CENTRAL BANK AUTONOMY, THE MONEY STOCK AND PRICE DEVELOPMENTS IN TANZANIA

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Abstract: Beginning the mid 1980s to the present the Bank of Tanania has used a number of instruments that have implications on its balance sheet, namely: those of commercial banks and those of other financial institutions. The size of the BOTs balance sheet relative to the rest of the banking system has implications on movement in monetary variables and hence prices. This article uses on econometric model to analyse central bank policy on the money stock and prices by investigating the relationship among the components of the balance sheet using data from the BOT spanning from 1986 to 2001. The results indicate that the behaviour of the BOT's balance sheet has strong implications on movements of the money stock. The policy implication is that allowing the central bank to adjust its balance sheet has effect on changes of the money stock and therefore brings more control of price developments.

INTRODUCTION

Since the introduction of the National Economic Survival Program (NESP) in 1981/82, low and stable inflation rates have been among the targeted macro variables. During the Structural Adjustment period reduction of price growth has also been emphasized. A sizeable reduction of inflation in order to create conditions conductive to saving, investment and balance of payments sustainability continued to be a key objective in the Economic Recovery Programme (ERP) of the Tanzania Government as a continuation of the policies spelt out in earlier programmes.

Despite all the efforts to combat inflation the average rise in the national consumer price index (NCPI) never dropped below 20 percent before the early 1990s. Between 1981 and 1998 the average rise in the NCPI was around 30 percent with a peak (36 percent) in 1985.

In the 1990s inflation was lower averaging 28% and dropped to 22.7% for the year ending June 1996 and further to 16.4
percent during the year ending June 1997. By year 2001, a single digit inflation rate was achieved, reaching a low 4.4 % two years after in 2003. This achievement has been explained by the current stance of a contractionary monetary policy. Prudent management of government finances whereby the fiscal deficit was reduced from 10% of GDP in 1994/95 to 5% of GDP in 1995/96 is linked to the success of monetary policy in reducing inflation (Tarimo & Nyagetera, 1997).

The Bank of Tanzania (Central Bank) is responsible for establishing monetary conditions conducive to price stability over time. In order to achieve the objectives of monetary policy, the BOT has a number of instruments at its disposal. Some of the instruments have implications on the Central Bank's balance sheet and balance sheets of commercial banks and other financial institutions. The size of the Central Bank's balance sheet relative to the rest of the banking system impinges on the movements in monetary variables and hence price developments.

Monetary growth in the economy has earlier been explained by large budget deficits. Large budget deficits have therefore received the blame for inflationary pressures as they are the source of high monetary expansion. However, after the reforms, the economy achieved budgetary discipline and enhanced efforts in collecting revenue thus reducing the deficit-money-inflation link. The Central Bank's policies link seems to be more relevant in view of the new development.

The main purpose of this study is to investigate how the inflationary process has taken place in Tanzania in view of the financial sector reforms. Financial sector reforms are mainly targeted to, among other things, controlling the money stock that has implications on price determination. An

examination of the effect of movements in the balance sheet of the Central Bank during the reform period is therefore one of the ways of assessing the impact of the policy on price developments in the economy. A similar approach was taken by Fielding (1993) covering several developing countries including Tanzania. His study applied data spanning the period 1976 to 1987.

Before we undertake an in-depth analysis of the link between central bank activities the money stock and inflation developments a brief background on trends of the monetary aggregates is given in first. We then review the literature and finally discuss conceptual and methodological issues. We then present the estimation results and draw conclusions.

PRICE AND MONEY STOCK DEVELOPMENT

According to the revised CPI statistics released by the Bureau of Statistics, the National Consumer Price Index increased by 30.2 per cent between June 1993 and June 1994. The inflation rate decelerated from 31.7% for the year ending June 1993 to 30.2% during the year ending June 1994. The comparable figure for the year ending December 1993 is 24.7%, while that of June 1994 was 26.2%. The inflation rate rose slightly to 27.7% by June 1995. It is noted that the rate of inflation accelerated faster during the year 1993/94 despite the deceleration in monetary growth. However, beginning 1996/97 inflation dropped to 16.4%. By 1999 the rate reached 7.9% and 4 years later before 1999 was low as 4.4% by 2003.

The inflation levels before 1999 show that inflation was still among the factors that exacerbated the economic crisis in the country. During the period under review the inflation rate concdusive to economic growth was targeted at 10% to 15% per annum while the actual inflation never went below 20%. The government aimed at progressively reducing inflation to 5% per annum by 1997 and monetary policy was to give priority to this objective. Economic projections showed that inflation would have declined to 10% in 1995 and 5% in 1997 (URT, 1994). These targets implied that the government had to pursue tight monetary and fiscal policies that would contribute to accelerated and sustained economic growth with low rates of inflation.

Monetary statistics depict an acceleration in monetary growth beginning the year 1994/95 compared with the same period in the previous year. For the period ending June 1995, extended broad money (M3) grew by 37.7% compared to a growth of 34.1% registered in the period ending June 1994. This performance was appalling considering that extended broad money (M3), was targeted to increase by 13% during 1994/95 in order to induce a reduction in the rate of inflation to 12.5%. During the quarter ending June 1997, extended broad money (M3) increased by 9.6%.

Monetary developments during the year ending June 1997 were largely dominated by a rapid expansion in Net Foreign Assets (NFA) of the banking system resulting largely from an increase in the foreign exchange holdings of commercial banks, arising from increased export earnings (BOT 1997).

Excluding foreign currency deposits, however, monetary growth was lower with broad money supply (M2) increasing by 34.1 percent, from TZS 394,779.8 million at end of June 1994 to TZS 529,558.1 million at end of June 1995. Currency in circulation plus demand deposits which constitute narrow money (M1), increased by TZS 80,237.2 million from TZS 260,9 million at end June 1994 to TZS 340,805.1 million at and June 1995, an increase of 30.8 percent. By June 1997 this component reached 472,621 billion Tshs a close to 26% increase. Between 1997 and 2000, MI reached 601,231 TZS Million, a 78.6% increase, averaging 15.7% per annum. The average annual growth declined to 8.7% between 2000 and 2001,following the tight monetary policy stance in place. However growth between June 2000 and June 2001 was at a rate similar to that

experienced during the 1997-2000 period, ie.15%.

Net foreign assets increased by 118.2 percent from TZS 64,808.5 million to TZA 141,407.5 million largely on account for a 217.9 percent increase in the foreign currency holdings of commercial banks, sincere the net foreign assets position of the Bank of Tanzania recorded a decline of 72.3 percent, due to the obtaining high requirements for debt service and the slow disbursement of donor funds experienced during the period. During the quarter ending June 1997, net foreign assets of the BOT increased by TZS 23.7 billion mainly due to the intervention by the BOT in the Interbank Foreign Exchange market. Net domestic assets grew by 21.7 percent from TZA 440,447.6 million at end June 1994 to TZS 109,762 million at end June 1995.

There was however during the quarter ending June 1997 domestic lending of the banking system declined, specifically credit by the banking system to the government other public sector and the private sector. Thus the envisaged repayment of bank credit by the Government to the banking system did not materialize despite the Bank of Tanzania employing various monetary policy instruments, including a rise in the discount rate and minimum reserve requirements, and conducting open market operations to mop up excess liquidity to contain rapid expansion of domestic credit. It may be observed here that problems of fiscal implementation rendered the monetary policy measures taken by BOT ineffective, as financing of the budget deficit heavily depended on BOT financing (BOT 1997).

Beginning 1994/95 the Bank actively used the discount rate as an instrument of monetary policy. While the discount rate was changed only four times between 1966 and 1993, the rate changed 10 times in 1994, and continued to be adjusted weekly in the first half of 1995. Thereafter the rate was made market-based by pegging it to the interest rates prevailing in the Treasury Bill market. Initially from February to September 1994, the discount rate was based o the marginal yield of 91-day Treasury Bills, while thereafter, the determination of the discount rate was based on the yields of all maturities, calculated as a weighted average of the annualized yields of the Treasury Bills of all maturities plus a penalty of five percentage points. Due to this development, the discount rate remained higher throughout 1994/95 than any other time before especially from mid-November 1994 to February 1995. The prevailing average discount rate during the period under review was 45.6% while for the period March through June 1995, it fluctuated between 37.0 and 55.5 %. By the year 2000 the rate charged on government overdraft at the Bank reached 13.1% and declined further to 9.8% by the year 2001. Currently the Central Bank does not determine discount rates to effect its monetary policy through discount window. The discount rate is rather market determined. During 2001 the fall in the discount rate was caused by declining interest rates in the security market.

After the year ending June 1995, various changes were made on the level of Minimum Reserve Requirement. On April 1, 1994, the base for the determination of the required reserves of commercial banks to be held with the BOT was changed from being domestic currency deposits only to include foreign currency deposits. At the same time, the ratio was lowered from 10 to 8 percent. From September 1, 1994, vault cash with banks started to be counted as part of the Minimum Reserve Require-ments and the ratio was raised from 8 to 12 %. Following a strong increase of liquidity in the economy, mainly fuelled by excessive Government borrowing, the Minimum Reserve Requirement was increased to 15 percent effective January 1, 1995. The ratio was increased further to 18 percent in June 1995. Statutory minimum required reserves (SMR), was 10% in 1999/2000. This is an important monetary policy instrument apart from open market operations and weekly auctioning of Treasury Bills and Treasury Bonds.

The activities of the Treasury Bills market were deepened during the year 1994/95. The

364-days Bill was introduced from December 14, 1994 coinciding with the termination of the 35-day Treasury Bill following an increase in demand for longer maturity. Both the number of participants and the volume of transaction rose steadily. One most important development was the decision to sterilize part of the realized Treasury Bills proceeds with the aim of improving effectiveness of Treasury Bills auctions as an instrument for controlling liquidity.

Up to end June 1995, cumulative sales of Treasury Bills amounted to TZS 249.9 billion. Total credit to Government stood at TZS 208.9 billion with cost to Government amounting to TZS 40.0 billion. However, the outstanding Treasury Bills of all maturity at end of June 1995 was TZS 74.1 billion. This amount more than doubled in a span of 10 years reaching TZS 163.1 billion in 2000. The amount offered for liquidity papers reflects the need to mop up more excess liquidity in order to achieve monetary targets.

Table 1: *Tanzania's Monetary Survey 1980-2001(Mil Tshs)*

Year	Foreign Assets (Net)	Domestic Credit	Credit to Government	Credit to Private Sector	Money Supply
1980	1199.6	18246.0	10899.6	7346.4	17519.9
1981	853.7	22406.7	13924.4	8482.3	20694.7
1982	761.7	27074.4	17537.1	9537.3	24725.6
1983	1879.9	31301.9	20659.1	10642.8	29127.1
1984	-7592.5	49957.7	24459.0	12922.2	30218.1
1985	-10789.3	49957.7	32278.9	17678.8	38971.0
1986	-12886.9	60290.9	32555.8	27735.1	50353.4
1987	-19940.1	90622.1	35579.6	55042.5	66495.0
1988	-23308.2	125091.7	51635.5	73458.2	89809.1
1989	-22074.1	166818.8	60057.4	106761.4	116295.2
1990	6393.5	199642.3	54180.9	145461.4	16668.7
1991	20050.1	287870.4	39717.8	198152.6	211579.0
1992	50724.3	262187.8	72904.6	189283.2	301925.9
1993	27059.2	429878.7	184089.3	245784.1	420635.5
1994	116393.2	461215.0	181056	280159	564743.2
1995	154333.7	526366.2	285815.2	240551.0	705472.4
1996	290319.8	586,642	295,822.8	141,341	818063
1997	372826.4	6603732	287545.8	182,976.9	879962.6
1998	458,000.6	818,063.0	276,5867	248,276.2	927,068.9
1999	622,286.8	927,068.9	366,596.2	311,533.0	1,026,984.7
2000	707,352.7	1,026,984.7	383,098.0	340,628.1	1,217,626.9
2001	842,755	1,217,626.9	399,352.1	340,628.1	1,397,688.8

Source: Bank of Tanzania , Economic and Operations Reports.

Table 2: *Trends in GDP, Inflation (%) and Budget Financing: 1980-2001(Mill TShs).*

Year	GDP	Inflation % ANCPI	Overall Budget Deficit	Eternal Grants and Loans	Bank g Borrowin	Non- Bank Borrowing
1980	37454	30.3	-1264.0	1845.1	2312.3	1373.6
1981	43906	25.7	-1254.1	1837.9	2610.8	-1499.2
1982	52546	28.9	-1726.5	1858.0	344.6	-1231.2
1983	62608	27.1	-2715.3	1895.0	3446.6	-1231.2
1984	78143	36.1	-2193.5	3658.3	1871.7	2144.2
1985	108083	33.3	-5081.3	2045.0	4924.8	1256.0
1986	140793	32.4	-5891.0	6235.0	1656.0	2857.5
1987	200377	29.9	-4621.9	9.880.9	2582.9	2354.7
1988	285152	31.2	-207734	10619.3	4460.0	2695.8
1989	336048	25.8	-21328.0	11301.0	-2609.0	4100
1990	410930	19.7	-35432.0	18200.0	43088.0	7769.4
1991	52565	22.3	-28156.5	12003.0	-26555.0	8713.1
1992	665976	22.1	-76240.0	120585.0	-10000.0	7000.0
1993	845485	26.2	-193159.0	226551.0	-3939.0	6000.0
1994	1,731,447	30.2	-184996.0	150756.0	-20160.0	36310.0
1995	2796642	22.7	-13922.2	15,509.0	-26072	-15851.3
1996	345258	16.4	-232,184	19,233.1	-259695	-12455
1997	4,281,600	16.1	-117,736.6	136,890.0	27274.3	-23605.1
1988	5,125,311	12.8	-68,461.4	53,842.8	1,230.0	-6,970
1999	5977699	7.90	-110,827.4	187,786.2	7690.6	163.8
2000	6,663,687	5.90	-89,105.3	172,880.4	18,654.8	16,160.4
2001	7,590,765	4.5	-43,335.00	187,335.0	-59,181.0	36,574.0

Source: Government Accounts

In line with the policy of achieving market-determined interest rates in the banking system, the condition that required commercial banks to set their 12 month deposit interest rates above inflation (or to maintain positive real interest rates) was lifted. This left commercial banks free to set both their lending and deposit rates, without interference from the Central Bank. Effective November 23, 1994, the interest charged on advances to the Government was based on the weighted average yields of all Treasury Bill maturities, in order to eliminate market segmentation and discourage Government resource to the Central Bank for a cheap sources of financing its budget.

Short term lending rates for the period ending June 1995 picked up to 37.3 percent compared with 34.2 percent recorded at end June 1994. Likewise the average interest rates on medium and long term lending increased from 33.0 percent in June 1994 to 38.8 percent at end of June 1995, while interest rates on housing mortgages picked up to 33.0 percent at the end of June 1995 from 31.0 percent in the same period the previous year. Unlike lending rates which assumed an upward trend, interest rates on saving deposits slackened from 24.2 percent at end of June 1994 to 23.6 percent at end of June 1995. In six years that followed the levels plummeted to below 10% by 2000. For example interest rates for inter-bank cash market, Treasury Bills, Treasury Bonds, Savings Deposits and time deposits fell further during the year ending June 2001 compared with rates registered during the year ending June 2000. The overall inter-bank cash market rates were,

Table 3: *Performance of GDP Money supply and Inflation during Reforms (%)*

Year	Money Supply		Inflation		GDP Growth	
	Planned	Actual	Planned	Actual	Planned	Actual
1986	10.0	23.0	25	32.4	4.5	3.26
1987	10.5	36.8	20	29.9	4.5	5.09
1988	15.0	38.4	15	31.7	4.5	4.23
1989	18.0	47.2	15	25.8	5.0	3.34
1990	18.0	28.6	15	19.7	4.5	3.49
1991	18.0	43.1	15	22.1	4.5	4.3
1992	21.4	40.1	15	19.7	4.5	3.6
1993	10.0	42.7	12	26.1	4.5	4.1
1994	10	34.1	15	30.2	4.4	3.0
1995	10	26.2	10	29.8	4.8	4.5
1996	10	22.7	7.5	21.0	5.8	4.7
1997	10	18.3	7.5	16.4	6.3	4.0
1998	10	23.0	7.5	12.8	6.0	4.0
1999	10	22.0	7.5	7.9	6.0	4.0
2000	10	21.7	5.0	5.9	6.0	4.7
2001	9-10		4.0	5.1	6.0	5.6

Source: Bank of Tanzania, Economic and Operations Reports

in 2001, 2.1%, Treasury Bills weighted average rate was 4.6% in June 2001 and Treasury Bonds interest rates declined from a high rate of 11.5 % in July 2000 to 6.5 % in 2001. Savings rates and overall time deposits rate reached 4.2 and 4.9% in 2001 from 7.1% in 2000. Inflation stood at 5.1% in 2001 leading to negative saving and time deposits interest rates in real terms.

A high demand for government securities implying either excess liquidity in the economy or disinclination of commercial banks to investing largely in other real sector or both led to the fall (BOT,2001).

LITERATURE REVIEW

The rate of growth of prices is an important determinant of investment and growth in many sub-Saharan economies Fielding (1994), Harvey and Jenkins, (1993).

One key issue is therefore the identification of the fundamental source or sources of inflationary pressure. Does inflation arise from demand side of the goods, factor and assets markets, from the supply side, or from some combination of the two – the so-called mixed inflation? Does the answer differ in the short run and the long run, in developed and under developed economics, with structural differences in countries over different periods?

As Fielding (1904) points out, it is a widely held belief that high inflation and volatile prices are a consequence of a rapidly expanding nominal money stock, which is itself a result of large budget, deficit, Dornbursch and Fischer, (1987). In the received wisdom, monetary authorities have little or no control over government borrowing, and therefore little or no control over money creation Fielding (1994), Curckierman et al (1992).

Fiscal deficits have therefore received much of the blame for the association economic ills that beset developing countries in the 1980s. Such phenomena like overindebtedness and the debt crisis, high inflation and poor investment performance and growth were believed to result from fiscal deficits, Easterly and Schmidt Hebbel

(1993). To regain macroeconomic stability through fiscal adjustment received uneven success raising questions about the macroeconomic consequences of public deficits and fiscal stabilization. On whether larger public deficits are always associated with higher inflation Sargent and Wallace's (1985) "monetarist arithmetic" showed that they do. However when governments finance deficits by borrowing as well as by printing money the relationship becomes unclear.

Other influences such as unstable money demand, inflationary exchange rate deprecations, widespread indexation and stubborn inflationary expectations further distort the relationship, Kiguel and Liviatan (1988): Dorbbusch and Fischer (1991).

Recent reforms in most economies have also involved change in financing sources of the deficit. Rather than finance deficits by money creation, borrowing from both domestic and foreign sources has been resorted to. The money stock has therefore not had a cone to one link with government deficit.

Another development that has taken place in the economies is financial sector reforms. The reforms have been targeted to such policy objectives as reduction of inflation and under-employment, increased growth of GDP and the country's external balance. In that endeavor, monetary policy has played a crucial role.

In Tanzania the reforms entailed ensuring the post 1986 period, particularly following the Banking and Financial Institutions Act (1991) and the related Acts and measures have entailed the dependence on much more indirect instruments of economic and monetary management. Liberalization I the financial sector accords financial institutions unrestricted leeway which if not properly managed increased the potential for destabilizing losses which may damage the entire financial system.

For these reforms to bring about growth, inflation and uncertainly has to be combated. A detailed look by Fischer (1993) at the nature. content and scope of financial liberalization in several countries emphasized that a successful liberalization programme will need among other things, a stable macroeconomic environment. Price stability is an important component of that and the Central Bank plays an important role in achieving price stability.

The net foreign assets item in the central bank balance sheet can be targeted, as is the case of net domestic assets. Foreign exchange reserves and credit to the public sector affect net domestic assets. The central bank can control net domestic assets by not extending credit to the public sector. Domestic credit has effect on reserve money which in turn influences the inflation rate.

Economists and practitioners in monetary policy generally believe that the independence of the central bank from other parts of government affects the rates of expansion of money and credit and, through them, important macroeconomic variables, such as inflation and the size of the budget deficit (World Bank, 1992)

Ultimately, the central bank's authority and scope of action depend on the government. But governments often pass laws and follow customs that grant their central banks authority and autonomy to pursue price stability, even when it conflicts with other government objectives. Making the central bank an agency with the mandate and reputation for maintaining price stability benefits the economy and the government in various ways.

A vast literature discusses the costs of inflation and how the central bank's pursuit of price stability can help reduce these costs Clause (2001; Friedman, 2001, Meyer, 2002). Price stability is also necessary, although far from sufficient, for developing a local capital market where both government and businesses can borrow more conveniently and cheaply in the long run. And international financing, such as for the countries recovering from hyperinflation in the 1920s, has often been conditional on the central

bank's mandate and authority to pursue the stability of prices and exchange rates.

The pursuit of price stability competes (at least some of the time) with other possible central bank objectives—such as managing the government's financial transactions, financing the government's deficits, financing development projects, and bailing out insolvent businesses, including banks and publicly owned enterprises. Although most governments recognize the long-run benefit of price stability, other goals often loom larger in the short run. So, assuring price stability usually requires ensuring that the central bank is not forced to pursue these other goals, at least not when they would cause inflation.

Sometimes the government or the treasury takes direct responsibility for limiting the demands on a subservient central bank. Even in these cases—but especially in the more typical case where the government has strong tendencies to focus on issues other than price stability—central bank independence and an explicit mandate to pursue price stability are generally important institutional devices for ensuring price stability.

This belief has eluded comprehensive verification because of the difficulties in measuring the autonomy of central banks independently from inflation. Actual, as opposed to formal, central bank independence depends not only on the law, but also on many other less-structured factors. These include factors such as informal arrangements between the bank and other parts of government, the quality of the bank's research department, and the personality of key individuals in the bank and the rest of the government.

Because of the difficulty in quantifying such features objectively, previous studies developed indexes of central bank independence based mostly on legal independence—and only for the industrial countries at that.

CONCEPTUAL FRAMEWORK AND METHODOLOGY

Conceptual Issues

In earlier studies trying to explain inflation, the Aghevli-Khan two track model which introduces a feedback between inflationary developments and government deficits have been tested and proved to work well in Tanzania. While some studies have shown that deficits would result from exogenously determined expenditure increased and revenue collection lags, in others, government deficit would also be a result of domestic inflation.

For the Tanzania case the two track model was tested in our earlier studies Kilindo, (1982, 1992, 1993). In Kilindo (1993) the existence of a structural break was proved after 1984. A different set of modeling was needed for the period after 1984. This was explained by reforms that were put in place during ERP I and ERP II. These include:

i) A little success in keeping the budget in shape i.e. reduction of deficits;
ii) A significant contribution of foreign inflows in the money supply process;
iii) Movement from bank borrowing to non-bank borrowing for deficit financing;
iv) Financial liberalization which among other things raised nominal interest rates; restructured the existing financial institutions; encouraged the establishment of domestic and foreign-owned private banks; introduced and strengthened adequate provision of Bank of Tanzania's prudential regulatory and supervisory roles of the financial system.

In view of the above developments we need to revisit the Aghevli-Khan model in explaining the inflationary process in Tanzania. One can expand the Aghevli-Khan model in two directions.

First, is by opening the closed model. In the Aghevli-Khan Model, Net Foreign Assets are treated as exogenous. In some studies they are endogenized. One can do this by modeling net foreign assets as being explained by exports, imports and change in inflows. Recent developments in the economy surely require

special treatment of inflows. What this approach tries to bring about here is that not only fiscal deficits explain price developments. Inflows have had a significant impact in the process.

In Tanzania foreign financing plays as important role in the economy. For example foreign financing of the budgets was 12.8% of GDP in 1992/93, 19.6% in 1993/94; 13.1% per cent and 12.6% percent in 1994/95 and 1995/96 respectively. For the period 1996/97 to 2000/01, this proportion averaged 30%. There has also been dramatic changes in local sources of financing deficits. Bank financing declined from 4.6% as a percent of GDP in 1992/93 to –1.5 % in 1994/95, and -.2% for the period 1996-2000 i.e. the government made net repayments to banks. Instead of bank borrowing, non-bank borrowing has been on the increase. This sources of financing was 0.6% per cent of GDP in 1992/93 and more than quadrupled to 2.5 percent of GDP in 1994/95. The proportion was 0.2% of GDP in 2000 but accounted for 14% of total financing requirements compared to 8.9% in 1994.

Despite the above positive developments in debt financing, the inflation rate is still, as pointed out earlier, not that low. This points to the need for investigating the role of inflows in the inflation developments. Central to such an investigation is obviously the ability of the monetary authority to control the money stock within the framework of the new reforms, the main direction of our study.

This direction is therefore to make a closer look at the ability of the Central Bank to control the money stock in view of the reforms. This entails an analysis of the balance sheet of the Central Bank and identification of which assets and liabilities are flexible and under its control. By manipulating its balance sheet the Central Bank can have impact on the liquidity of the rest of the banking system. It does this by using direct and indirect methods.

Through the direct method the Central Bank restores to banks the responsibility of balancing risk and returns and allocating credit. It does this by controlling monetary aggregates indirectly via control over bank reserves and by using process-based interventions (interest-rates) to achieve that control. This has formed an important component of overall financial liberalization.

The indirect methods consists of monetary base or commercial bank reserves as a focus of control; an intervention instrument enabling central bank to tighten or loosen reserves and a reasonably reliable transmission mechanism.

By exercising control over the components of its balance sheet money creation and hence price determination is affected. The components of the Central Bank balance sheet are currently issue (M), Net Foreign Assets (NFA), loans to government (CG) loans to commercial bank (CBL), government deposits at the Central Bank (GD), commercial banks' deposits DB and other assets of the Central Bank. It is assumed that M, NFA, RES and CBL are under Central Bank control and CC, GD, DB and EX are inflexible and not under Central Bank control. An analysis of the impact of central bank policy on the money stock and price determination requires investigating the relationship among the components of the balance sheet. The period 1986 to 2001 is chosen. After 1986 there was improvement in the budget that accompanied the slowing of the growth rate of the domestic debt stock and that reduced pressure on monetary aggregates. The bahaviour of both the monetary aggregates and reserve money was positive during the post 1986 period even prior to financial reforms.

Methodology

The analysis asses the basic relationship of money supply to the stock of high powered money is through the money multiplier.

$$M = mH \quad \ldots\ldots (1)$$

Where M = money supply;
m = money multiplier;

H = high powered money (monetary base).

A country's monetary base consists of currency in circulation and bank reserves. Changes in high powered money would result from:

i) Changes in international reserves;
ii) Changes in Central Bank claims on government (ΔCG); and
iii) changes in domestic credit to private sector (ΔCP).

If international reserves are grouped under net foreign assets (NFA) the following relationship is arrived at:

$$\Delta H = \Delta CG + \Delta NFA \quad \text{.....(2)}$$

In most cases, in the absence of non-bank borrowing central bank claims on government (CG) are simply a reflection of fiscal deficits. Representing the difference between government expenditure (G) and revenue (R) as the fiscal deficit, then:

$$\Delta CG = G\text{-}R \quad \text{.....(3)}$$

The special case for Tanzania as pointed out above is the substantial financing of the fiscal deficit by external sources in addition to internal sources. Thus equation (2) can be re-written as:

$$\Delta H = G\text{-}R = \Delta CG + (\Delta DDEBT + \Delta FDEBT) \ldots\ldots (4)$$

where ΔDDEBT = change in domestic debt
ΔFDEBT = change in foreign debt

We can also express ΔCG in equation (3) above by including the external aspects.

$$\Delta CG = (G - R - \Delta DEBT) - \Delta FDEBT \quad \text{.....(5)}$$

Since our interest is to study the price developments after financial sector reforms, we concentrate analysis into central bank financial policy. Money creation as determined by the interaction of the different components of the central bank's balance sheet is therefore the starting point. We can therefore closely follow Fielding (1994), by expressing the money stock as:

$$M = NFA + CG + CBL - GD - DB + RES \ldots\ldots (6)$$

Where,

M	=	currently issues,
NFA	=	net foreign assets,
CG	=	Central banks claims to Government.
CBL	=	Loans to commercial banks,
GD	=	Government deposits at the Central Bank.
DG	=	Commercial banks' deposits and
RES	=	Other assets of the Central bank.

If the central bank is not able to control loans and deposits and cannot adjust its other assets to accommodate a change in CG, then M = CG.. This has not been so due to the central bank's use of "controlling handles" like reserve policy and discount rate policy. In the situation that the central bank can adjust other asset stocks, then the link between M and CG will be weaker (fielding (1994). If NFA is under central bank control, then the policy form becomes:

$$\Delta M = k\ (CG + CBL - DG - DB + RES +) + U \ldots\ldots (7)$$
$$\Delta NFA = (1\text{-}k)\ \Delta(CG + CBL - GD - DB + RES) + U \ldots (8)$$

where a certain fraction (k) of a change in the "uncontrollable" part of central bank assets is transmitted into a change in the money stock, and the rest into a change in net foreign assets, Fielding (1994).

A model constructed along the lines of equation (6) will then be able to show us how the central bank responds to variations in the assets it cannot control. Calculation of assets average rates of growth will provide complementary evidence on the extent to which the long run growth of right hand sides assets is accommodated by monetary expansion.

The analysis would obviously involve identifying which of its assets and liabilities a central bank actually has control over.

Components of the central bank balance sheet can either be flexible or controlled by the central bank, or inflexible and not under central Bank Control. In the above, M, NFA, RES are usually under central bank control while CG, GD, and DB are not under central bank control.

To capture the short run relationship between different monetary aggregate we estimate the following equations following Fielding (1994).

$$\Delta M_t = a_{m,o} + \Sigma a_{m,j} ?M_{t-j} + \Sigma b_{mi} \Delta(CG-GD)_{t-l} - \Sigma C_{mi} \Delta DB_{t-i} + \Sigma f_{mi} \Delta EX_t \quad (9)$$

$$\Delta M_t = a_{n,o} + \Sigma a_{n,j} ?NFAt_{-j} + \Sigma b_{n,j} \Delta(CG-GD)_{t-l} - \Sigma C_{ni} \Delta DB_{t-i} + \Sigma f_{n,i} \Delta Ext-i \quad (10)$$

$$\Delta CBL = 110 + \Sigma a\hat{i}_i \Delta CBLt_{-j} + \Sigma b\hat{i}_j \Delta(CG-GD)_{t-l} + C\Delta DB_{t-i} + \Sigma f_t \Delta EX_{t-i} \quad (11)$$

$$\Delta RES = a_{r,o} + \Sigma a_{r,j} \Delta DRESt_{-j} + \Sigma b \Delta(CG-GD)_{t-l} - C\Delta DB_{t-i} + \Sigma f_i \Delta EX_t-j \quad (12)$$

REGRESSION RESULTS

Using quarterly data spanning from 1986 to 2001, the components of the Central Bank's balance sheet are related and estimated by least squares. Tables 5.1 to 5.4 report the results.

Table 5.1: *Dependent Variable is ΔM.*

Variable:	Coef.	Std Error	t-ratio	2-Tail sig.
Δ(CG+CBL -GD-DB+RES)	0.6145	0.0675	9.1011	0.000
R , 0.6698 DW	2.8229			

It is seen from the results that about 61 percent of changes in the components of the central bank balance sheet would be translated into the money stock. The rest (I-k) i.e. 39% would be translated into net foreign assets.

Next we estimate the impact of the four components of the central banks balance sheet: and the exchange rate in the money stock, loans to commercial banks and net foreign assets. The results are reported in Tables 5.2 to 5.4.

It is seen that variability in government borrowing (CD-GD) significantly translate into change in the money stock with a lag of two quarters.

Commercial bank reserve deposits also impact on the money stock (with a three quarter lag, while changes in the exchange rate affect money supply with a single quarter lag. Past change in the money stock are significant at first quarter and second quarter lags but with wrong signs.

Our next equation tries to measure the impact of the components of the Central Bank's balance sheet on changes in net foreign assets (NFA). The results indicate that government debt variability (CG-GD) has significant impact on changes in foreign assets at 99% level and has a negative sign as expected.

The one quarter lag of Commercial deposits variability is significant at the 95% level with a positive sign, while the exchange rate is significant at 90 and 95% at the first and third quarter lags respectively. Past changes of net foreign assets are significant at 99% but with negative signs for the first three-quarter lags.

The next exercise is to estimate the impact of central banks balance sheet on commercial bank lending (CBNL) as presented in equation (11). The results, reported on Table 5.4 indicate that commercial bank lending is negatively affected by commercial bank deposits at the central bank with a 3 quarter (lag at 95% level while and first and fourth quarters at 90% level the exchange rate variability positively influences commercial bank lending at 90% significance level for current and 2 quarter lag. The third lag is insignificant while the fourth quarter is significant but with a negative sign.

Lastly we need to see how the rest of the assets of the Central Bank are influenced by itself and the other components of the balance sheet as in equation 12.The results reported in Table 5.5 indicate that past changes in net foreign assets negatively influenced changes in current foreign assets. The second and third quarter lags of government debt variability positively affect the

Table 5.2: *Dependent Variable is ΔM: 1986: 1 – 2001:4*

Variable	Coefficient	Std. Error	t-ratio	2-Tail Sig
C	-1013.7541	0.4198	-1.2552	0.235
ΔM (-1)	-0.2907	0.4198	-3.0762	0.011
ΔM (-2)	-1.1607	0.5669	-2.0477	0.065
ΔM (-3)	-0.7803	0.7042	-1.1079	0.292
ΔM (-4)	-0.03281	0.6304	-0.0520	0.459
ΔM(CG-GD)-1)	-0.8087	0.7245	-1.1162	0.937
ΔM(CG-GD)-2)	0.9892	0.9053	3.3016	0.288
ΔM(CG-GD)-3)	-0.4151	1.1483	1.4781	0.007
ΔM(CG-GD)-4)	-1.3412	0.9073	0.0678	0.725
ΔDB	0.0320	0.4727	1.3310	0.167
ΔDB(-1)	0.9270	0.7017	0.1435	0.947
ΔDB(-2)	0.4902	0.80685	0.6075	0.213
ΔDB(-3)	0.3207	0.8821	4.1894	0.556
ΔEX(-1)	0.7493	358.0676	2.1162	0.863
ΔEX(-2)	0.4069	404.1245	1.0576	0.863
ΔEX(-3)	0.3967	283.7384	1.4630	0.313
ΔEX(-4)	0.2134	372.7113	1.350	0.121
R_{-2}	= 0.94			
DW	= 2.6			
F-Statistics	= 26.72			

Table 5.3: *Dependent Variable is ΔNFA: 1986: 1 – 2001: 4*

Variable	Coefficient	Std. Error	T-stat	2-Tail Sig
C	-27693.027	29344.192	-0.9437311	0.366
ΔNFA (-1)	-1.3325918	0.2765000	-4.8195003	0.001
ΔNFA (-2)	-1.1878265	0.3010527	-3.9455772	0.002
ΔNFA (-3)	-0.9564501	0.3925137	-2.4367302	0.033
ΔNFA (-4)	4.5625448	1.7245830	2.6455931	0.023
(CG-GD)	9.9875373	3.2187826	3.1028928	0.010
(CG-GD)-1)	4.279978	3.1470582	1.3599964	0.201
(CG-GD)-2)	-12.501033	3.3040716	-3.7835237	0.003
(CG-GD)-3)	-10.854909	4.5354101	-2.3933688	0.036
(CG-GD)-4)	-11.726666	4.9698038	-2.3595833	0.038
ΔDB	0.5663130	1.5979422	0.3544014	0.730
ΔDB(-1)	5.0522420	2.5147148	2.0090716	0.070
ΔDB(-2)	1.8843008	2.2577281	0.8345967	0.422
ΔDB(-3)	4.6055710	3.3944695	1.356767	0.202
ΔDB(-4)	1.0293970	2.0492389	0.5023314	0.625
DEX	-2709.2947	1182.7942	-2.2905885	0.043
ΔEX(-1)	1908.8803	1195.2872	1.5970056	0.139
ΔEX(-2)	1362.0139	1137.7081	1.1971559	0.256
ΔEX(-3)	11613.03167	1148.6070	1.031767	0.246
ΔEX(-4)	1276.11678	1155.7001	1.001767	0.126
R_{-2}	= 0.95			
DW	= 2.10			
F-Statistics	= 2617			

Table 5.4: *Dependent Variable is DCBL: 1986-4 - 2001: 4*

Variable	Coefficient	Std. Error	T-stat.	2-Tail Sig
C	-2132.8410	4088.1336	-0.5217151	0.612
ΔLCB (-1)	0.3113326	0.2608306	1.1936196	0.258
ΔLCB (-2)	0.1092845	0.2620051	0.4171082	0.685
ΔLCB (-3)	0.0027467	0.2674722	0.0102691	0.992
ΔLCB (-4)	0.0494850	0.4328673	0.114391	0.911
Δ(CG-GD)	-0.1771854	0.5483026	-0.3231526	0.753
Δ (CG-GD) (-1)	0.1926836	0.2671624	-0.7212227	0.486
Δ(CG-GD) (-2)	-0.2324571	0.2189665	-1.0616103	0.311
Δ(CG-GD) (-3)	0.3917131	0.5920893	-0.6615777	0.522
Δ (CG-GD) (-4)	-0.1269161	0.4321926	-0.2936563	0.774
ΔDB	-0.1253178	0.3124948	-0.4010235	0.696
ΔDB (-1)	-0.1377995	0.2924506	-0.4711891	0.647
ΔDB (-2)	-0.3585108	0.2604844	-1.3763235	0.196
ΔDB (-3)	-0.4940328	0.2390096	-2.0670000	0.063
ΔDB(-4)	-0/2141309	0.1532547	-1.3972226	0.190
DEX	183.67621	134.43894	1.3662426	0.199
ΔEX (-1)	140.12401	181.79544	0.7707785	0.457
ΔEX (-2)	244.20186	178.29556	1.366943	0.198
ΔEX (-3)	211.120687	165./29456	1.26968	0.188
ΔEX (-4)	119.11345	161.29678	1.16789	0.176
R_{-2} = 0.91				
DW = 2.11				
F-Statistics= 147.67				

Table 5.5: *Dependent Variable is ΔRES: 1986: 1 – 2001: 4*

Variable	Coefficient	Std. Error	T-stat.	2-Tail Sig
C	27029.489	12172.365	2.2205618	0.051
ΔRES (-1)	-0.9295551	0.3222955	-2.8841704	0.016
ΔRES (-2)	-0.5462521	0.2726543	-2.00034603	0.073
ΔRES (-3)	-0.1180976	0.1934281	-0.6105501	0.555
ΔRES (-4)	-0.16228372	0.4124514	-0.3948035	0.701
Δ (CG-GD)	0.6297117	1.4840101	0.42343311	0.680
Δ (CG-GD) (-1)	-0.5972010	1.182292	-0.5051482	0.624
Δ (CG-GD) (-2)	1.397815	0.8531720	1.6384639	0.132
Δ (CG-GD) (-3)	3.2344035	1.1916110	2.7143115	0.022
Δ (CG-GD) (-4)	1.0525598	1.5898581	0.6620715	0.523
ΔDB	1.6061068	0.6490730	2.4744626	0.033
ΔDB (-1)	1.9496522	0.9660223	2.0182269	0.071
ΔDB (-2)	2.3321909	1.0034781	2.3241073	0.042
ΔDB (-3)	0.5968843	0.8168246	0.730774	0.482
ΔDB(-4)	0.6852037	0.7952766	0.8615916	0.409
ΔDEX	485.25192	627.24759	0.7736210	0.457
ΔEX (-1)	-1057.7959	481.21965	-2.1981562	0.053
ΔEX (-2)	1054.2816	574.70407	-1.8344773	0.096
ΔEX (-3)	0991.2814	561.70410	-1.93447	0.043
ΔEX (-4)	-899.11678	502.67176	-1.86769	0.091
R_{-2} = 0.96				
DW = 2.8				
F-Statistic = 218.7				

rest of Central Bank assets with significance at 90% levels respectively. Commercial Bank deposits significantly affect the rest of Central Bank assets (the first quarter and second quarter) lag at the 95% and 99% level respectively. Exchange rate variability negatively affects the rest of Central bank assets at 90% level for the first and second quarter lags and 99% for the 3rd quarter lag.

CONCLUSION

The purpose of this paper was to see how operations of the Central Bank affect money creation and hence inflation. Earlier analysis indicated that monetary expansion was highly geared to central bank lending to government to finance deficits. Budget deficits were therefore linked with money creation. In recent years government borrowing has greatly been reduced and Central Bank autonomy increased. The deficit-money inflation link has therefore been weakened.

The ability of the monetary authority to control the money stock within the framework of the new reforms centres on both direct and indirect methods the Central Bank uses bank reserves and price-based interventions. The indirect methods consist of monetary base or commercial bank reserves as a focus. These actions are done by adjustments in the components of the Central Bank balance sheet that consequently affect money creations and hence price determination.

This study has empirically shown that components of the Central Bank balance sheet are related to the components of the money stock. The recent achievements in stabilizing monetary movements and lowering the inflation rate should therefore be enhanced by reducing fluctuations in the central bank's balance sheet so that the money supply and hence inflation fluctuations are minimized. For example it is reported that a notable decline in domestic credit, particularly bank credit to non-government sectors of the economy explained much of the declaration in monetary growth since 1994/95. This was possible through Central Banks "contractionary" Monetary policy effected through altering its balance sheet. The ability of the Central Bank to alter its balance sheet is thus an important element in controlling inflation. This points to the need to enhance autonomy on the part of the Central Bank.

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