SAVINGS AND INTEREST RATE: THE CASE OF KENYA*

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1. Introduction

The part that the interest rate should play in the economic policies of developing countries is still a hotly debated issue, from both a theoretical and an empirical point of view. Among the reasons for disagreement between the researchers is the fact that the government only controls, if at all, the rate of interest in the formal market. Many economists argue that this official rate does not matter, because it is the informal (or curb) market that determines the relevant (marginal) rate of interest. Fry (1988) and Montiel, Agénor and Haque (1993) have recently provided useful surveys of this issue, while Calvo (1992) has raised sceptically the relatively new issue of its role in fighting inflation. Nevertheless, there is a widespread consensus that interest rates should be liberalized, if only because of their impact on the quality of investment (Collier and Mayer, 1989). However, the debate over the impact of the real interest rate on savings behaviour in developing countries seems to have led many authors to dismiss this link as empirically unimportant. The implication of this view is that interest rate liberalization can only improve the quality of investment, but not much its quantity in the long run. Fry (1988) discusses critically some of the empirical results in this area, and defends the view that there is a positive impact on savings, for the case of various Asian countries.

In the case of Kenya, Mwega, Ngola and Mwangi (1990) and Oshikoya (1992) have tested the impact of the real interest rate on total or private domestic savings, with negative and non significant results. The case of Kenya is particularly important for at least two reasons. First, it is certainly the country with the most developed financial sector in Africa (Grosh, 1990, Killick and Mwega, 1990, Azam and Daubrée, 1995). It is thus the country where *a priori* financial variables should potentially play the most important macroeconomic role in Africa. Hence, it is especially interesting to see what contribution this sector can make to the determination of savings and growth, in order to evaluate the potential for boosting the development of such a financial sector in other African countries. Second, this country adopted a program of financial liberalization, after a prolonged period of financial repression. The real rate of interest on bank deposits became positive in the mid-1980s,

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after having been negative ever since 1971. The real rate of interest is represented below at figure 2, for the period 1967-1990. Hence, we want to know whether such a move has an impact on savings and growth.

The present paper presents econometric equations with the opposite result to those described above, showing a positive and significant impact of the real rate of interest on savings. We argue that the impact of the interest rate on savings cannot be captured unless due account is taken of the role that financial repression plays in shaping the relationship between them. This is probably what the previous studies cited above failed to do. The theoretical discussion of this point is presented in section 2 below, while the econometric results are described in section 3.

2. Financial Repression and the Impact of the Interest Rate on Savings

The main drawback of the previous studies devoted to the link between the interest rate and savings behaviour in Kenya is that they failed to take into account the regime switches entailed by the succession of periods of financial repression and financial liberalization. During the former, the real interest rate paid on deposits is appearently negative, and sometimes very much so. Then, basic principles suggest that the observed rate of interest that banks serve on deposits should not be interpreted at face value, as it is not the only benefit that households derive from holding such bank deposits. Otherwise, they would just have to cash in their deposits and invest in some kind of inflation-proof assets like storable goods to be better off. Hence, bank deposits serve some other purpose, that households view as valuable to such a point that they accept willingly to hold this kind of asset, which pays a negative real rate of interest.

This issue is not foreign to the question of why households hold non interest bearing money, which afterall pays an even more negative rate of interest than bank deposits in times of financial repression. The usual answer to this puzzle by monetary theorists is that money provides some liquidity services, which are in fact an implicit interest on holding them. For example, Levhari and Patinkin (1968) discuss how the implicit flow of income derived from holding cash balances is related to the interest rate on alternative assets. One can imagine various aspects of the implicit interest paid by banks on deposits. For example, holding positive deposits with a bank might be an investment in goodwill by households, if banks provide more easily consumption loans to their usual depositors than to anybody else. Then, holding deposits with the bank may be a way of keeping an entitlement to a loan, and plays the part of some kind of insurance contract. Moreover, banks may provide various other services like legal advice or information gathering on investment opportunities, that they only deliver free of charge to their regular customers.

One may thus assume that the implicit interest paid on deposits plays a more important part in inducing the household to deposit the marginal shilling at the bank when the real rate of interest is negative that when it is positive. In the latter case, households may deposit some money with their bank just because it pays a positive interest, without the other services playing any part at the margin. In other words, one may view the relevant rate of interest as the sum of the explicit interest rate, which is measured by the published rate of interest, and of the implicit rate of interest, which is usually not measured by any number. We assume that the implicit rate is proportionately much more important when the real rate of explicit interest is negative than when it is positive.

Moreover, bank deposits are not the only store of value that households can hold for keeping their wealth. They can hold various physical assets, like storable goods, buildings, granaries, cattle, etc. They can also lend money in the informal market to some entrepreneurs of their relatives, etc. Hence, when analysing the impact of the rate of interest on saving, one should in fact take into account, beside the rate of interest on bank deposits, the rates of return of some other assets that households may hold in their portfolios. For the sake of parsimony, the normal way to get around this problem is to look for some representative rate of return on the entire portfolio held by the household. Unless the asset market is dramatically distorted, we can safely assume that the various rates of return are linked together by the households portfolio behaviour. Hence, in equilibrium, one may assume that the composite rate of interest on deposits described above, comprized of the explicit and the implicit interest, is equal to representative rate of return on the household's entire portfolio. Otherwise, they would either give up completely the holding of deposits, if the composite interest rate was below the representative rate, or put all their capital in bank deposits, in the reverse case.

Hence, the assumption that we are testing below is that (i) savings depend on the representative rate of return on household assets, and (ii) this rate of return is linked to the rate of interest on bank deposits *via* the asset market equilibrium. We can write this more formally as a two-equation model. We first assume that savings S is a function of the real rate of return on the household portfolio r, along with various other arguments like the level of income Y, etc.:

$$S = S\underset{(+)}{(r},\ \underset{(+)}{Y},\dots). \qquad (1)$$

Denote i the real rate of interest on bank deposits, and $\beta(R)$ the implicit rate of interest.

The functional notation $\beta(R)$ is meant to capture the idea that the size of this premium is an increasing function of the degree of financial repression, denoted R. Then, portfolio equilibrium implies:

$$i + \underset{(+)}{\beta(R)} = r. \qquad (2)$$

Hence, by inverting (2), we can write $R = \beta^{-1}(r-i)$, where $\beta^{-1}(\cdot)$ is the inverse function of $\beta(\cdot)$. This corresponds simply to the intuitive idea that the absolute value of a negative real rate of interest is a natural indicator of the intensity of financial repression. In the empirical application performed in section 3 below, we simply assume that $r = 0$. Assuming any constant value for r would essentially yield the same result.

Substituting (2) into (1) yields:

$$S = S(i+\beta(R), Y, \ldots) \qquad (3)$$

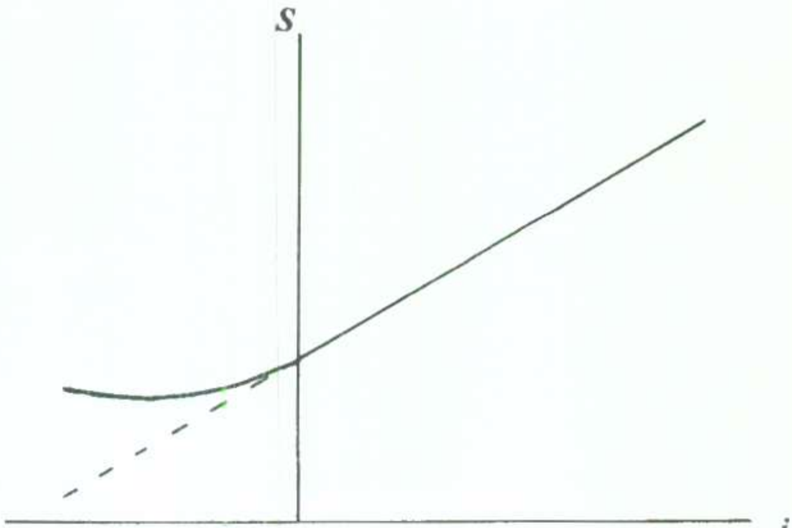

Figure 1: The Non Linear Relationship

Figure 1 represents a simple case of (3), where $\beta(R)$ is constant when $i > 0$, and increasing with R otherwise. The indicator of financial repression R is in turn assumed to be higher, the lower is the rate of interest in the negative quadrant. This diagram captures the essence of the non-linear relationship that we estimate below.

Beside the rate of interest and the level of income, one should also take into account the effect of the windfall gains resulting from external shocks, as argued by Bevan, Collier and Gunning (1991). In most African countries, exports are limited to a small number of primary commodities, sold on very volatile markets. Typically, the world prices of these commodities are fluctuating widely, with occasional positive shocks of a large amplitude. In the case of Kenya, the coffee boom of 1976-79 is the most spectacular example of such an external shock. Bevan, Collier and Gunning (1992) have shown how farmers, among others, have had an extremely large marginal propensity to save windfall income. This proves how agents correctly foresaw the temporary nature of these positive shocks, and adopted the type of consumption-smoothing behaviour that most modern theories of consumption behaviour would predict. In particular, such a behaviour fits very well within a theoretical framework based on the permanent income hypothesis (Bevan, Collier and Gunning, 1992). Consequently, we include the growth rate of the terms of trade as an argument in our estimated savings function below.

3. Econometric Results

We take the national savings rate, *i.e.* the ratio of national savings to national income, as the dependent variable in the econometric equations presented in this section. It is noted S/Y. This is more satisfactory than the domestic savings rate analysed in the papers referred to above, *i.e.* the ratio of domestic saving to GDP. The main difference is that we take international transfers into account, so that national income comes closer to capturing the purchasing power of the households than GDP does.

We denote *gtot* the growth rate of the terms of trade, *gtot(-l)* its lagged value, and i the real rate of interest on deposits. We simply compute the latter by subtracting the *ex post* observed rate of inflation to the rate of interest, instead of trying to compute any type of expected real rate of interest series. In so doing, we accept the risk of introducing some measurement error, which might bias downwards the estimated coefficient. Hence, this potential downward bias reinforces our case, insofar as we find a positive effect of the real rate of interest. Figure 2 represents a plot of the national savings rate and the real rate of interest, with different scales. The savings rate can be read off the left-hand scale, and the real rate of interest off the right-hand scale. The horizontal dotted line corresponds to the zero value of the real rate of interest.

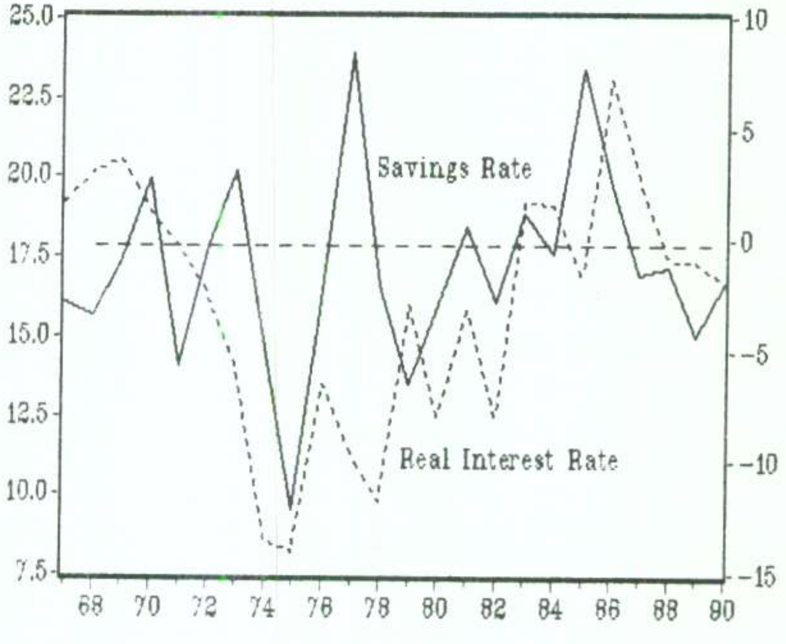

Figure 2: Savings Rate and Real Interest Rate (%)

Lastly, we use an indicator of the degree of financial repression, that is originally due to Roubini and Sala-y-Martin (1992). It is a variable that takes the value 1, when the real rate of interest is positive; it takes the value 2, when the real rate of interest lies between 0 and - 5%, and it takes the value 3, when it falls below - 5%. It is denoted *R*. As will be seen shortly, we can best capture the regime switch analysed at figure 1 by entering the real rate of interest in a non linear way, as the interaction term *iR*.

As a benchmark, let us first analyse the results when the real rate of interest is entered linearly in the equation:

$$S/Y = 13.35 + 0.09\ gtot + 0.12\ gtot(-1) + 3.01\ R + 0.54\ i. \qquad (4)$$
$$(4.90)\ (2.10) \qquad (2.63) \qquad (1.81) \quad (2.22)$$

$N = 24$, $R^2 = 0.42$, $F(5,19) = 3.46$,
$D.W. = 2.14$, $L.M.F(6,18) = 0.13$, $ARCH.F(6,18) = 2.20$,
$WhiteF(9,13) = 2.72$, $ChowF(4,20) = 0.52$.

The numbers in parentheses below the estimated coefficients are the usual *t* ratios. *N* is the number of observations, corresponding to the period 1967-1990. R^2 is the usual coefficient of determination. It is not very high, but quite acceptable for a savings rate equation. *F(5,19)* is the standard *F*-test of equation (4) against the assumption that its four coefficients are jointly zero. *D.W.* is the Durbin and Watson test of serial independence of the residuals. It does not detect any autocorrelation, and this is confirmed by the *L.M.* test, which is the *F*-version of the Lagrange multiplier test. The *ARCH* test is also used to check that no auto-regressive conditional heteroscedasticity is present. *White F(-)* is the White test of homoscedasticity. Lastly, *Chow* is the Chow-forecast test of parameter constancy. As none of these tests signal any econometric problem, we can go on with the economic comments of the results.

As expected, the terms of trade shocks have a positive impact on the savings rate, and we find a short lag polynomial of the first order. More importantly, we find that the two financial variables are significant. The coefficient of the real rate of interest is positive and significant. It implies that an increase in the real rate of interest by 1 percentage point would raise the national savings rate by about half a point. This is not a negligible contribution. It follows that the real rate of interest could play an important role in a policy aiming at reducing foreign indebteness and enhancing growth. The degree of financial repression has a positive impact, given the real rate of interest. In other words, when the real rate of interest becomes largely negative, savers get some compensation by an increase in the implicit rate of interest, so that savings do not fall comformably with the measured real rate. When the real rate is positive, the Roubini-Sala-y-Martin *R* variable is equal to one, and we get a straightforward positive impact of the real rate.

We have managed to improve a little bit on equation (4), by entering the real rate of interest in a non linear way. As a first attempt, we enter an interaction term *iR*. This yields:

$$S/Y = 14.47 + 0.11\ gtot + 0.12\ gtot(-1) + 2.66\ R + 0.19\ iR. \qquad (5)$$
$$(6.80)\ (2.57) \qquad (2.83) \qquad (1.93) \quad (2.48)$$

$N = 24$, $R^2 = 0.45$, $F(5,19) = 3.89$,
$D.W. = 1.92$, $L.M.F(6,18) = 0.02$, $ARCH.F(6,18) = 1.87$,
$WhiteF(9,13) = 2.98$, $ChowF(4,20) = 0.64$.

The presentation of the results follows the same principles as for equation (4). No more econometric problem seems to arise with (5) as it did with (4). The goodness of fit is slightly better with (5), as can be seen from comparing either the R^2s or the $F(-)$s, as the number of variables involved is the same in the two equations. Hence, it seems that the non linear specification of the interest rate effect is marginally better. Notice that it only matters when the rate of interest is negative, as $R = 1$ when the real rate of interest is positive. This result leads to a qualification of the comments made above about the potential of an active interest rate policy. Now, it appears that the impact of a 1 point increase in the real rate, while the rate is already positive, would only increase the national savings rate by 1/5 of a point. However, the impact is potentially more powerful if we start from a position where the real rate is initially negative. This is the typical scenario of a liberalization episode, like the one that took place in Kenya in the mid-1980s.

We have obtained still another slight improvement, by dropping the Roubini-Sala-y-Martin R variable, and entering the real interest rate to the power 3. The reason for this substitution is that $(i)^2$ may be regarded a smoothed version of R when the real rate is negative, within the relevant range, so that $(i)^3$ is related to iR. This is preferable to the stepwise behaviour of the Roubini-Sala-y-Martin R in the range of negative real rates, but implies some undesirable properties for high positive values of i. So, provided we keep in mind that the validity of this equation must be restricted to a range of values of the real rate of interest that excludes high positive values, and this is the realistic range, the best econometric performance is given by:

$$S/Y = \underset{(31.55)}{18.43} + \underset{(2.14)}{0.08}\, gtot + \underset{(2.70)}{0.11}\, gtot(-1) + \underset{(2.70)}{0.0017}\, (i)^3. \qquad (6)$$

$N = 24$, $R^2 = 0.46$, $F(4,20) = 5.64$,
$D.W. = 1.88$, $L.M.F(6,18) = 0.02$, $ARCH.F(6,18) = 1.52$,
$WhiteF(9,13) = 0.98$, $ChowF(4,20) = 0.54$.

This equation has a better fit than (5), and is more parsimonious. It does not raise any econometric problem. What it implies for the interpretation of the interest rate policy pursued in Kenya over our period of analysis can be best analysed with the help of figure 3. It represents the contribution of the real rate of interest to the national savings rate that can be derived from equation (6), defined as 0.0017 $(i)^3$. Hence, we observe that the interest rate made only a positive contribution to the savings rate in 1986, when it had a high real value. On the other hand, we can clearly see the cost of the financial repression policy, which was pursued between 1972 and 1983. For example, the savings rate would have been about 5 points higher in 1975 had the real rate of interest been simply zero instead of being as negative as it was, below - 10%.

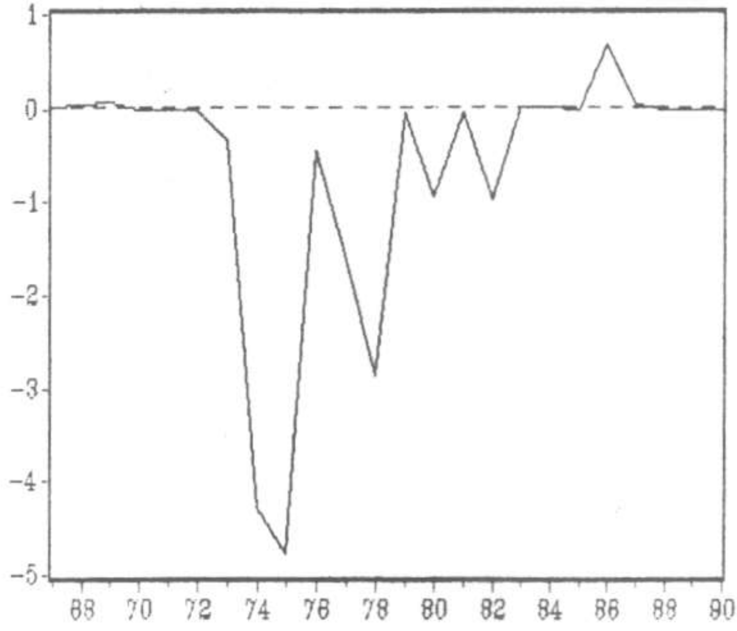

Figure 3: Contribution of $(i)^3$ to the Savings Rate

4. Conclusion

In this short paper, we have brought out a significant positive relationship between the real rate of interest and the national savings rate in Kenya. In order to do this, we had to control for external shocks, on the one hand, and for financial repression, on the other hand. The degree of financial repression can either be represented by the proxy used by Roubini and Sala-y-Martin, or by the square of the real interest rate, when the latter is negative. This is in fact marginally a better solution, which provides the best fit and the most parsimonious equation of the three equations presented.

The most striking implication of this result is that the financial repression policy that was pursued consistently between 1972 and 1983, with some relapse afterwords, had a sizeable cost. According to our estimate, this cost in terms of foregone savings could have been as high as about 5% of GNP in 1975, the worst year in this respect. Applying some kind of standard Harrod-Domar formula, with a capital-output ratio calibrated at 2.5, such a figure implies that the growth rate could have been about 2 percentage points higher that year had the interest rate simply been zero.

However, we have emphasized that our results should not be pushed too far, and could not be used to simulate the type of savings rate that could be reached by raising real interest rates sky high. Within the whole sample, we only had one point when the real interest rate was above 5%, so that nothing should be inferred for rates at or above this level. Nevertheless, this exercise was worthwhile as an indication of the cost of financial repression in terms of savings and growth foregone in Kenya in the 1970s and 1980s.

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Abstract

This paper presents an empirical savings function for Kenya with a significant positive impact of the real interest rate, after controlling for terms of trade effects and the effect of financial repression on the functional form of this equation. Previous studies failed to find this impact because they did not pay due attention to this latter effect. The theoretical underpinnings of this model stress the role of the implicit interest that banks have to pay on deposits when the (explicit) real interest rate is negative. This explains why deposits do not fall to zero in such a case. The model shows that the savings rate in Kenya could have been much higher than it was in the 1970s, had the real interest rate been simply zero instead of being negative.

ÉPARGNE ET TAUX D'INTÉRÊT: LE CAS DU KENYA

Résumé

Cet article présente une fonction d'épargne estimée économétriquement pour le Kenya, avec un effet positif et significatif du taux d'intérêt réel, après avoir contrôlé pour l'influence des termes de l'échange et pour l'impact de la répression financière sur la forme fonctionnelle de cette équation. Les études précédentes n'ont pas saisi cet effet parce qu'elles n'ont pas pris cet impact en compte. Les fondements théoriques de ce modèle soulignent le rôle du taux d'intèrêt implicite que les banques doivent payer sur les dépots quand le taux d'intérêt réel (explicite) est négatif. Ceci explique pourquoi les dépots ne tombent pas à zéro dans un tel cas. Le modèle montre que le taux d'épargne au Kenya aurait pu être beaucoup plus élevé dans les années 1970 si le taux d'intérêt réel avait été nul au lieu d'être négatif.