

# AFRICAN REVIEW OF MONEY FINANCE AND BANKING



"GIORDANO DELL'AMORE" FOUNDATION

Centre for Assistance to Financial and Credit Institutions of Transitional Countries

Established by

 **CARIPLO**

Milan - Italy

Supplementary issue of "Savings and Development"

1-2/1998



# AFRICAN REVIEW OF MONEY FINANCE AND BANKING

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# INTEREST RATES, AND THE SAVING-INVESTMENT PROCESS IN BOTSWANA (\*)

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University of Botswana.

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## 1. Introduction

Apart from being grouped among other developing countries, no extensive study of the determinants of saving and investment has been done for Botswana. When Botswana has been mentioned it has been as a contrast to a more typical developing country experience<sup>(1)</sup>.

The only recent and related study (Jefferis, 1993) tests the effects of interest rates on the demand for bank credit. Jefferis specifies a double-log model that regresses the log of the ratio of bank credit to total private sector credit on the lagged values of the credit ratio, the real lending rate, and on the log of real per capita income. Estimation is done for the household sector, business sector, and for total domestic credit demand. Jefferis finds that total credit demand is not affected by the level of real interest rates in the economy. When estimating for the household sector, and business and manufacturing sectors, the results are mixed. Bank credit to the household sector is affected positively by real lending rates whilst credit flows to the business and manufacturing sector are not. He also finds that the level of bank is affected positively by rising per capita incomes.

The main finding of his study is borrowing by the business sector are not. He also finds that the level of bank borrowing by the business sector that bank borrowing does not seem to be affected by real interest rates, prompting him to conclude that "the government can pursue its high interest rate policy and at the same time boost the quality and quantity of investment through reforms aimed at mobilising long term lending through the development of new financial institutions and markets". Although representing the first known study for Botswana, his study does not estimate an investment function. As a result, the fact that high interest rates may not affect credit demand significantly leaves unanswered the question of whether bank credit is an important source of funding domestic investment. This would seem to be important because Jefferis finds that the manufacturing sector's demand for credit is neither sensitive to interest rates nor to per capita incomes. The insignificance of the interest rate variable is argued to reflect the importance of internal

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(\*) This paper derives from my Ph.D thesis submitted to the University of Kent at Canterbury, Kent. I am indebted to my thesis supervisor Professor Tony Thirlwall for accepting me as a student. I have also received helpful comments from Keith Jefferis and Webster Masenya. None of them are responsible for the remaining errors.

1. In a study of financial liberalisation in a sample of nine African countries, Seck and EL Nil (1993) stated with reference to Botswana:

The case of Botswana is portrayed in this study not because, like other African countries, it faced economic difficulties, but it is an illustration of the potential for stability and growth that liberal policies can bring about, for a small economy. In this regard, throughout ..... Botswana's economic policies were cited will be contrasted with those of the other sample countries that were forced to undergo SAPs(p.1878).

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financing as a source of funding for a large number of investment projects. It is, however, curious to attribute the lack of sensitivity of business borrowing to interest rates as due to the shortage of long term finance because most of the credit analysed is allocated by the private banking sector and hence short term. If indeed lending rates do not determine the demand for credit by the business sector this is cause for concern since higher interest rates not only signal information on the relative scarcity of capital, but are also supposed to ration domestic resources efficiently.

## 2. Saving and Investment in Botswana

There are two distinct periods in the relationship between total savings and investment in Botswana. It can be observed, from the figure below, that from 1967 to 1985 the ratio of investment to GDP has consistently exceeded the savings ratio, whereas between 1985 and 1991 the domestic saving ratio exceeded domestic investment ratio (Hope, 1997).

The ratio of domestic investment to gross domestic product was 23 percent in 1967. The rise in investment from 1967 to 1974 reflects capital investments into the development of the Orapa mining project. The development phase started in June 1967 with production beginning in July 1971. The consistently high investment ratios in the period 1967-1985 also reflect government investment in social infrastructure, for example, schools, hospitals and roads and investment in housing developments in the major towns. The construction boom of the late 1980's resulted in the investment ratio increasing to 32 percent in 1990. By 1993 the investment ratio had increased to 58.6 percent of total gross domestic product.





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It is observed that when domestic investment was expected to fall because of the balance of payments difficulties of 1981-82, there was a moderate increase instead. This was because the balance of payments difficulties coincided with the development of the second mine in the town of Jwaneng. This allowed for moderate increases in investment despite restrictions on demand.

The ratio of total domestic saving to gross domestic product was negative in the 1960's. It was -8.4 percent in 1967. It became severely negative at -13.0 percent the following year. Following the development of mining projects, domestic savings increased from 1.67 percent in 1970 to 27.4 percent in 1980. This was, however, reversed by the balance of payments problem that occurred in 1981/82. This saw the domestic savings ratio declining to 5.5 percent. The savings ratio has since increased to 58.6 percent in 1993. This is against an investment ratio of 58.6 percent in the same year.

The performance of the different types of savings varied between 1967 and 1993. The ratio of government saving was -7.0 percent in 1971. This declined to -17.0 percent in 1972. The government saving ratio remained negative for most of the 1970's until 1983 when it became positive. It was 20.9 percent in 1986. Government saving declined to 9.8 percent in 1993. The negative government saving ratio reflects increased government investment in the development of infrastructure in schools and roads in the period 1970-1980. When government savings are measured as the fiscal deficit, they are underestimated by the size of foreign reserves, which are also available to the government. Government saving when calculated as the fiscal deficit is also underestimated by the stock of government cash balances. Finally, private saving increased from 8.7 percent in 1970 to 27.5 percent in 1980. It has since increased to 48.7 percent in 1993.

### 3. Interest Rate Policy in Botswana

Botswana's interest rate policy shares the objectives of the financial liberalisation proposition by aiming to mobilise domestic savings (especially private savings), promote investment, and achieve a higher and sustainable rate of economic growth. Botswana has, however, not experienced the same type of financial repression (Jefferis, 1991). Instead, excess liquidity, insufficiency of investment demand, and higher consumer spending, financed by borrowing, are the main concerns of the monetary authorities. This is attributed to the accelerated growth of the mineral sector and, as such, considered to be unsustainable in the long term. The desired policy to pursue, in the long term, is of positive real interest rates in order to cultivate a culture of thrift in the economy, and to discourage consumer spending financed by borrowing.

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The Bank of Botswana (1994) states the policy position as follows: "The Bank of Botswana [continued] to focus on the real interest rate in the domestic financial markets as the intermediate target of monetary policy. The Bank's interest rate policy continues to be geared towards attaining real levels of interest rates in Botswana that reflect the opportunity cost of capital as represented by comparable real rates of interest prevailing in international capital markets". The positive interest rate policy is also intended to ensure "that *private savings* (own italics) are increased and appropriate investment decisions are made" (MFDP, 1996).

The practice and evolution of interest rate policy, can be divided into three sub periods. In the first stage (1976-1981), the central bank kept nominal interest rates low with the aim of providing affordable credit to the key sectors of the economy, especially the manufacturing sector. The financial strategy was to maintain low interest rates in order to promote investment and economic growth. The prime lending rate was used as the focus of monetary policy. This period represented low nominal interest rates which were negative in real terms. The real deposit interest rate ranged from -8.4 percent and -9.7 percent per annum between 1976 and 1981.

In the second stage (1981-1985) interest rate policy was responding to the balance of payment problems of 1981/82 rather than a planned policy of the central bank; the primary policy continued to be the maintenance of low interest rates because, when the balance of payments issue was resolved there was a general reduction of interest rates (Bank of Botswana, 1987). In that sense, the increased interest rates in this period do not reflect a basic shift in financial policy. The policy response to the balance of payments problem was to increase interest rates in order to restrict both consumption and investment demand in the economy. Although the economy adjusted out of the crisis, the successful adjustment cannot be attributed to interest rate policy alone as there were other measures undertaken simultaneously. This included a combination of incomes policy measures, taxation and reductions in government spending, and adjustments to the exchange rate (Harvey, 1985). By 1983/84, real deposit rates were positive at 1.5 percent. The real prime lending rate was also positive at 1.5 percent and increased further to 4.7 percent in 1983 and 1984. It is important to note that this period is the only time when deposit and lending rates were positive in real terms.

Against the background of high real interest rates there was an accumulation of excess liquidity in the banking system. And as part of the comprehensive review of monetary policy, interest rates were consistently reduced from September 1986 until 1989 to stimulate credit demand, and to reduce excess liquidity. The policy measures also

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included: the reduction of commercial bank lending rates by 15 percent and not to exceed 17 percent when dealing with greater risks; deposit rates were also reduced to minimise the effect of reduced lending rates on the incomes of banks; the Bank of Botswana cancelled deposit facilities extended to parastatal organisations with a view to forcing them to invest in productive investment; and exchange control regulations restricting commercial bank lending to non resident controlled businesses were relaxed. This was intended to encourage inward foreign investment, and also increase foreign-owned businesses access to domestic credit; finally the government reduced lending rates on the Public Debt Service Fund (PDSF) and the Revenue Stabilisation Fund (RSF) from 9.5 percent to 8.5 percent per annum (Bank of Botswana, 1986).

The strategy of low interest rates brought out other problems. It became apparent that whilst credit demand was responding to low interest rates most of the credit was channelled to the household sector, boosting imports, which was undesirable as the economy had just emerged from a period of restrictive monetary and fiscal policy. There was another concern that low interest rates were promoting capital intensive investment and adding to unemployment, which was, and still is, one of the major problems confronting the economy.

The third and current stage can be referred to as the financial liberalisation phase. This is liberalisation in a broader sense because whilst interest rate policy is key to financial liberalisation; it also includes competition and licensing policy. Moreover, despite the aim of positive interest rate in the market, real deposit interest rates are still negative though they are less severe than during the first period (1976-1981). The most progress has been made in reforming licensing procedures. Firstly, the increase in the number of financial institutions in the market has resulted in improved competition, and an efficient delivery of service in the banking market. And although commercial banks continue to lend primarily for short term investment, the ratio of loans with a maturity of more than five years has increased since the beginning of the reforms. Secondly, the establishment of the Botswana Stock Exchange has provided an avenue for companies to raise long term capital. The number of companies listed increased from five to eleven between 1989 and 1997. Despite the growth of the stock exchange, parastatal organisations still obtain credit from the government at subsidised interest rates, leading to the continued separation of the lending market into short term lending provided by the commercial banks, and long, term lending undertaken by the government (Bank of Botswana, 1996). However, lending by the government through both the PDSF and the RSF has declined in recent years.

There are three factors that may explain the policy shifts between the three periods.

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Firstly, the inability of interest rate policy in both cases to stimulate sufficient investment demand in the economy. There is a caveat here, however, in most cases interest rates were negative in real terms, suggesting perhaps that the type of investment undertaken could have been inefficient as claimed by proponents of financial liberalisation. Secondly, financial liberalisation policy as pursued in Botswana is motivated by the need to achieve diversification of the sources of saving. It does not reflect a shortage of loanable funds in the economy as evidenced by the persistence of excess liquidity. Financial reforms is intended also to support the efforts to transform Botswana into a major financial services centre of the Southern African region. It is considered that other factors, for example, liberal exchange controls and political stability, are additional advantages.

The policy of higher interest rates reflects the perception of the monetary authorities in Botswana that the liquidity glut is not sustainable in the long run, and that what is required in the long term are higher but mildly positive interest rates. It is important that where governments regulate interest rates because the financial system is not adequately developed such control must be sufficiently flexible to respond to inflation pressures and market fundamentals, otherwise the development of the financial system will be hampered.

#### **4. Interest Rate and Domestic Saving**

There are three key elements of a positive interest rate policy (McKinnon, 1973; Shaw, 1973; Jao, 1985; Arrieta, 1988; Gibson and Tsakolotos, 1994; Dornbusch, 1990; Fry, 1995). Firstly, positive real deposit interest rates are required in order to raise the domestic savings rate. Secondly, that high interest rates increase the level and efficiency of investment, and hence promote economic growth. And as a result there exists a positive relationship between the growth of the financial sector and economic growth.

This study makes the distinction between total savings, financial saving and private saving. There are a number of reasons why this is important. Firstly, financial savings are only a part of total savings, and the decision to save in financial form is a portfolio choice whereas the decision to save is an intertemporal choice. Secondly, the use of private saving highlights the central role that the private sector can play in savings mobilisation. It is also important to distinguish private saving from total saving because mineral economies, like Botswana, accumulate large fiscal balances which account for a significant proportion of domestic savings. As such the failure to account for government savings in the definition of domestic saving may bias the results. Thirdly, the other aim of policy is to increase the proportion of private saving in total saving.



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Only until recently the practice in the literature has been to use a definition of saving derived either from the national income and product accounts or the flow of funds accounts (Fry, 1978, 1980, 1982, 1995; Gupta, 1987; De Melo and Tybout, 1986). These, however, may be inappropriate measures since they include other consumer durables, like owner occupied dwellings. Moreover, saving, as distinct from financial saving, refers to the flow of real resources not consumed during the specified period. And even though such saving may be available for investment, it is not as ready to deploy as financial saving. Some studies (Giovannini, 1985) use aggregate consumption functions and introduce the interest rate as an explanatory variable. The important factor is the *financial resources* available in the *financial system*, and not necessarily total saving, even though increases in financial saving may lead to increased total saving. This is important because firms require liquid capital to finance capital formation. Consequently, a definition of financial saving is adopted in this study which makes the availability of credit the transmission through which saving will be channelled to ultimate users and hence affect economic growth. It is argued, therefore, that when real savings are converted into real financial saving, investment and growth will be affected. Moreover, allocating savings through the financial system is efficient at choosing more productive investment opportunities.

Many studies use the financial intermediation ratio (Harris, 1977; Kariuki, 1996) to measure the size of the financial system. This is some measure of the money supply (M1 or M2) as a ratio of total output (GDP). There are a number of factors to consider when selecting which monetary aggregate to use. The money supply series selected must reflect, to a greater extent, the development of the financial system and the potential for intermediation. Furthermore, the use of a narrow monetary series conceals the size and development of the financial system especially when the banking system is dominant. In other words, it is important to distinguish the liquidity function of the financial system from the credit creating function. But when accounting for the effect of financial intermediation currency and demand deposits should be deducted from M2 since they are not expected to be responsive to interest rates (Warman & Thirlwall, 1994). Moreover, including liquid assets makes it difficult to distinguish the effects of financial development from the evolving process of monetisation. This is especially important because liquid monetary aggregates relate to the ability of the financial system to provide liquidity and do not reflect the development of the financial sector, which is what the financial intermediation ratio attempts to capture (De Gregorio & Guidotti, 1995). This study uses the broad measure of the money supply, which is M3 for Botswana. This includes M2 plus Bank of Botswana certificates.

The M3 data series for Botswana was revised in 1991. The call deposit account was

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terminated from August 1991 with the introduction of Bank of Botswana Certificates (Bank of Botswana, 1981, 1991). Because the published series have only been revised up to 1981, only currency was deducted when calculating the measure of financial saving. The M3 data series prior to 1979 combines current and call account deposits. The appropriate thing to do would have been to also deduct demand deposit accounts as they are not interest earning. But nonetheless, this measure of financial saving is expected to be affected strongly by interest rates than, say, M1.

Total domestic saving is defined as real Gross Domestic Product less domestic consumption. Private saving is defined as domestic savings less the overall government budget deficit (including grants). Gross domestic investment is defined as gross fixed capital formation plus changes in stocks. The measure of credit is the ratio of credit allocated to the private sector to total domestic credit (net of lending by the government to the parastatal organisations). Finally, we measure income as the value of gross domestic product at 1987 prices.

It is hypothesised that the types of savings will be affected positively by real interest rates with the effect expected to be greater for financial and private saving than for total domestic saving. And although the McKinnon and Shaw model posits a positive relationship between interest rates and total domestic saving, it is argued here that a negative relationship found between total domestic saving and interest rates, does not constitute a sufficient basis for the rejection of the model. Instead the ultimate test depends on the effect of interest rates on financial savings. Finally, per capita income is expected to exert a positive effect on savings, however defined, in line with the Keynesian absolute income hypothesis.

#### *4.1 Total Domestic Saving*

We now present the results of the log-linear model estimated for total saving over the period 1976-1995<sup>1</sup>. We do not, as in some studies (De Melo and Tybout, 1986; Fry, 1978, 1982; Oshikoya, 1992), use ratios of saving over GDP or GNP since the use of ratios presupposes a proportional relationship between savings and income. Instead we use level data (Rittenberg, 1991; Warman and Thirlwall, 1994).

The effect of interest rates on domestic savings may be either positive or negative. The positive effect of interest rates on domestic saving would imply, that savings increase as

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1. The main sources of data are Bank of Botswana Quarterly and Annual reports, International Financial Statistics (IMF), World Tables (World Bank, 1995), and Botswana Central Statistics Office Bulletins. All variables are expressed in real 1987 prices.

individuals accumulate financial wealth (substitution effect). On the other hand, the income effect of increased interest rates results in reductions in total domestic saving (Buckett and Dutt, 1991). Moreover, the transformation of physical saving into liquid form may result in increased consumption if the holding of a liquid asset is to facilitate transactions in the economy. This may provide a partial explanation of why cases of financial liberalisation have initially been followed by decreased savings rates (Jappelli and Pagano, 1994) or an explanation of why financial liberalisation is followed by increased household consumption (Fry, 1995).

The other factor to be borne in mind when assessing the effect of interest rates on domestic saving, apart from the income and substitution effects, is the size of contractual savings. For example, pension funds are unlikely to be sensitive to current interest rates (Khatkhate, 1988). They as such need to be accounted for in the definition of saving. This was not possible to do for Botswana due to the unavailability of data.

The log of total domestic saving (GDSLOG) is regressed on the real deposit interest rate (RDIR)<sup>2</sup> and the log of real income (RGDPLOG). The results for diagnostic tests are also presented with the relevant probability values in squared brackets. The following result is obtained (t ratios are below the coefficients).

$$\begin{array}{rcll} \text{GDSLOG} = & -839.21 & + & 0.644\text{RGDPLOG} & -41.45\text{RDIR} \\ & (-4.60) & & (11.89) & (-2.27) \\ & R^2 = 0.89 & & \text{D.W} = 1.73 & \end{array} \quad (1.1)$$

Diagnostic tests:

Serial correlation  $\chi^2(1) = 0.1147[.735]$ ; Functional form  $\chi^2(1) = 1.938[.164]$ ;

Normality  $\chi^2(2) = 33.866[.000]$ ; Heteroscedasticity  $\chi^2(1) = 2.920[.087]$ .

In the above formulation we are able to explain 89 percent of the changes in total domestic saving. We find a negative and statistically significant effect of interest rates on total domestic savings. This suggests that the income effect of an interest rate increase outweighs the substitution effect, which means that interest income earned is not saved but consumed. The level of real income affects domestic savings positively and significantly. The income coefficient of 0.644 means that a percentage increase in income results in a less than proportionate increase in savings. The effect of income as a more important

2. The real interest rate is calculated by the following formula  $[(1+r)/(1+P)] \times 100$ , where P is the inflation rate and r is the nominal deposit interest rate (Seck and EL. Nil, 1993; Khatkhate, 1988; World Bank, 1989).

determinant of saving than interest rates has been found in other studies (Khatkhate, 1980; Fry, 1978; Warman and Thirlwall, 1994).

We conclude that total saving is determined positively by the level of income and negatively by domestic interest rates. This would seem to suggest that the contention that interest rates affect total savings positively is not supported in the case of Botswana. It was noted earlier, however, that the ultimate test of the effect of interest rates is on the other types of saving, especially financial saving. The next section presents results for the other types of saving: private saving and financial saving.

#### 4.2 Total Private Saving

In this section the log of private saving (PRIVLOG) is regressed on real deposit interest rates (RDIR) and log values of real income (RGDPLOG), and the following result is obtained (t-ratios are indicated below the coefficients):

$$\begin{array}{rcll} \text{PRIVLOG} = & 4.14 & + & 0.007\text{RGDPLOG} - 0.60\text{RDIR} \\ & (16.65) & & (9.43) & & (-2.40) & & (1.2) \\ & \bar{R}^2 = 0.84 & & \text{D.W} = 1.78 \end{array}$$

Diagnostic tests:

Serial correlation  $\chi^2(1) = 0.425[.837]$ ; Functional form  $\chi^2(1) = 1.42[.232]$ ;

Normality  $\chi^2(2) = 0.356[.837]$ ; Heteroscedasticity  $\chi^2(1) = 0.014[.904]$

The calculated t-ratios indicate that the real deposit interest rate is significant. However, the sign does not accord with expectations. Income exerts a positive and significant effect on private saving. The coefficient is significant at the 1 percent level. We observe that the income and real interest rate coefficients reduce significantly in magnitude for the private savings function. This is possibly because of deducting the share of government saving in total savings.

Studies that estimate the determinants of saving using the real interest rate impose a restriction that the percentage change in the nominal interest rate brings about an equal (but opposite) effect on saving as the same percentage change in the rate of inflation (Gupta, 1987; Seck and EL Nil, 1993; HadjiMichael M.et.al, 1995). The financial liberalisation model expects the inflation coefficient to take a negative value and the nominal deposit interest rate a positive value, and furthermore the absolute values of the coefficients to be equal. We test this hypothesis for private saving by specifying separately the nominal interest rate and the rate of inflation. In practice, the effect of inflation on the



ratio of saving may be either positive or negative. When the precautionary motive dominates, a positive relationship is expected whereas portfolio effects tend to yield a negative relationship (Gupta, 1987). The negative effect occurs when economic agents respond to higher inflation by diverting resources to inflation hedges to alleviate the burden of the inflation tax (Galbis, 1977).

When estimating the private saving function distinguishing between inflation and nominal deposit interest rates we obtained the following result:

$$\begin{aligned} \text{PRIVLOG} = & 3.86 - 0.073\text{DIR} + 0.08\text{INFL} + 0.007\text{RGDPLOG} \\ & (9.91) \quad (-2.24) \quad (2.62) \quad (9.13) \\ R^2 = & 0.86 \quad \text{D.W.} = 1.60 \end{aligned} \quad (1.3)$$

Diagnostic tests:

Serial correlation  $\chi^2(1)=0.358[.549]$ ; Functional form  $\chi^2(1)=3.79[.052]$ ;

Normality  $\chi^2(2) = 0.542[.762]$ ; Heteroscedasticity  $\chi^2(1) = 0.043[.834]$

All variables affect private savings significantly. None of the conditions of the financial liberalisation model are met. Nominal deposit interest rates affect private savings negatively, whereas the rate of inflation affects private savings positively. This would imply that savers react to the variability in the consumer price index by increasing their levels of savings. Moreover, inflation can lead to increases in savings through the redistribution of income in favour of profits because of the rigidities in the labour markets that do not allow for the adjustment of wages to inflation (Thirlwall, 1974; Ghatak, 1981). Furthermore, total savings may increase as resources are shifted to the government through the inflation tax. As with total savings we find that income remains the most significant determinant of private saving.

#### 4.3 Total Financial Saving

The following model estimates the effect of interest rates on financial savings by regressing the log of real financial saving on the log of real income and real deposit interest rates. We obtained the following result:

$$\begin{aligned} \text{FINSLOG} = & 5.00 + 0.005\text{RGDPLOG} - 0.081\text{RDIR} \\ & (37.77) \quad (13.84) \quad (-1.33) \\ R^2 = & 0.922 \quad \text{D.W.} = 1.28 \end{aligned} \quad (1.4)$$

Diagnostic tests:

Serial correlation  $\chi^2(1)=2.019[.155]$ ; Functional form  $\chi^2(1) = 9.470[.002]$ ;  
 Normality  $\chi^2(2) = 1.36[.504]$ ; Heteroscedasticity  $\chi^2(1) = 1.136[.286]$

The effect of real income on financial saving is positive and significant. The real deposit interest rate has no statistically significant effect on the level of financial saving. The two variables explain 92 percent of changes in the level of financial saving. Even with a definition of financial saving we still do not find support for the positive effect of real interest rates on savings.

Similarly we tested for the separate effect of inflation and the nominal deposit interest rate on real financial saving and obtained the following result:

$$\begin{aligned} \text{FINSLOG} = & 5.45 - 0.046\text{DIR} + 0.016\text{INFL} + 0.0005\text{RGDPLOG} \\ & (26.61) \quad (-2.68) \quad (1.01) \quad (13.48) \\ \bar{R}^2 = & 0.93 \quad \text{D.W} = 2.06 \end{aligned} \quad (1.5)$$

Diagnostic tests:

Serial correlation  $\chi^2(1) = 0.0082[.774]$ ; Functional form  $\chi^2(1) = 3.850[.050]$ ;  
 Normality  $\chi^2(2) = 0.2790[.870]$ ; Heteroscedasticity  $\chi^2(1) = 0.0184[.892]$

The income variable emerges as the most significant determinant of financial saving in the regression. We find that changes in the consumer price index affect financial savings positively but insignificantly. On the other hand, the nominal deposit interest rate affects financial savings negatively and significantly at the 5 percent level. This contrasts with Seck and EL Nil (1993) who find in their study of nine Sub-Saharan countries, that include Botswana, that nominal deposit interest rates affect financial savings<sup>3</sup> positively and significantly, whereas inflation has a negative effect.

The results presented do not seem to provide support for the assertion that high interest rates have positive effects on total savings and especially financial resource mobilisation. In both cases the coefficient is negative. The most important determinant of saving, however defined, is income. The empirical evidence in support of the dominating effects of income has been found elsewhere (Gibson and Tsakalatos, 1994; Jao, 1985; Arrieta, 1988; Fry, 1995; Kariuki, 1996).

3. Other studies (Seck and EL Nil, 1993; Kariuki, 1996) use a definition of financial saving that includes currency whilst we deduct currency. This is important because it distinguishes the process of monetisation from the development of the financial system.

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It is clear that saving is determined by factors (income) other than the interest rate, implying that interest rate policy if used will not yield the expected outcome as the income effect tends to dominate the substitution effect. Although the sample is not large enough to warrant strong conclusions<sup>4</sup>, the findings cast doubt on the emphasis on the interest rate as the key policy to achieve higher private savings mobilisation, and a higher rate of economic growth.

If the policy objective is to promote saving and investment (in that order) then it does not seem, on the basis of the available evidence, that it is achievable. The policy effort should perhaps be geared to the promotion of investment given saving depends on income. This would target key sectors of the economy and complement diversification. The fact that interest rates do not affect savings positively, as claimed by the financial liberalisation hypothesis, would suggest that "a key part of the story is missing, and therefore one must ask whether this does not seriously limit any policy implications" (Dornbusch, 1990 p. 38).

## 5. Interest Rate Policy and Domestic Investment

Theoretically, investment is determined by the differential between the market rate of interest and the rate of return on productive physical capital. And even though financial liberalisation may result in higher interest rates, thereby narrowing the gap between profit and interest rates, investment will remain unaltered if the rate of profit on marginal investment is equal to the rate of interest (Khatkhate, 1988). Additionally, negative interest rates lead to an outflow of financial saving from the domestic financial system whereas raising them to positive levels results in an inflow of foreign financial resources. Higher interest rates (relative to the rest of the world) also retain domestic savings (World Bank, 1989).

Domestic investment also depends on the development of the money market proxied by the monetary aggregate or the financial intermediation ratio. In this framework money holding is viewed as a conduit to investment demand and a rapid rate of economic growth (McKinnon, 1973; Shaw, 1973). Real deposit interest rates affect investment positively, with the effect operating through financial saving and the supply of credit to the private sector.

It is hypothesised, in this study, that credit allocation to the private sector is a much stronger determinant of domestic investment than the financial intermediation ratio. This

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4. The limited observations have made it difficult to use new time series techniques like cointegration and unit root tests. An attempt was made without any success.

is because it is considered that credit availability to the private sector is the link through which resources are transferred for capital formation. This measure also has the added advantage that it excludes credit allocated to the public sector (local government authorities and parastatal organisations). Note that when the greater proportion of total credit is not allocated by the domestic financial system, which is the case in Botswana, this measure may not capture the full effect of credit flows, but the measure is considered appropriate in that it reflects the ability and potential of the private financial system to allocate credit. Finally, the effect of aggregate demand on investment is tested for by including the lagged accelerator in the investment function. This is expected to affect investment positively.

The investment function regresses the real level of domestic investment on the real deposit interest rate, real private sector credit, the lagged accelerator, and a dummy variable for 1987/88 that captures the effect of the decline in investment, and obtained the following result, with t values below the coefficients:

$$\begin{aligned} \text{GDILOG} = & 5.46 - 0.006r + 0.002Pc + 0.001XGDP_{-1} - 0.43D_{1987} \\ & (20.60) \quad (0.23) \quad (2.99) \quad (1.72) \quad (-1.53) \\ \bar{R}^2 = & 0.68 \quad D.W = 2.15 \end{aligned} \quad (1.6)$$

Diagnostic tests:

Serial correlation  $\chi^2(1) = 3.093[0.062]$ ; Functional form  $\chi^2(1) = 0.702[0.375]$ ;

Normality  $\chi^2(2) = .519[0.445]$ ; Heteroscedasticity  $\chi^2(1) = 0.558[0.415]$

The interest rate variable is negative but insignificant. All the other variables, except the dummy variable, have the expected signs and are significant. The coefficient for lagged accelerator is significant. It is clear from this result that the level of investment is affected principally by the availability of credit and to a lesser extent by the lagged effects of output on demand.

We now estimate the indirect effects of interest rates on investment that work through the supply of credit, which in turn depends on the flow of financial savings. The effect of financial savings on credit is given by (the equation is corrected for serial correlation using the Cochrane-Orcutt Method);

$$\begin{aligned} \text{Pclog} = & 1.50 + 0.66 \text{Fslog} \\ & (1.83) \quad (5.20) \\ \bar{R}^2 = & 0.77 \quad D.W = 2.15 \end{aligned} \quad (1.7)$$

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The supply of credit has a positive effect on domestic investment through financial savings. When we convert the sensitivity of real credit supply on domestic investment (equation 1.6) to find the absolute magnitude of credit supply we obtained 0.685. This contribution of credit to investment is found by multiplying the mean value of credit (342.51) by the estimated elasticity (0.002). The estimate is interpreted to mean that for a percentage increase in the supply of credit there is an increase of about 0.685 million pula in investment. It will also be observed that the credit coefficient is only 0.002 reflecting perhaps the size of government investment in total domestic investment. It is expected that the coefficient may increase in size when government capital formation is deducted.<sup>5</sup>

We find no support for the hypothesis of a positive effect of deposit interest rates on the level of investment. Instead, the availability of private sector credit is the most important determinant of domestic investment demand because not all financial saving is converted into credit. The Bank of Botswana (1996) also reports that credit allocation to the business sector by the commercial banking system declined since the beginning of the financial reforms of 1989.

## 6. Conclusion

We conclude this paper with a caveat that the smallness of the data set being used in the study dictates that the results be interpreted with caution. Tests of the effects of interest rates on savings were done on three definitions of savings, namely; total savings, private savings, and financial savings. This is important because interest rates are not expected to affect types of savings equally. Furthermore, interest rate policy aims to mobilisation financial savings or to increase the ratio of financial assets to total output. These are considered to lead to a higher rate of economic growth. The study also estimated the determinants of domestic investment demand.

The study found no evidence to support the positive effect of interest rates on savings. This is the case for all measures of saving. In fact, a negative relation is found for total and private savings. This suggests that the income effect of higher interest rates outweighs the substitution effect. We also found no significant effect of interest rates on financial saving. The major determinant of saving, however defined, is income; a finding which is consistent with the Keynesian absolute income hypothesis. With regard to the investment function, it is found that higher interest rates do not have a significant effect on domestic investment. Domestic investment is found to be affected strongly by private sector credit, and to a lesser extent by past levels of demand.

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5. This issue is being investigated in an on going paper prepared by the author.



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**Abstract**

*This paper discusses interest rate policy in Botswana, and tests the impact of interest rates on savings and investment in Botswana. The study uses three measures of saving: total domestic saving; private saving; and financial saving. We find that high interest rates affect none of the types of saving positively. Instead, income emerges as the most important determinant of saving, however defined. With regard to the determinants of domestic investment the study identifies private sector credit as the important variable in the investment function. It is the conclusion of this paper that emphasis be placed on the promotion of investment given that saving is explicable only by past development (Schumpeter, 1961). The level of output and employment depend on investment, which in turn, depends on finance and business expectations (Asimakopulos, 1986; Davidson 1986; Chick, 1987).*

**LES TAUX D'INTÉRÊT ET LE PROCESSUS D'ÉPARGNE-INVESTISSEMENT AU BOTSWANA.****Résumé**

*L'auteur analyse les politiques des taux d'intérêt au Botswana et l'impact des taux sur l'épargne et l'investissement en utilisant trois mesures de l'épargne: l'épargne intérieure totale, l'épargne privée et l'épargne financière. On a observé que les taux d'intérêt élevés n'influent positivement sur aucun des types d'épargne considérés, tandis qu'il résulte que le déterminant le plus important de toute forme d'épargne semble être le revenu. En ce qui concerne les déterminants de l'épargne des ménages, l'étude a identifié le crédit au secteur privé comme la variable la plus importante dans la fonction de l'investissement. La conclusion de cet étude est, donc, qu'il faut mettre l'accent sur la promotion des investissements puisque l'épargne s'explique seulement comme résultat du développement préalable. Les niveaux de la production et de l'emploi dépendent de l'investissement qui à son tour dépend des attentes dans le domaine économique et financier.*

