

INTEREST RATE REFORMS, FINANCIAL DEPTH AND SAVINGS IN TANZANIA: A DYNAMIC LINKAGE

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Abstract

In this paper, the impact of interest rate reforms on financial deepening and savings in Tanzania is examined using two models, namely the financial deepening model and the savings model. Using cointegration and error-correction techniques, the empirical results of this study reveal that there is abundant support for the positive impact of interest rate reforms on financial deepening in Tanzania. Likewise, the study finds financial deepening, which results from interest rate reforms, to have a positive influence on domestic savings. However, the study failed to find any strong support for the direct positive interest rate elasticity of savings in Tanzania.

Keywords: (Africa, Tanzania, interest rate reforms, savings)

1. INTRODUCTION

Since the widespread acceptance of the theory of financial liberalisation, many developing countries have implemented far-reaching financial reforms. Specifically, many countries have made attempts to deregulate interest rates, eliminate or reduce credit controls, allow free entry into the banking sector, give autonomy to commercial banks, allow for the private ownership of banks, and liberalise international capital flows. However, of these six dimensions of financial liberalisation, interest rate liberalisation has been the main centre of attention. Unfortunately, the experiences of these countries with regard to interest rate liberalisation have been mixed, and whether financial liberalisation impacts positively on financial deepening, savings and economic growth, as postulated by the proponents of interest rate liberalisation, remains an issue of empirical investigation.

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In Tanzania, the upward trend of financial savings experienced immediately after interest rate liberalisation in 1992 did not last for long. In 1998, for example, financial savings declined to 13% from the 52% recorded in 1992. As in the case of financial savings, the domestic savings also remained relatively low with mixed trends after financial liberalisation. The gross domestic savings, as a percentage of GDP, decreased systematically between 1991 and 1993 - with the lowest rate of -4.6% being recorded in 1993 - as compared to 11% and 7.1%, recorded during 1975-1984 and 1985-1989, respectively. Although the rate increased between 1994 and 1997, it later decreased to (-) 0.7% in 1998. However, between 1999 and 2000 the saving rate increased dramatically. The rate increased from -0.7% in 1998 to 3.9% in 1999, and to a historic 9.2% in 2000. Notwithstanding this increase, the post-reform saving rate in Tanzania is still lower than the pre-reform saving rate.

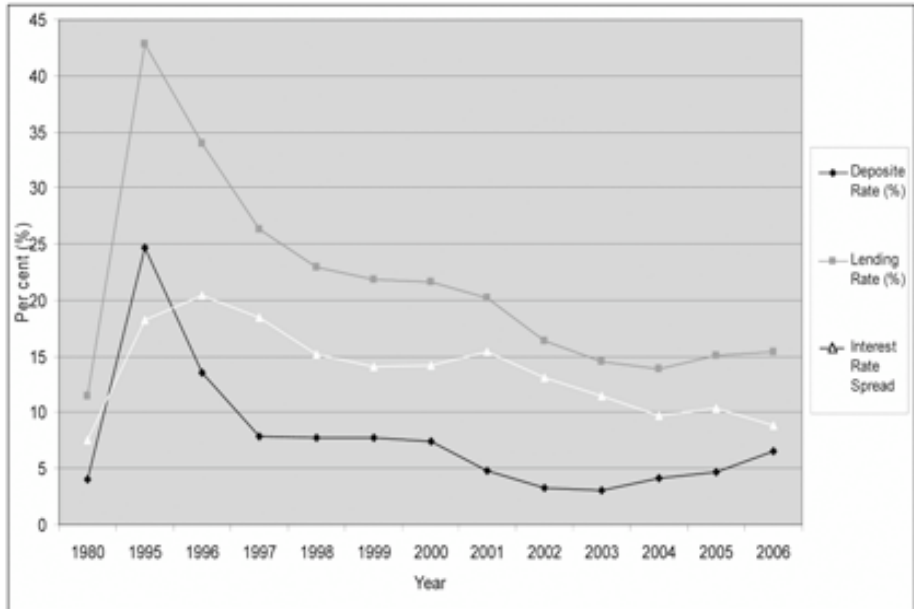
The majority of the previous empirical studies on this topic have concentrated mainly on Asia and Latin America, affording sub-Saharan African (SSA) countries very little or no coverage at all. Even where such studies have been undertaken, findings on the role played by high interest rates and their effect on financial deepening and savings are at best inconclusive. For instance, several studies have found no direct relationship between the level of savings and the interest rate. Yet, there has been enormous support for the position that even though interest rates might not directly affect the savings rate, they do affect the form in which savings are held.

The current study takes a fresh look at the impact of interest rate liberalisation on financial deepening and savings in Tanzania. The study attempts to answer two critical questions: Does interest rate liberalisation contribute positively towards financial deepening in Tanzania? Does financial deepening, which results from interest rate liberalisation, positively influence savings in Tanzania? The remainder of the paper is organised as follows: Section 2 traces the origin of interest rate liberalisation and the trends of interest rates before and after interest rate liberalisation in Tanzania. Section 3 sketches the relationship between interest rate liberalisation and savings on one hand, and interest rate and financial deepening on the other. Estimation techniques and empirical results are discussed in section 4, and the concluding remarks are presented in the final section.

2. INTEREST RATES LIBERALISATION IN TANZANIA

The implementation of interest rate policies in Tanzania can be divided into three periods (Odhimabo, 2004). The first period is between 1961 and

Figure 1: The Trend of Interest Rates during the Period 1995-2006 as Compared to 1980.



Source: Compiled from International Financial Statistics Yearbook (2007).

N/B: Interest Rate Spread = Lending rate - Deposit rate.

1966. During this period, interest rate policy depended on what happened in the London financial markets. The second period spanned 1967 to 1985. This was the era of administratively fixed interest rates. The third period, from 1986 to the present, is the period of deregulated interest rate policy. The deregulation of interest rates in Tanzania was supported by the predominant view that the root cause of many macroeconomic imbalances such as the savings-investment gap in Tanzania, was mainly the interest rate policies of the past (Ndulu and Hyuha, 1989; Nyagetera, 1997).

Although the financial reform process in Tanzania started in the 1980s, full-fledged financial reforms commenced only in 1992. For example, it was only in July 1992 that BOT lifted its responsibility of setting interest rates (except for the maximum lending rate). Financial institutions were therefore free to set their deposit and lending rates (subject to the maximum lending rate of 31% set by BOT) and 12-month deposit rate above the inflation rate. However, in July 1993 the lending interest rate ceiling of 31% was abolished,

and the requirement of positive real deposit rates was also abolished in 1994 (Bank of Tanzania, 1998). In 1993, BOT commenced Treasury bill auctions with 91-day bills. The Treasury bill auctions served as a tool for financing short-term government debt and as an instrument of liquidity management as well as a reference point for the determination of market interest rates. In September 1993, the 35-day Treasury bill was also introduced for Treasury bill auctions. In January 1994, the discount rate, the rate at which BOT accommodates commercial banks on a short-term basis, was increased from 27% to 50% per annum. Thereafter, the discount rate was adjusted bi-weekly, on the basis of the marginal yields of the 91-day Treasury bill auctions. In October 1994, computation of the discount rate was determined by the weighted average of T-bill auction yields for all maturities. Figure 1 shows the trends of deposit and lending rates, as well as the spread between the two rates in Tanzania during the period 1995-2006 as compared to 1980.

3. LITERATURE REVIEW

3.1 *Interest Rate Liberalisation and Savings*

Since the onset of interest rate liberalisation in the 1970s, a number of schools of thought have criticised the efficacy of interest rate liberalisation for various reasons. The most influential of all these criticisms is based on the argument that savings may not necessarily depend on the rate of interest, and if it does, it may reduce rather than increase the volume of savings. A number of reasons have been advanced in the literature to support this view¹.

The first and the most appealing reason is based on the argument that a change in interest rates, just like other prices, has two effects: substitution and income effects. The substitution effect encourages saving by making current consumption more expensive, but the income effect deters savings because at a higher interest rate the same income can be obtained with less savings. However, it is likely that the negative income effect of the increased interest rate will offset the positive substitution effect between consumption and savings (see Bandiera et al., 1999; Warman and Thirlwall, 1994; Cho and Khatkhate, 1990; Arrieta, 1988; Giovannini, 1983).

The second argument is anchored in the fact that an increase in the real interest rate will only reallocate the existing volume of savings in favour of financial savings and leave the total volume of savings unchanged. When

¹ See Odhiambo (2007).

the real interest rate is high, financial savings are made more attractive and economic agents find it more rewarding to transfer their savings from other forms of savings to financial savings. Such reallocation may also occur if reforms provide a new range of financial investments such as shares, mutual funds, postal savings, and pension funds. That is to say that, if these assets are made more attractive, it is likely that economic agents may reallocate their savings in favour of these assets, but such a reallocation may have no impact on the volume of the total savings (Gupta, 1984; Mahambare and Balasubraman, 2000).

The third argument in this respect is that, at very low levels of income, interest rates are unlikely to stimulate savings. This is so because the totality of incomes will be devoted to consumption rather than savings. Therefore, when income is low, even if a high deposit rate is sustained, savings will not increase unless income rises beyond a threshold level. Statistical evidence on this argument suggests that a one per cent increase in the real interest rate increases savings rate by only about one-tenth of one percentage point in the relatively poor countries, whereas in the relatively rich countries it increases the savings coefficient by about two-thirds of one percentage point (Ogaki et al., 1996). Even at relatively high levels of income, financial reforms, which ease borrowing constraints, may stimulate consumption rather than savings (see also Japelli and Pagano, 1989, 1994; and Hall, 1978).

In general, empirical studies on the elasticity of savings with respect to real interest rates have produced a mixed bag of results. Fry (1980) found a positive relationship between savings and the rate of interest for fourteen countries. Similar results were obtained by Yusuf and Peters (1984) for South Korea, Leite and Makonnen (1986) for six African countries, and Ostry and Reinhart (1992) for 13 developing countries. Studies with distinct negative or insignificant relationships include Giovannini (1983, 1985), Mwegu et al. (1990), Oshikoya (1992) and Reichel (1991). Finally, mixed results were obtained by Gupta (1987), Lahiri (1989) and Villagomez (1997). The weight of evidence, however, supports a weak and relatively low positive elasticity of saving with respect to interest rate.

3.2 Interest Rate Liberalisation and Financial Deepening

One of the main objectives of financial liberalisation is to boost financial depth, which in turn leads to an increase in the resources available for financial intermediation. The main channel through which this occurs is interest rate liberalisation, which is intended to raise real deposit rates and hence price incentives for depositors. In addition, greater non-price competition

among banks for deposits may also boost deposit mobilisation. According to the financial liberalisation theory, a high and positive real deposit rate enables savers to switch some of their savings from unproductive real assets to financial assets – thus expanding the supply of credit in the economy. In this way, financial liberalisation in general and interest rate liberalisation in particular plays a crucial role in financial deepening. According to Ikhide (1992), positive real interest rates favour financial savings over other forms of savings and, therefore, promote financial deepening.

A few studies have been conducted in developing countries to examine the impact of financial liberalisation on financial deepening, but with varying results. Mosley (1999), for example, whilst examining the impact of financial liberalisation on access to rural credit in a number of countries, finds that the impact of financial sector reforms on financial depth, as measured by bank deposits and M2 as a percentage of GDP, varies between countries. The author finds little change in financial depth in Madagascar, and a small decline in Malawi. Although Tanzania suffered a sharp contraction of financial depth in the second half of the 1980s, the country recovered almost half of the fall in the first half of the 1990s. In Uganda a small recovery was achieved in the first half of the 1990s after the collapse in financial depth in the 1980s, but the financial system remained very shallow. In Zambia, the reforms were unable to prevent a continued rapid decline in financial depth, which began in the first half of the 1980s. Ikhide (1992) conducts a study on financial deepening, credit availability and the efficiency of investment in 17 African countries. His analysis uses three variants to test the aspect of financial deepening in these countries. The results of this study show that the real rate of interest turned out to be positive and significant in 12 out of the 17 countries in the sample. The variable was significant in Kenya, Ghana, Nigeria, Cameroon, Burundi, Rwanda, Sierra-Leon, Ethiopia, Niger, Zambia, Malawi, Cote d'Ivoire, and Mauritius. Although the real interest rate was positive in Tanzania, in Botswana and Lesotho it was not statistically significant.

4. RESEARCH METHODOLOGY

4.1 Empirical Model Specification

In this study, the dynamic relationship between interest rate liberalisation, financial deepening and savings in Tanzania is investigated using two models, namely a financial deepening model and a savings model. What follows is a discussion of the empirical specifications of these models.

4.1.1 Financial Deepening Model

In this model, the relationship between interest rate liberalisation and financial deepening is examined by regressing the financial depth variable on real income, deposit rate, expected inflation and the lagged value of financial depth. The research question in this case is whether real interest rates positively or negatively affect financial depth. The model can be expressed as follows²:

$$\text{Log} (M2/GDP)_t = \beta_0 + \beta_1 \log y + \beta_2 \log d + \beta_3 \log Pe + \beta_4 \log (M2/GDP)_{t-1} + Et \quad (1)$$

where: $(M2/GDP)_t$ = financial development; y = real income; d = deposit rate (nominal); Pe = expected inflation; $(M2/GDP)_{t-1}$ = financial development lagged once.

The rationale for including different variables in the financial deepening model is based on the following theoretical arguments: The inclusion of deposit rate is expected to capture the impact of interest rate liberalisation on financial deepening. The coefficient of deposit rate in the financial deepening model is, therefore, expected to be positive and statistically significant. A positive relationship between real interest rate and financial depth will inevitably corroborate the positive role of interest rate liberalisation on economic growth. The inclusion of inflation rate is meant to capture the impact of inflation on the various components of money. There has been an argument that inflation adversely affects the holding of all classes of financial assets and not just a narrow class. In addition, it has been argued that inflation will tend to encourage the holding of currency and discourage the holding of quasi-money (see also Odhiambo, 2005; Ikhide, 1992). According to English (1999), a higher inflation rate encourages households to substitute purchased transactions services for money balances, thereby boosting the financial sector. The coefficient of inflation in this study is, therefore, expected to be positive and statistically significant (see Odhiambo, 2008).

4.1.2 Domestic Savings Model

In this model, the impact of interest rate and financial deepening on domestic savings is estimated using the following equation:

$$\text{Log}(S/Y)_t = \delta_0 + \delta_1 d - p_t^e + \delta_2 \log M2/GDP_t + \delta_3 \log y_t + \delta_4 S_f/Y_t + \delta_5 \log(S/Y)_{t-1} + \delta_6 \log DR_t + Ut \quad (2)$$

where: $(S/Y)_t$ = the ratio of domestic savings to GDP; $d - p_t^e$ = the real rate of interest; $(M2/GDP)$ = the financial depth variable defined as money supply

² See Odhiambo (2008).

as a percentage of GDP; y_t = real GDP; S_f / Y_t = the ratio of foreign savings to GDP; DR_t = the dependency ratio; and U_t = error term.

The rationale for including different variables in the savings function is briefly summarised below. The deposit rate of interest is intended to capture the relationship between interest rate liberalisation and savings. As discussed in the previous sections of this paper, the relationship between the deposit rate and the savings ratio is controversial and remains an empirical issue. The financial depth variable is intended to capture the effect of financial deepening, which results from interest rate liberalisation, on savings. The theoretical link between interest rate liberalisation and financial deepening is based on the McKinnon (1973) and Shaw (1973) hypotheses. According to these hypotheses, the coefficient of the financial depth variable is expected to be positive and statistically significant.

In a highly open economy, such as Tanzania, it is easy to justify the introduction of foreign savings (S_f/Y) in the savings function. Foreign savings assume a critical role either as a complement to or as a substitute for domestic savings. The impact of foreign savings (S_f/Y) on the savings rate in developing countries, however, remains controversial. Khan and Hasan (1998) and Khan, Hasan and Malik (1994), for example, argue that foreign savings relax the resource constraint in developing countries and may augment national savings with a time lag via increasing income. In this case, the dynamic impact of foreign savings on national savings may be positive. However, the overwhelming evidence is in favour of an inverse relationship between the two savings rates. In fact, it is usually hypothesised that high levels of foreign savings discourage the indigenous savings effort. The substitutability between foreign and domestic savings has been found in a number of empirical works, including those of Fry (1978, 1980), Giovanini (1985), Bowles (1987), Watson (1992), Thornton (1990) and Kendall (2000).

The lagged savings is included because the adjustment process may be spread over multi-periods (De Melo and Tybout, 1986). The coefficient of lagged savings is expected to be positive and statistically significant. Finally, the dependency ratio (DR) is included to test for the influence of demographic variables on the saving rate. Indeed, the rate of economic growth will have little or no effect on the saving rate if the population dependency ratio is high. Moreover, in the lifecycle model, households with more children are likely to consume more and save less at younger ages than households with few or no children³. Therefore, the higher the population dependency ratio, the lower the saving rate.

³ See also Khan and Hasan, 1998.

4.2 Data Source and Definitions of variables

4.2.1 Data Source

Annual time series data, which cover the 1968 to 2001 period, are utilised in this study. The data used in the study are obtained from different sources, including various series of the Bank of Tanzania reports, the International Financial Statistics Yearbook published by the International Monetary Fund and the World Bank Statistical Yearbook.

4.2.2 Definitions of Variables

- i) Domestic savings** in this study is computed as gross investment minus foreign savings.
- ii) Real interest rate** is computed as the difference between nominal deposit rate and expected inflation.
- iii) Nominal deposit rate (d)** = interest rate on 6 to 12 months deposits in commercial banks.
- iv) Expected inflation (P^e)** = The unobservable expected inflation is generated from the actual inflation rate using adaptive expectations theory.
- v) Financial Depth**
Financial depth = $M2/GDP$
where: M2 is the broad money stock; and GDP is gross domestic product.
- vi) Foreign savings** in this study is measured by the current account deficit on the balance of payments.

4.3 Empirical Analysis

4.3.1 Stationarity Tests

In order to test for the stationarity of the variables used in this study, the Dickey-Fuller, Augmented Dickey-Fuller, and Philips-Perron class of tests are used. The results of the stationarity tests in levels (not presented here) show that all the variables are non-stationary in levels. Having found that the variables are not stationary in levels, the next step is to difference the variables once in order to perform stationary tests on differenced variables. The results of the stationarity tests on differenced variables are presented in Tables 1 and 2.

The foregoing results show that after differencing the variables once, all the variables are confirmed to be stationary. The unit root tests applied to the first difference of the data series reject the null hypothesis of the non-station-

Table 1. Stationarity Tests of Variables in First Difference – DF and ADF Tests⁴

Variables	DF	ADF	Order of Integration
DLM2/GDP	-3.860	-4.286	(1)
DLy	-4.285	-3.592	(1)
DLD	-2.929	-3.831	(1)
DPe	-7.721	-4.778	(1)
DLS/Y	-4.369	-4.337	(1)
DLEXP/GDP	-5.282	-3.291	(1)
Dd-Pe	-7.594	-4.569	(1)
DSf/y	-4.358	-4.477	(1)

Critical values: 1% level: DF= -4.32, ADF = -4.12; 5% level: DF= -3.67, ADF = -3.29; 10% level: DF = -3.28, ADF = -2.90

Table 2. Stationarity Tests of Variables on first Difference - Philips – Perron Test

Variable	NO TREND	TREND	Stationarity Status
DLM2/GDP	-7.099497	-11.68519	Stationary
DLy	-6.920550	-7.492237	Stationary
DLD	-3.509891	-3.365145	Stationary
DPe	-8.282393	-17.74783	Stationary
DLS/Y	-5.811605	-6.961804	Stationary
DLEXP/GDP	-7.740163	-13.97198	Stationary
Dd-Pe	-7.487742	-7.526487	Stationary
DSf/y	-5.596266	-7.894201	Stationary

Note: The truncation lag for the PP tests is based on Newey and West (1987) bandwidth.

arity of variables used in this analysis. This, therefore, implies that the variables are integrated of order one. This also suggests that the regressions for all the variables have to be done in first difference.

4.3.2 Cointegration Analysis

Having established that the variables are of the same order of integration

⁴ The variables used in this analysis were expressed in their natural logarithm in order to reduce the effect of outliers.

(order one), the next procedure is to test the possibility of cointegration among the variables used in models 1 and 2. In this study, the Johansen-Juselius (Maximum-Likelihood) cointegration technique is employed to test the existence and the number of cointegrating vectors. The results of the cointegration tests for models 1 and 2 are presented in Table 3⁵.

Table 3. Johansen-Juselius Maximum Likelihood Cointegration Tests

Model 1: Financial Deepening Model Trace Test				Maximum Eigenvalue Test			
Null	Alternative	Statistics	95% Critical value	Null	Alternative	Statistics	95% Critical value
$r = 0$	$r \geq 1$	57.40	47.2	$r = 0$	$r = 1$	32.05	27.1
$r \leq 1$	$r \geq 2$	25.35	29.7	$r \leq 1$	$r = 2$	14.08	21.0
$r \leq 2$	$r \geq 3$	11.27	15.4	$r \leq 2$	$r = 3$	10.41	14.1
$r \leq 3$	$r = 4$	0.86	3.8	$r \leq 3$	$r = 4$	0.86	3.8
Model 2: Savings Model Trace Test				Maximum Eigenvalue Test			
Null	Alternative	Statistics	95% Critical value	Null	Alternative	Statistics	95% Critical value
$r = 0$	$r \geq 1$	104.6	94.2	$r = 0$	$r = 1$	45.72	39.4
$r \leq 1$	$r \geq 2$	58.92	68.5	$r \leq 1$	$r = 2$	24.41	33.5
$r \leq 2$	$r \geq 3$	34.51	47.2	$r \leq 2$	$r = 3$	15.11	27.1
$r \leq 3$	$r \geq 4$	19.40	29.7	$r \leq 3$	$r = 4$	11.60	21.0
$r \leq 4$	$r \geq 5$	7.80	15.4	$r \leq 4$	$r = 5$	5.47	14.1
$r \leq 5$	$r = 6$	2.34	3.8	$r \leq 5$	$r = 6$	2.34	3.8

On the basis of the trace test, there is at most one cointegrating vector in model 1 and model 2. The trace statistics reject the null hypothesis of $r=0$ in model 1 and model 2 in favour of the general alternative hypothesis of $r \leq 1$. However, the null hypothesis of $r \leq 1$, $r \leq 2$ and $r \leq 3$ in model 1 and $r \leq 1$, $r \leq 2$, $r \leq 3$, $r \leq 4$ and $r \leq 5$ in model 2 could not be rejected at the 5% level of significance.

In the case of the maximum eigenvalue test, the null hypothesis of $r=0$ in the case of model 1 and model 2 is rejected at the 5% level of significance in favour of the specific alternative, namely that there is at most one cointegrating vector

⁵ The Akaike and Schwarz criteria were used to determine the number of lags for the cointegration test.

($r = 1$) in both models. However, the null hypothesis that $r \leq 1$, $r \leq 2$ and $r \leq 3$ in model 1, and that $r \leq 1$, $r \leq 2$, $r \leq 3$, $r \leq 4$, $r \leq 4$ and $r \leq 5$ in the case of model 2, could not be rejected at the 5% level of significance. It is therefore worth noting that both the trace and maximum eigenvalue test statistics reject the null hypothesis of no cointegration in the two models at the 5% level of significance.

4.3.3 Error Correction Modelling

Financial Deepening Function (Model 1)

The results presented in the preceding section indicate that cointegration has been accepted in the financial deepening model (model 1) and in the savings model (model 2). The next procedure in this analysis, therefore, is to estimate an error-correction model by including the error-correction term (ECM-1) lagged once in the set of explanatory variables. The results of the general over-parameterised error-correction model for financial deepening equation (not reported here) are difficult to interpret and many variables are not significant. The model is therefore reduced until the preferred model is obtained. The results of the preferred model are presented in Table 4.

Table 4: Modelling financial Deepening Equation DLFD by OLS

Variable	Coefficient	T-Value
Constant	0.19110	1.541
DLFD-3	0.44287	0.992
DLy -1	-0.22469	-0.211
DLy-2	-1.89230	-1.805*
DLy-3	-0.64205	-1.020
DLD-1	-0.23033	-1.454
DLD-2	-0.65429	-0.864
DLD-3	1.78160	2.553**
DLD-4	-0.52266	-1.782*
DLPe	0.23147	1.769*
DLPe-1	-0.16145	-0.677
DLPe-2	-0.40334	-1.989*
DLPe-3	-0.12847	-1.068
DLPe-4	-0.00848	-0.061
ECM-1	-0.27646	-2.474**
R ² = 0.87; F(14, 5) = 2.4546 [0.1642] δ = 0.106338; DW = 2.25; RSS = 0.056538343		

NB: * and ** denote significance at 10% and 5% respectively.

Savings Function (Model 2)

As in the case of model 1, the results of the general over-parameterised error-correction model for savings function (not reported here) are difficult to interpret and many variables are not significant. The model is, therefore, reduced until a preferred model is obtained. The results of the preferred model are presented in Table 5.

Table 5. Preferred Model for Savings Function

Variable	Coefficient	T-Value
Constant	0.14443	1.418
DLS/Y-1	0.54819	1.775*
DLS/Y-2	-0.17115	-0.629
DLFD	-0.60193	-1.687
DLFD-1	1.27210	2.038**
(D-pe)-1	0.00034	0.077
DSf/Y	-0.08188	-4.027***
DSf/Y-1	0.06257	1.466
DLy-1	0.75686	1.468
DLDR-1	-2.01930	-1.641
ECM -1	-0.85089	-2.363**
R ² = 0.66; F (10, 13) = 2.514 [0.0610]; δ = 0.170446; DW = 1.91; RSS = 0.3776739		

NB: *, ** and *** denote significance at 10%, 5% and 1% respectively.

4.4 Analysis of Empirical Results

The battery of tests reported for financial deepening and savings equations (not reported here) suggests that the two equations do not suffer from serial correlation, nor are the models miss-specified nor is the choice of functional forms incorrect. The normality of the residuals in the two models are not rejected and, therefore, the reliability of the 't' values are ascertained. The residuals are also confirmed to be homoscedastic. The error-correction terms (ECM1-1 and ECM2-1) in both equations have the correct (negative) sign and are statistically significant. The presence of significant coefficients of error-correction terms indicates a strong feedback effect of the deviation of both the financial depth and savings rate from their long-run growth path. Specifically, 28% and 85% of the discrepancy between the actual and equilibrium values of the financial depth and savings are corrected in each period.

The results for model 1 indicate a strong support for the positive relationship between interest rate liberalisation and financial deepening. The deposit rate in the financial deepening model is positive and statistically significant, as expected. Contrary to the expectation of this study, the empirical results for model 2 reveal that domestic savings in Tanzania are interest inelastic. The coefficient of the real interest rate, though positive, remains statistically insignificant - showing that the interest rate has little or no effect on domestic savings in Tanzania. Likewise, the coefficient of lagged value of savings is not significant, implying that the current domestic saving rate does not depend on the last period's domestic savings. However, the coefficient of the financial depth variable is positive and statistically significant. This shows that the financial deepening which results from interest rate liberalisation has a positive impact on domestic savings in Tanzania. The empirical results also indicate that foreign savings substitute, rather than complement, domestic savings in Tanzania as shown by the negative and statistically significant foreign savings variable in the domestic savings equation. This finding is consistent with other empirical works, such as those of Fry, 1978; 1980; Giovanini, 1985; Bowles, 1987; Khan and Hassan, 1998; and Kendall, 2000, among others. The remaining variables were, however, found to be insignificant in this study.

5. CONCLUSION

This study examines the impact of interest rate liberalisation on financial deepening and domestic savings in Tanzania. The study uses two models to examine this linkage. In the first model, the impact of interest rate liberalisation on financial deepening is estimated by regressing financial depth (proxied by M2/GDP) on real income, nominal interest rate, expected inflation rate and lagged financial depth. In the second model, the impact of financial deepening on domestic savings is estimated by regressing domestic savings on the real rate of interest, financial depth, real GDP, foreign savings and dependency ratio.

The results for the financial deepening model indicate a strong support for the positive relationship between interest rate liberalisation and financial deepening. The deposit rate in the financial deepening model is positive and statistically significant, as expected. The error-correction term also has the correct (negative) sign and is statistically significant. The significant coefficient of error correction term indicates a strong feedback effect of deviation of financial deepening function from its long-run growth path. The error-correc-

tion term ECM1-1 indicates that about 27% of the discrepancy between the actual and equilibrium value of financial depth is corrected in each period.

However, the results for the savings model (model 2) are mixed. Although the empirical results of the study find a distinct positive relationship between financial depth and domestic savings, the results failed to find support for the positive interest rate elasticity of savings in Tanzania. The study, therefore, concludes that although financial liberalisation unambiguously affects financial deepening in Tanzania through its influence on interest rates, its impact on domestic savings takes place through financial deepening rather than through the interest rate.

References

- Arrieta Gerardo M., 1988, "Interest Rates, Savings and growth in LDCs: An Assessment of Recent Empirical Research". *World Development*, Vol. 16, No. 5, pp. 589-605.
- Bandiera O., G. Caprio, P. Honohan and F. Schiantarelli, 1999, "Does Financial Reforms Raise Or Reduce Savings?", *Policy Research Working Paper*, No. 2062, World Bank.
- Bank of Tanzania (Annual Report), Various Issues.
- Bank of Tanzania, (1999) Press Release of 23rd (August).
- Bank of Tanzania, "Economic and Operations Report", Various Issues.
- Bank of Tanzania, *Its Functions and Monetary Policy Instruments*, Dar-es-salaam, May 1997:
- Bowles P., 1987, "Foreign Aid and Domestic Savings in Less Developed Countries Some Tests of Causality", *World Development*, Vol. 16, No. 6, pp. 989-96.
- Cho Yoon and Khatkhate D., 1990, "Financial Liberalisation: Issues and Evidence", *Economic and Political Weekly* (May).
- De-Mello J. and J. Tybout, 1986, "Effects of Financial Liberalisation on Savings and Investment in Uruguay", *Economic Development and Cultural Change*, Vol. 34, No. 3, pp. 561-585.
- English W.B., 1999, "Inflation and Financial Sector Size", *Journal of Monetary Economics*, Vol. 44, pp. 379-400.
- Fry M.J., 1978, "Money and Capital or Financial Deepening in Economic Development", *Journal of Money, Credit and Banking*, Vol. 10, pp. 464-75.
- Fry, M.J., 1980, "Savings, Investment, Growth and the Cost of Financial Repression", *World Development*, Vol. 8, No. 4, pp. 317-27.
- Giovannini A., 1983, "The Interest rate Elasticity of Savings in Developing Countries: Existing Evidence", *World Development*, Vol. 11, No. 7, pp. 601-607.
-

-
- Giovannini A., 1985, "Savings and Real Interest Rate in LDCs", *Journal of Development Economics*, Vol. 18, No. 2-3, pp. 197-217.
- Gupta K.L., 1984, *Finance and Economic Growth in Developing Countries*, Croom Helm Ltd, London.
- Gupta K.L., 1987, "Aggregate Savings, Financial Intermediation and Interest Rates", *Review of Economics and Statistics* (May).
- Hall R.E., 1978, "Stochastic Implications of the Life Cycle-Permanent Income Hypothesis: Theory and Evidence", *Journal of Political Economy*, Vol. 86, pp. 971-987.
- Ikhide S., 1992, "Financial Deepening, Credit Availability and the Efficiency of Investment: Evidence of Selected African Countries", *Development Research Paper Series*, Research Paper No. 2.
- Jappelli T. and M. Pagano, 1989, "Consumption and Capital Market Imperfections: An International Comparison", *American Economic Review*, Vol. 79, pp. 1088-1105.
- Jappelli T. and M. Pagano, 1994, "Savings, Growth and Liquidity Constraints", *Quarterly Journal of Economics*, Vol. 109, pp. 83-109.
- Kendall P., 2000, "Interest Rates, Savings and Economic Growth in Guyana", *Caribbean Development Bank Staff Papers* (August).
- Khan A., L. Hasan and A. Malik, 1994, "Determinants of National Saving Rate in Parkistan", *Economia Internazionale*, Vol. 47 (November), pp. 365-82.
- Khan A. and L. Hasan, 1998, "Financial Liberalisation, Savings and Economic Development in Pakistan", *Economic Development and Cultural Change*, pp. 581-595.
- Lahiri A., 1989, "Dynamics of Asian Savings: The Role of Growth and Age Structure", *IMF Staff Papers*, Vol. 36, pp. 228-261.
- Leite S. and D. Makonnen, 1986, "Savings and Interest Rates in the BCEAO Countries: An Empirical Analysis", *Savings and Development*, Vol. 10, No. 3, pp. 219-131.
- Mahambare V. and V.N. Balasubramanyam, 2000, "Liberalisation and Savings in Developing Countries: The Case of India", Department of Economics Working Papers, Lancaster University, Ref. EC 4/00.
- McKinnon R.I., 1973, *Money and Capital in Economic Development*, The Brookings Institution, Washington D.C.
- Mosley P., 1999, "Micro-Macro Linkages in Financial Markets: The Impact of Financial Liberalisation on Access to Rural Credit in Four African Countries", Finance and Development Research program, Development Initiative, Working Paper No. 4.
- Mwega F.M., S.M. Ngola and N. Mwangi, 1990, "Real Interest Rate and the Mobilisation of Private Savings in Africa, A case of the Kenya", AERC - Research Paper No. II.
- Ndulu B. and H. Mukwanason, 1989, "Inflation and Economic Recovery in Tanzania-Some Empirical Evidence", *UCHUMI* 2 (1).
-

- Newey W.K. and K.D. West, 1987, "A Simple, positive semi-definite, heteroskedasticity and Autocorrelation consistent covariance matrix", *Econometrica*, Vol. 55, pp. 703-8.
- Nyagetera B.M., 1997, "Financial Repression in Tanzania, its Impact on Savings, Investment, Credit and Growth", Unpublished PhD thesis, University of Dar-es-salaam.
- Odhiambo N.M., 2004, "Money demand in Tanzania: A dynamic test of McKinnon's Complementarity Hypothesis", *African Finance Journal*, Vol. 6, part. 1.
- Odhiambo N.M., 2005, "Financial Liberalisation and Financial Deepening: The case of Three sub-Saharan African Countries", *African Review of Money Finance and Banking (Savings and Development Supplement)*.
- Odhiambo N.M., 2007, "The Determinants of Savings in South Africa: An Empirical Investigation", *African Finance Journal*, Vol. 9, part 2, pp. 37-52.
- Odhiambo N.M., 2008, "Interest Rate Reforms, Financial Deepening and Economic Growth: Kenya's Experience", *Journal of Developing Areas (JDA)*, Vol. 42, Part 2 (Forthcoming).
- Ogaki M., J. Ostry and C.M. Reinhart, 1996, "Savings Behaviour in Low and Middle Income Developing Countries: A Comparison", *IMF Staff Papers*, Vol. 43, No. 1, pp. 38-71.
- Ostry J. and C.M. Reinhart, 1992, "Private Savings and Terms of Trade Shocks: Evidence from Developing Countries", *IMF Staff Papers*, Vol. 39 (September), pp. 495-517.
- Oshikoya T.W., 1992, "Interest Rate Liberalisation, Savings, Investment and Growth-The case of Kenya", *Savings and Development*, Vol. 16, pp. 305-320.
- Reichel R., 1991, "The Macroeconomic Impact of Negative Interest Rates in Nigeria: Some Econometric Evidence", *Savings and Development*, Vol. 15, pp. 273-282.
- Shaw E.S., 1973, *Financial Deepening in Economic Development*, New York, Oxford University Press.
- Thornton J., 1990, "The Demand for Money in India: A Test of McKinnon's Complementarity Hypothesis", *Savings and Development*, Vol. 14, No. 2, pp. 153-159.
- Villagomez F.A., 1997, "Private Saving, Interest Rates and Liquidity Constraints in LDCs: Recent Evidence", *Applied Economics*, Vol. 29, pp. 607-615.
- Warman F. and A.P. Thirlwall, 1994, "Interest Rates, Savings, Investment and Growth in Mexico 1960-1990: Test of the Financial Liberalisation Hypothesis", *The Journal of Development Studies*, Vol. 30, No. 3, pp. 629-649.
- Watson P.K., 1992, "Savings, the Rate of Interest and Growth in a Small Open Economy: The Trinidad and Tobago Experience", *Social and Economic Studies*, Vol. 41, No. 4, pp. 1-24.
- Yusuf S. and R.K. Peters, 1984, "Savings Behaviour and Its Implications for Domestic Resource Mobilisation: The case of Republic of Korea", *World Bank Staff Working Paper*, No. 628, Washington DC, The World Bank.
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Résumé

Dans cet article, l'impact des réformes du taux d'intérêt sur l'intensification financière et les épargne est analysé. Les résultats empiriques démontrent qu'il y a un impact positif des reformes des taux d'intérêt sur l'intensification financière an Tanzanie. Cet intensification financière a une influence positive sur l'épargne. Toutefois l'étude ne peut pas démontrer une élasticité directe positive aux taux d'interêt de l'épargne an Tanzanie.