate, it is the nominal exchange rate and inflationary shocks which are important in explaining the variations the model. The effect of these shocks stabilizes after the fifth period. For the money supply model shocks are expected for output variations which provide permanent cumulative effect on money supply. Shocks on output are expected from money supply and nominal exchange rate. Considering the price level variations, the important shocks are expected from nominal exchange rate. In general however, all variables to a large extent are exogenous with the exception of nominal exchange rate.

Figure 2 : Impulse Response Functions

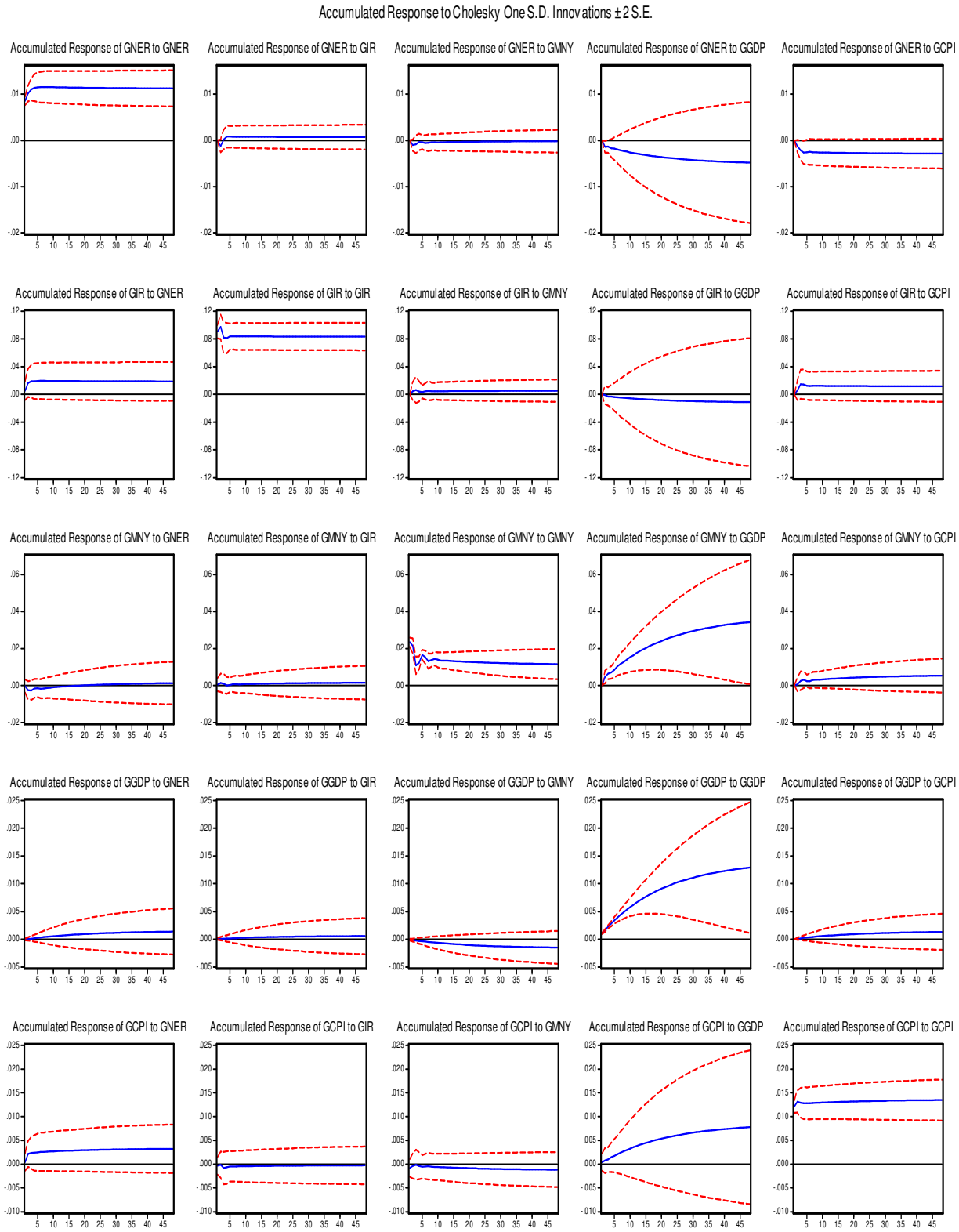

Table 16 : Forecast Error Variance Decomposition

Period	Gner/gner	Gner/gir	Gner/gmnv	Gner/ggdp	Gner/gcpi
1	100.0000	0.000000	0.000000	0.000000	0.000000
2	92.74733	1.753828	1.385847	2.260115	1.852883
3	89.69625	3.961081	1.372619	2.171921	2.798128
4	88.60122	4.369842	1.665610	2.362673	3.000655
5	88.58939	4.368897	1.670744	2.366579	3.004392
6	88.50505	4.366960	1.704689	2.419792	3.003512
7	88.47214	4.365305	1.709593	2.449240	3.003721
8	88.43283	4.363541	1.721016	2.477824	3.004793
9	88.41527	4.362668	1.720837	2.496742	3.004480
10	88.39502	4.361725	1.720855	2.518558	3.003845

Period	gir/gner	Gir/gir	Gir/gmnv	Gir/ggdp	Gir/gcpi
1	0.000000	100.0000	0.000000	0.000000	0.000000
2	1.431577	97.91362	0.254968	0.014455	0.385383
3	1.469422	96.91059	0.274822	0.058013	1.287151
4	1.469400	96.85816	0.327049	0.058470	1.286918
5	1.468125	96.80448	0.332397	0.065974	1.329026
6	1.468157	96.78712	0.346300	0.068529	1.329890
7	1.468143	96.78385	0.347799	0.070237	1.329974
8	1.468149	96.78039	0.350111	0.071394	1.329955
9	1.468118	96.77837	0.350147	0.073427	1.329940
10	1.468090	96.77600	0.350970	0.074964	1.329972

Period	Gmnv/gner	Gmnv/gir	Gmnv/gmnv	Gmnv/ggdp	Gmnv/gcpi
1	0.019715	0.023031	99.95725	0.000000	0.000000
2	0.892017	0.196074	95.24432	3.631422	0.036164
3	0.743920	0.198805	94.98882	3.440867	0.627585
4	0.935551	0.307824	94.61635	3.482322	0.657954
5	0.912228	0.302304	94.43629	3.649137	0.700040
6	0.917992	0.334099	93.92161	4.131339	0.694959
7	0.916040	0.331194	93.69082	4.337324	0.724626
8	0.934041	0.333533	93.51735	4.487719	0.727360
9	0.933889	0.333592	93.32277	4.684267	0.725477
10	0.932117	0.335231	93.12116	4.885740	0.725748

Period	Ggdp/gner	Ggdp/gir	Ggdp/gmnv	Ggdp/ggdp	Ggdp/gcpi
1	0.000107	0.545942	0.543878	98.91007	0.000000
2	0.204345	0.484459	0.945102	98.09857	0.267526
3	0.436283	0.356863	1.101220	97.41550	0.690139
4	0.640159	0.319252	1.101582	97.16842	0.770586
5	0.759010	0.296470	1.108389	97.01935	0.816777
6	0.856369	0.284169	1.148162	96.86068	0.850618
7	0.930720	0.272533	1.167584	96.74961	0.879552
8	0.989660	0.264348	1.173000	96.67411	0.898886
9	1.034205	0.258143	1.180474	96.61321	0.913965
10	1.070595	0.253195	1.189988	96.55967	0.926556

Period	Ggdp/gner Gcpi/gner	Ggdp/gir Gcpi/gir	Ggdp/gmnv Gcpi/gmnv	Ggdp/ggdp Gcpi/ggdp	Ggdp/gcpi Gcpi/gcpi
1	0.140780	0.088222	0.434141	0.135555	99.20130
2	2.031579	0.121263	0.525224	0.199129	97.12280
3	2.070150	0.452467	0.576224	0.224472	96.67669
4	2.066283	0.469596	0.615371	0.377364	96.47139
5	2.068733	0.491903	0.636504	0.440422	96.36244
6	2.071426	0.491517	0.638696	0.510988	96.28737
7	2.071236	0.491178	0.638571	0.577152	96.22186
8	2.070581	0.491075	0.643094	0.641557	96.15369
9	2.070660	0.490882	0.644815	0.693727	96.09992
10	2.070696	0.490692	0.644530	0.741651	96.05243

5. CONCLUSION AND RECOMMENDATIONS

The major fiscal policy issues currently being debated in Uganda revolve around the possibility of increasing fiscal space and the trade-off between macroeconomic stability on the one hand and the need to finance strategic investments and social sector targets on the other. In the face of a narrow tax base, the country's strategy since the early 1990s has been to run a budget deficit (financed to a significant extent by donor inflows). Whereas aid funded deficits appear to be benign, budget deficits beyond 'certain financeable limits' negate the possibility of attaining other objectives of macroeconomic policy.

This paper sought to make a contribution to the ongoing debate in Uganda on the possibility of increasing fiscal space versus the trade-off between macroeconomic stability on the one hand and the need to finance some pertinent development challenges on the other. We also examined both short term as well as long term interactions between selected macroeconomic aggregates with particular focus on the relationship between money growth and price changes.

The results show that domestic debt financing of the deficit has been on an upward trend on account of liquidity management pressures stemming from increased donor inflows whereas the real foreign debt on the other hand has declined over the study period reflecting an increase in grants and debt relief from the HIPC Initiative and the recent Multilateral Debt Relief International (MDRI). In addition, whereas the overall deficit excluding grants has increased, the real net operational deficit of government has actually reduced owing to increased foreign grants. Unfortunately though, increased reliance on donor support has complicated macroeconomic management. The results also suggest that there is a real potential of increasing revenue up to some feasible level from monetization. Overall, the actual deficit was shown to be consistent with the financeable deficit.

The contemporaneous structural vector autoregression show a weak causation from growth in monetary aggregates to price changes, but the link between changes in monetary aggregates and prices becomes stronger in the long run. Our evidence also points to a strong relationship between price changes on the one hand and exchange rate depreciation, and past inflation outcomes on the other.

A contentious question for macroeconomic management involves the domestic debt which has accumulated at an unsustainable rate, thus, increasing the domestic real interest rates. From a policy perspective, issuing domestic debt at such high real interest rates will allow lower money growth but at the cost of future increases in debt service obligations and thus future budget deterioration. This calls for caution not to sacrifice future budget balance for current monetary restraint since this would fuel inflationary expectations. This in turn would keep nominal interest rates high, fuelling a vicious circle of high interest rates, high public debt service, increasing budget deficits, high

inflationary expectations, and back to high interest rates. Of course high interest rates then limit private sector investment which in turn deteriorates long term sustainable growth, thus, affecting the country's ability to service its liabilities.

The dilemma is to determine the best options that reduce deficits but without necessarily affecting social service delivery as well as investments in critical public infrastructure. Viable options (in view of a narrow tax base owing to a large informal sector) lie in enacting laws and putting in place an appropriate institutional framework for the functioning of public private partnerships so as to relieve government of part of the responsibilities for public goods provision. With regard to strategic investments in infrastructure and capital development government could consider employing more 'technical' procedures to guide project selection and implementation. The ability to carefully select and implement strategic investments and doing so in a transparent manner would not only constrain 'bad' decision making but would maximise returns and synergies among the selected projects.

At the same time, there is a real potential of increasing revenue from monetization at the expense of some modest level of inflation. The trade-off between macroeconomic stability and higher deficits falls with higher rates of economic growth. Relaxing infrastructural constraints and improving the general business climate (through monetisation up to some feasible level) has the potential to result in higher rates of economic growth that can enable the economy to accommodate higher real deficits and at the same time stay in line with goals for other macroeconomic targets. Even in this case, strategic investments in infrastructure and capital development need to be selected and implemented on the basis of 'technical' procedures and done so transparently, not only to constrain 'bad' decision making but to maximise returns and synergies among the selected projects as well.

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APPENDICES

Appendix 1

Variable list and data sources

D	=	non-interest deficit
i	=	nominal domestic interest rate
i^*	=	nominal foreign interest rate
B	=	domestic debt stock
B^*	=	foreign debt stock
NFA^*	=	net foreign assets
E	=	exchange rate (domestic in terms of foreign units)
$\dot{B}$	=	change in domestic debt stock
$\dot{B}^*$	=	change in foreign debt stock
$\dot{D}C_g$	=	net credit to government
$N\dot{W}$	=	change in central banks net worth
M	=	nominal base money
b	=	real domestic debt stock
r	=	domestic real interest rate
d	=	real non-interest deficit
r*	=	foreign real interest rate
nfa	=	real net foreign assets
P	=	general price level
m	=	real base money
gdp	=	real GDP
dd	=	domestic debt
fd	=	foreign debt
e	=	real exchange rate
ir	=	nominal interest rate
gir	=	growth rate of nominal interest rate
gmny	=	growth rate of nominal money supply
gner	=	growth rate of nominal exchange rate
gcpi	=	growth rate of the consumer price index
ggdp	=	growth rate of gdp
g	=	growth rate of real gdp

The study used quarterly data for the period from 1992 to 2006. Data that were used to analyze fiscal consistency were sourced from the Macroeconomics Department of Ministry of Finance, Planning and Economic Development (MFPED) and was complimented by Bank of Uganda (BoU) sources. Data that were used to analyze the interaction of selected macroeconomic aggregates (such as interest rates, money supply, exchange rates and CPI) were sourced from BoU. Data for GDP which is not available on quarterly basis was interpolated.

Appendix Table 1: DOLS Co-integrating Relationship

	lrgdp	lsr	linf	lreer	lfir	Constant	Prob>F
lrm	1.51	-0.21	-0.38	-0.065	0.37	-2.77	0.0000
	(24.56)	(-.26)	(-.94)	(-0.29)	(0.19)	(-11.34)	

Notes: t-Statistic in parenthesis generated by Newey-west standard errors

Appendix Table 2: Results of the Restricted Short-run Model for Money

dlrm2	Coefficient	Std. Err.	t-Statistic	P>|t|
dlrm_1	-0.3296**	0.1388	-2.38	0.022
dlrm_2	-0.3330***	0.1032	-3.23	0.002
dlrgdp_1	0.3725*	0.1539	2.42	0.041
dlsr_1	-0.0644***	0.0180	-3.59	0.001
dlsr_2	-0.0352*	0.0180	-1.96	0.057
dlsr	-0.0560***	0.0152	-3.67	0.001
inf_2	0.0548***	0.0161	3.40	0.002
dlfir_2	-0.0730**	0.0336	-2.17	0.036
dlfir	-0.0613*	0.0322	-1.90	0.064
dlreer	0.2119**	0.1020	2.08	0.044
ecm m_3	-0.3812***	0.1034	-3.69	0.001
d1	0.0092**	0.0044	2.07	0.044
d2	0.0163***	0.0045	3.59	0.001
_cons	0.0047	0.0073	0.65	0.519

F(13, 41) =6.70; Prob > F =0.0000; R-squared = 0.6800;Adj R-squared = 0.5786
LM test; Prob > chi2=0.3945; H0: no ARCH effects
Breusch-Godfrey LM test; Prob > chi2=0.3504; H0: no serial correlation
Durbin's alternative test; Prob > chi2=0.4221; H0: no serial correlation
Ramsey RESET test; Prob > F = 0.9563; Ho: model has no omitted variables

Appendix Table 3: Debt Trends

Year			Debt Service Inc Relief		HIPC Relief		MDRI Relief		Debt Service excl Relief		HIPC Relief (Effect %)		MDRI Relief (Effect %)		Total Relief (Effect %)	
		Debt Stock	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest	Principal	Interest
1992/93		2,637.20	108.33	30.20	-	-	-	-	108.33	30.20	-	-	-	-	-	-
1993/94		2,999.30	131.14	27.50	-	-	-	-	131.14	27.50	-	-	-	-	-	-
1994/95		3,386.92	114.55	36.11	-	-	-	-	114.55	36.11	-	-	-	-	-	-
1995/96		3,515.78	101.57	40.68	-	-	-	-	101.57	40.68	-	-	-	-	-	-
1996/97		3,660.23	118.45	37.46	-	-	-	-	118.45	37.46	-	-	-	-	-	-
1997/98		3,631.60	121.05	33.58	-	-	-	-	121.05	33.58	-	-	-	-	-	-
1998/99	pre-HIPC	3,495.61	120.47	43.27	-	-	-	-	120.47	43.27	-	-	-	-	-	-
1999/00	pre-HIPC	3,576.94	96.90	36.53	-	-	-	-	96.90	36.53	58.23	54.89	-	-	(58.23)	(56.48)
2000/01	pre-HIPC	3,391.53	107.66	38.44	62.69	21.10	-	-	44.97	16.73	62.36	53.78	-	-	(62.36)	(53.78)
2001/02	pre-HIPC	3,799.37	99.97	33.65	62.34	18.10	-	-	37.63	15.56	67.38	52.76	-	-	(67.38)	(52.76)
2002/03	pre-HIPC	4,211.39	110.82	35.09	74.67	18.51	-	-	36.15	16.58	50.88	55.48	-	-	(50.88)	(55.48)
2003/04	pre-HIPC	4,464.92	133.49	34.28	67.92	19.02	-	-	65.58	15.26	41.09	44.05	-	-	(41.09)	(44.04)
2004/05	pre-HIPC	4,421.66	154.14	38.56	63.33	16.99	-	-	90.81	21.58	28.97	37.44	11.42	0.71	(40.39)	(37.44)
2005/06	pre-HIPC	4,464.38	152.21	42.60	44.10	15.95	17.38	0.30	90.73	26.65	23.63	37.39	41.20	36.94	(64.83)	(74.33)
2006/07	pre-HIPC	1,468.08	142.29	42.46	33.62	15.87	58.62	15.69	50.05	10.90	22.03	37.34	44.07	39.21	(66.10)	(76.54)
2007/08	pre-HIPC	1,792.60	152.57	44.72	33.62	16.70	67.23	17.53	51.72	10.49	44.32	46.64	32.23	25.62	(56.41)	(56.35)