

Private Savings Behaviour in Lesotho: An Application of Autoregressive Distributed Lag (ARDL) Model

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INTRODUCTION

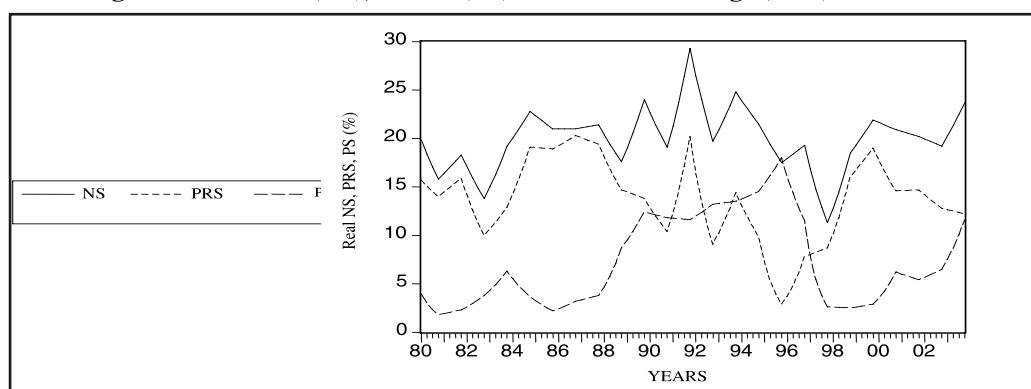
In traditional economic theory, the rate of saving has received some remarkable attention. This is due to inevitable role that savings play on private capital formation and their subsequent impact on economic growth. Several authors in the savings-investment-growth literature have argued that most significant factor behind the country's economic development is its level of savings, (Edwards, 1985; Agrawal, 2001; Deaton, 1989; Tsakatolos et.al, 1994 and Loayza et.al, 1998). Despite this argument, the last few decades have seen a decline in the rate of savings in many industrialized and developing countries. The decline has resulted in the reemergence of the empirical work in the long-run determinants of private savings in both the developed and developing nations and such determinants are becoming increasingly pertinent to the economic policy. Despite the significant role played by savings in promoting economic growth and development, in most developing countries, savings do not match the required levels of investment. Consequently, this significantly impacts the economic growth performance of these countries and thereby trapping them in an inescapable poverty trap. The Two-Gap model also argues that most developing countries are constrained by lack of savings and foreign exchange reserves which could be utilized to import capital goods for investment, hence resulting in economic growth.¹

AN OVERVIEW OF SAVINGS BEHAVIOUR IN LESOTHO (1980-2004)

In Lesotho, despite the government's thirst for sustainable economic growth and poverty alleviation, the level of national savings have shown considerable decline from 1980 to 1983, though with some significant fluctuations from year to year (see the solid line in Figure 1). National saving fell from 21.4% of total gross domestic product to 13.8% during the same period after which it began to exhibit the rising trend until the last quarter of 1985. In the period after 1985, national savings began to fluctuate dramatically till 1997 (the last quarter). In 1998, gross national savings reached its trough, hovering around 13% after which it began to show a transitory increase till the third quarter of 1999.

In the period 2000-2002, national savings showed the declining trend after which it rose steadily. During the 1980s, private savings were following more or less the same pattern as national savings while public savings were as exhibiting a rising but fluctuating trend till 1990. In the early 1990s, more so in the last quarter of 1991, private savings shot up to 20% of total GDP and the government savings were still steadily increasing. During the same

Figure 1: National (NS), Public (PS) and Private Savings (PRS) in Lesotho



Source: Central Bank of Lesotho Report 2004.

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¹Empirical literature on savings shows that such a constraint could be addressed through international or domestic funds. But, borrowing from abroad may not only threaten the stance of the balance of payments of a country, since such loans have to be serviced in the future, but also is a carrier of foreign exchange risk.

period, private savings were declining until it reached its trough in the third quarter of 1996 while government savings reached its peak at around 17% of total GDP. From 1996 to 2003, these components of the total national savings moved in totally opposite directions thereby showing the existence of the Ricardian Equivalence where, when private savings fall dramatically, public savings steadily increase. The income and outlay account of CBL also demonstrates that private savings declined from 19% of total GNI to 12% in the period 2000-2004.

Given that savings play an important role in enhancing capital accumulation and stimulating economic growth, it is imperative to examine factors that determine the level of private savings in an economy. Since Lesotho is a developing country, there exists the disparity between savings and investment. However, the investment- savings gap narrowed down in 2004. Gross national savings as a percentage of GNI was estimated to hover around 22.3% while investment was projected at 23.2%. This macro economic performance scenario was as a result of a decline in private savings rates which can be witnessed from the above graph. The low levels of national savings (despite the government savings accumulations as a result of SACU revenue wind falls) were a result of private savings. Private savings commands a lion's share in the size of domestic saving.

There arose the need to decrease the dearth of knowledge regarding the important factors that impact savings in Lesotho with more emphasis on private savings. This is because private savings are the largest component of the total domestic savings. Moreover, the study is a reconsideration, which means some earlier studies did not do enough justice to analyze the topic of savings in this country.

On the other hand, some studies were solely concerned with aggregate savings, household savings, and financial savings (Foulo, 1998; Chakela, 1994; Braimoh, 2003) without giving enough vents to private savings. Therefore, the objective of the paper is to evaluate the private savings behaviour and to estimate elasticities of the determinants of private savings in Lesotho. The study estimates a dynamic model and endeavors to fill this gap regarding the methodology and was conducted to compliment some previous studies on savings, particularly in Lesotho.

REVIEW OF LITERATURE

In an evolving literature on savings, several economists have put forward some theories as their basis for analysis. The most prominent theories in recent several years have been the Friedman Income Hypothesis and Ando-Modigliani Life Cycle Hypothesis. The former theory makes some differentiation between permanent and transitory components of income and views them as important determinants of savings. Friedman (1957) defined permanent income in terms of the long time income expectation over a planning horizon and transitory income as the difference between the permanent income and the actual/current income. For empirical favour, Gupta (1971) endeavored to refute or confirm this hypothesis.

Keynesian theory of consumption and income, on the other hand, links the issue of savings to income distribution by emphatically postulating that current or actual income plays a significant role in the determination of private savings. The Keynesian hypothesis of current income posits that current savings rise with an increase in income in the same interval of time. The Keynesians postulated that current savings levels depend on current income.

Ando and Modigliani life cycle hypothesis takes another stage in savings literature. According to this theory, individual people spread their life time consumption over their lives by accumulating savings during earning years and maintaining their levels during their lifetime. This model is constructed on the basis of consumption/savings behaviour of a representative agent who is assumed to maximize his or her utility subject to a constraint. His or her constraint is the current net worth plus the present value of working labour income over the remaining life of an agent which should equal the present value of his total consumption.

On the other hand, the impact of real interest rate on savings rate is very crucial, particularly in the mobilization of domestic or household savings to promote growth and hence development. According to Mackinnon and Shaw (1973) hypothesis, an increase in the level of real interest rate in developing countries will raise savings and eventually spark an increase in the supply of credit to potential domestic borrowers, and subsequently lead to speedy economic growth rates.

Another relevant variable is the financial market development which is proxied by the degree of monetization of the economy. This monetization is money plus quasi-money represented by M2/GDP ratio. This variable has been placed at the forefront of the theoretical literature by theorists by arguing that since it captures the degree of financial intermediation in the economy, it must be relevant as the theoretical determinant of private savings. This measure of financial sector development seems relevant for developing countries which have undergone and are still undergoing the liberalization process (Ozcan et.al, 2003).

The variables that capture the effects of uncertainty about the future bear much on savings rates primarily via their

impact on precautionary motive for savings. Macroeconomic uncertainty, usually proxied by the variability of inflation is expected to positively impact on savings as people in such an environment would try to hedge risk by saving. More over, credit conditions also affect saving by promoting or inhibiting household's access to borrowing and thus can create a forced saving effect. Total domestic credit to the private sector can be used to capture the impact of the credit conditions in any economy.²

On the other hand, the Keynesian model suggests that higher savings will result in a transitory reduction in public savings. Another view is the Ricardian Equivalence argues that an increase in government savings will result in no effect on national savings as it would be met by an equal offsetting decline in private savings. The term "Ricardian Equivalence" refers to the full offsetting of the change in public savings by a change in private savings of equal magnitude.

On theoretical grounds, saving rates generally possess the feature of sluggishness; that is they are serially correlated, even after controlling the other factors. Hence, lagged private saving rate is included as a potential determinant of private savings in any given year, which implies that factors that affect saving rates have long term impact on short term ones.

For the economy to achieve a vibrant, satisfactory macroeconomic performance; various prudential and potential economic policies should be embarked on. The economy can follow the strategy of mobilizing saving funds. Modern theories of economic growth demonstrate that an increase in the level of savings can be regarded as a vehicle through which a fragile and stagnant economy can be engineered into one with sustained economic growth, (Chenery and Strout, 1966). A transition into a sustained economic growth as stated and demonstrated by Rostow (1956) dictates that for the realization of this goal, an increase in the rate of capital accumulation should double from its original level.

Dayal-Ghulati and Thimann (1997) embarked on the study on private savings in Southeast Asia and Latin America. They used panel data estimation to establish the relationship between private savings rates and a number of policy variables. They found that Fiscal policy influence private savings and macroeconomic stability produced by the variation in the inflation rate and financial deepening proxied by the ratio of money and quasi-money M2 to GNP (M2/GNP) do impact on private savings.

Subsistence-Consumption theories suggest that countries with higher levels of income tend to register higher savings rates and empirical evidence supports this conclusion (Edwards, 1996, Dayal-Ghulati and Thimann, 1997, and Loayza et.al, 1999). Collins (2000) also found that income growth would increase savings rate.

McKinnon (1973) and Shaw (1973) analyzed the impact of interest rates in developing countries and found that increases in interest rates were responsible for triggering higher levels of savings. Oshikoya (1992) also undertook the study in Kenya in relation to savings and interest rates and found that positive real deposits rates sparked an increase in interest rates, increased real rates, raise the level of capital formation and increased real deposit rates to promote economic growth.

Moreover, Oshikoya formulated the model of savings which was a function of gross domestic savings, economic growth, real deposit rates, and foreign savings and lagged saving rate. The estimated model indicated that increases in real deposit rates raise the saving rate while economic growth rate on savings in Kenya was significant in determining the level of savings. McKinnon (1973) and Shaw (1973) deemed low interests rates as a brake against increased savings and the level of investment.

Warman and Thirlwall (1994) investigated the impact of interest rates on savings in Mexico using the data spanning the period 1960-1990 and found that even though interest rates affect financial savings positively, its impact on private savings was insignificant. Nonetheless, saving was seen to be responding positively to private savings by Uchendu (1992) who carried the study on Nigerian economy. He further found that interest rate-induced saving was used in a consequential manner to promote mobilization of financial savings in Nigeria.

Mundel (1963), however found that equilibrium interest rate is determined in the same way as in the IS-LM analysis, in which case savings is equal to investment along the IS curve and the steepness of the IS curve demonstrates that an increase in the interest rate lowers investment and hence savings. To the contrary, Giovannini (1983) estimated the model on savings and found that interest rate has no influence on savings for seven Asian countries in the interval 1960-1970.

The nature of savings was also investigated by Morande (1998) in Chile who was motivated by the seemingly significant and sustained increase in domestic savings figures around 24 per cent of Gross Domestic Product. The paper empirically assessed the reasons underlying such notable behaviour in the context of cointegration

²McKinnon and Shaw (1973) and World Bank.

framework to find out the long run relationship between variables and error-correction modeling to verify short-run adjustments. Morande found that economic growth and the dummy reflecting the pension funds positively affect private savings. Demographic variables such as urbanization ratio and dependency ratio are also other factors that determine the level of private savings. Adams (1971) found that dependency ratio statistically and significantly affects aggregate private savings.

METHODOLOGY

The data used in this study is the secondary time series data that covers a 23-year period (96 quarterly observations) starting from 1980-I to 2003-IV. It was obtained from the publications of the Bureau of Statistics and Central Bank of Lesotho. The series for M2 and Credit to the private sector are available quarterly, while the rest of the variables are published annually. Therefore, simple interpolation was used to obtain quarterly observations.

ECONOMETRIC METHODOLOGY

Given the empirical evidence on the determinants of private savings and the basic features of the Lesotho economy, the long-run and short-run determinants of private savings in Lesotho are modeled using the dynamic Autoregressive Distributed Lag (ARDL) Modeling³ approach popularized by Pesaran and Pesaran (1997), Pesaran and Smith (1998), Pesaran and Shin (1999). Therefore, the ADRL model for the long-run determinants of private savings is specified as:

$$PRS_t = \sum_{i=1}^p \alpha_i PRS_{t-i} + \sum_{i=0}^n \beta_i' X_{t-i} + \varepsilon_t \quad \dots (1)$$

where PRS_t denotes the aggregate private savings, ε_t is a scalar zero mean error term and x_t is a k -dimensional column vector of explanatory variables which include Real Credit as percentage of GDP (CR/GDP) extended to the private sector, Real Interest Rates (RIR), Public Savings (PSc), Inflation Rate (INFs), Real GDP per capita (RGDP), Degree of Monetization (DM_t), and Economic Growth (ECG). Typically, the constant term is included in the model, and the coefficients α_i are scalars while β_i' is a row vector of scalar co-efficients (both α_i & β_i define the long-run multipliers). The model is succinctly expressed in Lag operator as:

$$\alpha(L)PRS_t = \beta'(L)X_t + \varepsilon_t \quad \dots (2)$$

In order to integrate the short-run dynamics with the long-run equilibrium without losing long-run information, the Error Correction Model (ECM) of the ARDL model was used and this is specified as:

$$\Delta PRS_t = \psi_0 + \sum_{i=1}^p \psi_i \Delta PRS_{t-i} + \sum_{i=0}^n \lambda_i' \Delta X_{t-i} + \phi ec_{t-1} \quad \dots (3)$$

where all variables are as previously defined and ψ_i is and λ_i are the short-run dynamic co-efficients of the model's convergence to equilibrium and ϕ is the speed of adjustment. In both model (1) and (3), selecting the order of ARDL (p, n) in order to arrive at the parsimonious ARDL model was very important and was done using the Akaike information criteria (AIC).

THE VARIABLES AND SOME APRIORI EXPECTATIONS

The variables included in the model draw heavily from the empirical literature on savings and peculiar features of the Lesotho economy. These variables are considered one at a time with their expected impact of the dependent variable.

- Private Savings (PRS_t) which is the dependent variable is defined as the ratio of household plus corporate savings to Gross National Disposable Income (GNDI) and its lagged value is included in the model to provide for inertia behaviour of savings. Literature shows that savings generally contain inertia which implies that factors that determine savings rates will have larger long-term impacts than short-term ones. Thus, passed values of savings are expected to have positive relationship with the current values.
- Degree of Monetization (DM_t) of the economy which is used as a proxy for financial intermediation is proxied by the ratio of broad money supply (M2) to Gross Domestic Product (GDP). This is used to capture the degree of financial sector development. Dayal-Ghulati and Thimann (1997) conclude that if the sign of the coefficient of this variable is positive, it shows that financial market developments have positive net effects on savings.

³The advantages of ARDL model is that it can be applied irrespective of whether the variables are integrated of different orders (i.e. I (0), or I (1)), it introduces sufficient number of lags to capture the data generating process in a general to specific modeling framework and a dynamic Error Correction Model (ECM) can be derived from ADRL through a simple transformation, (Banerjee et al. 1993). For the other advantages of ARDL approach to modeling, see Pesaran and Pesaran (1997), Laurenceson and Chai, (2003).

- Credit to the private sector as percentage of total real GDP (CR/GDP). This is used to indicate the access of consumers to domestic borrowing or as an approximate measure of liquidity constraint. It refers to financial resources provided to the private sector such as loans, purchase of non-equity securities, and trade credit and other receivables that establish a claim for payment. This is expected to have a negative sign.
- Real Interest Rate (RIR). It captures the effects of financial reform and deepening. It is measured as the difference between one year “time deposit rate” and the expected rate of inflation. The theoretical literature is ambiguous about the effect of a change in interest rates on savings because the income and substitution effects of such a change work in opposite directions.
- Inflation rate (INFs). It shows the volatility of macroeconomic variables in any economy. Due to precautionary motive for saving, inflation rate is expected to affect private savings positively.
- Government Savings (PS). Fiscal policy can potentially affect private savings through revenue policy (say, tax structure), expenditure policy (say, income redistribution), or the extent of public savings. The rationale is to find the extent to which private sector in Lesotho internalize the government budget constraint and hence the extent to which an increase in public savings is offset by an increase in private savings. This is expressed as a ratio of public savings to GDP. The coefficient of this variable is expected to be negative.
- Log of real GDP per capita (RGDP). It is measured in constant 1995 prices as a proxy for the household income level. However, the impact of income on private savings is inconclusive. This is due to the conflicting Permanent Income theory and the Intertemporal Optimizing model of the life cycle. The former predicts that higher income and economic growth reduce private savings because forward looking agents, who expect their permanent income to rise, will dissave against the future. In contrast, the latter suggests that individuals save mainly to smooth their consumption path over time in accordance with their anticipated lifetime income. Therefore, it is left to empirical analysis to determine the exact sign for this variable in Lesotho.
- Growth of Real GDP (ECG) is used as a proxy for economic growth. Economic growth is expected to impact positively on private savings.

EMPIRICAL RESULTS

In pursuant of the objectives of this paper, this section outlines various methods of empirically analyzing the private savings rate behaviour in Lesotho. This is in a form of simple descriptive statistics, viz., tables and graphs where necessary. These simple statistics act as a signpost for further robust analysis, where recent and popularly used econometric techniques are employed. The empirical investigation begins with the analysis of the time series properties.

UNIT ROOT TESTING (TESTING FOR ORDER OF INTEGRATION)

The first step in evaluating the theoretical propositions as stated above is to determine the order of integration of respective variables. Empirical analysis using time series data requires that each variable be stationary at the level in order to reduce spurious results that are likely to arise when variables of interest are nonstationary. Therefore, testing for the order of integration becomes crucial in modeling private savings behaviour in Lesotho. Order of integration refers to the number of times a variable needs to be differenced in order to attain stationarity. For example, if a time series has to be differenced once, for it to be stationary, then it is said to have a unit root, that it is integrated of order one and is denoted as $I(1)$.

Generally, a non-stationary time series is integrated of order “k” if it has to be differenced k times before it becomes stationary. Any variable that has one or more unit roots is nonstationary at its level, whereas if it does not need to be differenced for it to be stationary, it is said to be integrated of order zero and is denoted as $I(0)$. Differencing variables may result in the loss of potentially long run information but estimating the general to specific model aims at minimizing the possibility of spurious relations while retaining the long run information.

In an attempt to examine the properties of the relevant time series, the popularly used unit root tests such as the Augmented Dickey-Fuller (ADF) (Dickey and Fuller, 1979) and Phillips-Perron (Phillips-Perron, 1988) are used to determine the presence of unit roots. The ADF and PP tests use a null hypothesis of a unit root with the alternative being trend stationary. For the ADF test, lag length is chosen on the basis of either the Akaike information criterion or Schwartz information criterion.

The private savings and its determinants reveal that they are not stationary at their levels but to analyze them meaningfully, robust econometric techniques are applied to ascertain their orders of integration. Therefore, the estimation process starts by examining the time series properties of the data using both the Augmented Dickey-Fuller (ADF) and Phillips-Perron tests. Table 1 show the order of integration of the variables in their differenced

form and on the basis of both ADF and PP tests we conclude that all variables are integrated of the same order, that is order one in their level forms. These tests were implemented with intercept and trend in order to remove serial correlation that might rear its head.

UNIT ROOT TEST RESULTS

Table 1 : Forms At Which The Series Are Stationary First Differences of the Variables

<i>Variable</i>	<i>Unit Root</i>	<i>ADF</i>	<i>PP</i>
Δ CRDP	$I(0)$	-4.98	-5.17
Δ GRGDP	$I(0)$	-7.16	-10.24
Δ INF	$I(0)$	-4.47	-4.56
Δ INTRR	$I(0)$	-7.92	-11.25
Δ LOGRGDPP	$I(0)$	-3.57*	-3.66
Δ M2	$I(0)$	-6.38	-7.93
Δ PRS	$I(0)$	-4.87	-4.88
Δ PS	$I(0)$	-2.98	-3.22

* Significant at 5% and 10% significance levels.

However, when the variables were differenced, they were found to be stationary. This means that if they become stationary after being differenced once, then they are non-stationary at their levels. The presence or absence of unit roots helps to identify some features of the underlying data generating process of a series. If a series has no unit roots, it is characterized as stationary and therefore exhibits mean reversion in that it fluctuates around a constant long run mean. Also, the absence of unit roots implies that the series has a finite variance which does not depend on time (This point is crucial for economic forecasting and that the effects of shocks dissipate over time).

COINTEGRATION RESULTS

The concept of cointegration is associated with the long-run equilibrium between two or more variables. The economic interpretation of cointegration is that if two or more variables are linked together to form an equilibrium relationship spanning the long run, even though the series themselves in the short run may deviate from the equilibrium, they will move closer together in the long run equilibrium (Harris and Sollis 2003, p.34). A non-stationary variable might have a long run relationship with other non-stationary variables and this does not create a spurious regression if the deviation of this long run relationship is stationary. It implies that these variables are cointegrated.

Among the myriad methods of cointegration analysis, the most widely used cointegration test is the Residual-based Engle-Granger (1987) test because of its simplicity. This test consists of a two-step procedure. In the first step, the residual error is tested for stationarity. Variables Y and X might individually be non-stationary but if the estimate of their residual error is stationary, Y and X are said to be cointegrated. It implies that Y and X form a long run relationship and the regression is not spurious. Engle and Granger (1987) have shown that any cointegrated series has an error correction representation. Therefore, if the residual error of the estimation in the first step is stationary, the error correction model can be estimated. In the second step, the error correction model is estimated, which represents the short run dynamics of the model. Thus, this two-step procedure covers both long run and the short run adjustment process.

It should be noted, however, that this procedure requires the variables to be of the same order of integration and it crushes if there are structural break in the data. Finally, after estimating the derived parsimonious model, it shall be passed through various diagnostics such as Stability test, Serial Correlation test, Functional form, Normality test and Heteroscedasticity. The concept of cointegration mimics the existence of long run relationship between the dependent variable and a myriad of its explanatory variables. As noted earlier, the method used to test for the existence of the long run relationship between variables of interest is a two-step Engle-Granger cointegration test. The generated residuals from the static model were tested for the unit roots and it was found that it is integrated of order zero. Therefore, on the basis of that the conclusion is that there is the existence of the long run equilibrium relationship between private saving and its determinants (Gujarati, 1995). Moreover, considering the Durbin-Watson statistic which is greater than the respective coefficient of determination, the existence of cointegrating vector is reinforced.

Even though all variables become stationary at first, differences when testing for unit root, in which case we can conclude that they are cointegrated. Since all of the determinants of private saving were found to be integrated of the same order, that is, integrated of order one in their levels, then they are said to be cointegrated of order one denoted as CI (1, 1). Moreover, the variables are cointegrated which means that their linear combination yields a stationary process. So regressing them in their levels will not result in regressions that will not make much economic sense.

RESULTS FOR THE LONG-RUN ARDL MODEL

Regressing the difference term avoids the problem of non-stationary stochastic trend and the respective related problems of variables having unit roots. However, solving the problem brought about by the non-stationary variables is normally assumed and taken to result in a loss of long run valuable information between dependent variable and each of the explanatory variables that is given in its level form. Hence it makes great economic sense to regress variables in their level forms as long as they have the long run equilibrium relationship.

Table 2: The Long-run Determinants of Private Savings: ARDL Model
(Dependent Variable: PRS_t , Method of estimation: OLS, Sample: 1980: I-2004: IV)

Variable	Coefficient	Standard Error	t-Statistic	P-Value
C	-17.089	23.35199	-0.731	0.470
PRS_{t-1}	1.391	0.080	17.300	0.000*
PRS_{t-2}	-0.585	0.081	-7.149	0.000*
PS_t	-0.364	0.185	-1.964	0.053***
PS_{t-1}	0.560	0.313	1.786	0.078***
PS_{t-2}	-0.308	0.191	-1.617	0.109
CR/GDP_t	0.193	0.087	2.224	0.029**
CR/GDP_{t-1}	-0.222	0.084	-2.648	0.010**
$RGDP_t$	-0.086	0.039	-2.205	0.031**
$RGDP_{t-1}$	0.052	0.038	1.393	0.168
INF_t	0.550	0.125	4.415	0.000*
INF_{t-1}	-0.895	0.217	-4.125	0.000*
INF_{t-2}	0.386	0.129	2.994	0.004*
RIR_t	-0.109	0.036	-2.997	0.004*
$RGDPP_t$	53.660	24.794	2.164	0.034*
$RGDPP_{t-1}$	-47.213	23.869	-1.978	0.052***
DM_t	0.080	0.088	0.909	0.366
DM_{t-1}	-0.096	0.088	-1.100	0.275
$R^2 = 0.974$				
Adj- $R^2 = 0.969$				
DW= 2.0190				
Note: *, ** and *** indicate 1%, 5% and 10% level Significance respectively				

The long run statistics from Table 2 reveal that inflation and the lagged values of the private savings are highly significant in explaining the movements in private savings. Other variables that feature as the most important determinants of private savings include credit to the private sector as the ratio of real gross domestic product (Real GDP), public saving as the ratio of real GDP, growth rate of real GDP, real interest rate (time deposits adjusted for inflation), Log of Real GDP per capita while the ratio of money supply to real GDP is insignificant in accounting for the movements in the levels of private savings.

In the long run, our estimates find that inflation has a positive and significant (relatively high) impact on the long run private saving rates. This confirms the result in Reis et al (1998)⁴ and suggests that effect of inflation in

⁴ Loayza, Schmidt-Hebbel and Servén (2000) also found that a rise in inflation has a positive impact on saving

stimulating precautionary demand for saving exceeds that of any impact it may have on the real return of financial assets due to imperfect indexation. It should be noted that the positive impact of inflation on (precautionary) saving does not imply that stabilization is detrimental to savings, since positive impact of macroeconomic stability would be felt indirectly through other channels and variables such as growth and financial market development.

Although statistically insignificant, the ratio of broad money supply to real GDP (M2/RGDP) is found to have a positive impact on private savings in the long run. This implies that financial deepening contributed to raise the long run private saving rate in Lesotho, as it did in other countries according to international literature. On the other hand, the coefficient on government saving rate is significantly negative but less than one in absolute value, thus refuting the holding of the Ricardian Equivalence in Lesotho. Specifically, the private sector reduces its long run saving rate by 36 percentage points for each percentage point increase in the public saving ratio.

The coefficient of income as proxied by log of real GDP per capita is positive and statistically significant at 5 % level, while the one-period lag by a quarter exerts a negative relationship. This means that in a given year, a 1 % point increase in income will lead to approximately 54 % increase in private savings rate, while in the long run, a 1 % increase in the last quarter of a given year will decrease the long run private saving rate by 47 % points. The long run positive impact of income confirms the Permanent Income Hypothesis which postulates that for countries in the initial stage of development, the level of income is an important determinant of the capacity to save. In this respect, the results are consistent with the cross-country results of Modigliani, Loayza *et al.*

On the other hand, the rate of economic growth is negatively related to private saving rate in a steady state, that is, in the long run, the 100% increase in the rate of economic growth leads to a decline of about 8.55 % in private savings. This again confirms that the Permanent Income Hypothesis of Milton Friedman holds in Lesotho. However, just like the income level, a one-period lag quarterly effect of economic growth on the rate of private saving is negative, implying that a 1 % increase in the rate of economic growth in the third quarter leads to about 5.24 % decline in private saving rate in the next quarter. The long run coefficient of credit to the private sector is significantly positive implying that in the long run, credit to the private sector stimulates private saving rate. This means that in an environment where the liquidity constraint is relaxed, people as well as business enterprises will be induced to save more, but the lagged effect of private sector credit is negatively related to the private savings rate implying that the current year's private saving rate is affected negatively by private sector credit. This means that in such an environment, relaxing the liquidity constraint will induce people not to save because they know that whenever they need to meet their daily needs, the banks are willing to lend those funds readily and may be at a low cost of borrowing.

Finally, in the long run, coefficient of interest rate is negative and statistically significant at 5 % level. An increase in the real rate of interest tends to decrease the private saving rate in the long run. Saving rate could decline as result of interest rate increase because one of the primary methods of saving is ownership. When interest rates increase, home loans become more expensive, also, uncertainty about the direction of cash rate changes could affect investment decisions. The negative impact of real interest rate on the private saving rate suggests that the income effects outweigh the sum of the substitution effect. While such a long run negative impact could be justified theoretically, the absence of a significant positive effect, even in the short run, is difficult to rationalize. In the case of many countries, savings may have become more responsive to foreign rather than domestic interest rates given the closer linkages of international capital markets.

RESULTS FOR THE SHORT-RUN ARDL MODEL

The short run dynamics of the model are shown in Table 3. The coefficient of $DCRDP/RGDP1$ is not statistically significant while the coefficient if $CRDP/RGDP$ is

Table 3: The Short-run Determinants of Private Savings: ARDL model
(Dependent Variable: PRS_t , Method of estimation: OLS, Sample: 1980: I-2004: IV)

Variable	Coefficient	Standard Error	t-Statistic	P-Value
C	-0.024	0.122	-0.197	0.845
PRS_{t-1}	0.749	0.107	7.019	0.000*
PRS_{t-2}	-0.154	0.105	-1.463	0.148
PS_t	-0.613	0.217	-2.822	0.006**

PS_{t-1}	0.446	0.265	1.684	0.096 ^{***}
PS_{t-2}	-0.173	0.198	-0.876	0.384
CR/GDP_t	-0.075	0.044	-1.700	0.094 ^{***}
CR/GDP_{t-1}	0.002	0.039	0.052	0.959
$RGDP_t$	105.143	41.390	2.540	0.013
$RGDP_{t-1}$	-82.943	41.553	-1.996	0.050 ^{**}
INF_t	0.413	0.136	3.044	0.003 [*]
INF_{t-1}	-0.404	0.173	-2.339	0.022 ^{**}
INF_{t-2}	0.072	0.139	0.514	0.609
RIR_t	-0.103	0.049	-2.115	0.038 ^{**}
$RGDPP_t$	0.216	0.116	1.872	0.065 ^{***}
$RGDPP_{t-1}$	-0.137	0.115	-1.193	0.237
DM_t	0.108	0.104	1.032	0.305
DM_{t-1}	-0.104	0.106	-0.977	0.332
$R^2 = 0.651$				
Adj- $R^2 = 0.562$				
DW = 2.16				
Note: *, ** and *** indicate 1%, 5% and 10% level of Significance respectively				

Statistically significant at 5 % level. This implies that although there is no statistically significant short run impact of credit to the private sector, an increase in credit to the private sector is associated with an increase in the private sector saving rate in the long run. However, the coefficient of $DCRDP/RGDP$ is statistically significant at 10 % level and implies that the short run credit to the private sector has a significant impact on the private saving rate. Similarly, all other variables have the signs that are depicted even in the long run and hence play a significant role as determinants of private saving rate. However, $DPS2$, $DINF2$, $DGRGDPI$, $DM2/RGDP$ cannot be relied on in the short run as the determinants of private saving rate.

The coefficient of error correction term, if found to be small in magnitude, is statistically significant. It has the correct sign and thus confirms the existence of the long run relationship between variables of interest. The coefficient of the error correction term is -0.049969, which suggests a slow adjustment process. It implies that nearly 5 % of the disequilibria of the previous quarter's shock adjust back to the long run equilibrium in the current quarter.

The overall performance of the long run model shows that about 97 % of the total variation is explained by regressors which have an impressive performance of the best fitting model. The Durbin-Watson statistic is also around two which may suggest that the model under consideration is not prone to serial correlation but more robust diagnostic test is employed. Similarly, F-statistics measuring the joint significance of all regressors in the model is statistically significant at 1 per cent level. On the other hand, the short run model of private saving rate also has a high value of the coefficient of determination of about 65 % showing that the overall fitness of the model is satisfactory. The F-statistic measuring the joint significance of all regressors is also satisfactory. Similarly, the DW-statistic is above 2.

CONCLUSION

The study set out to analyze the behaviour of private savings in Lesotho by attempting to find the main determinants of private savings. Moreover, the structural stability of the private savings function and the elasticities of private saving to each of its explanatory variables were other objectives. A gamut of literature was reviewed in this area. Several analytical tools ranging from simple descriptive statistics to involving econometric

tools were employed. Therefore, the focus of this section centers on presenting the summary of findings with policy implications and the resultant conclusion.

The econometric evidence reported in this paper points out that growth of real GDP, the real interest rate, the income level as proxied by log real GDP per capita, the credit to the private sector, inflation, fiscal policy as captured under government saving are the main determinants of private savings in Lesotho. However, the financial market development as proxied by the ratio of broad money supply to real GDP is found to be an insignificant factor in explaining any changes in private savings. This finding is in line with the rudimentary financial market development in Lesotho. Moreover, the sign for private credit does not tally with the *priori* expectations in which case it may be indicative of the degree of financial market reform.

On the other hand, the sign of the real interest rate is negative which is clearly an indication that the Mackinnon-Shaw hypothesis does not hold true in Lesotho. This means that the real time deposit as a proxy for real interest dampens the private savings rate both in the long and short run. Moreover, the coefficient of this real interest rate is significant both in the short and long run implying that it can be counted on as the most significant determinant of private saving rate in this time interval.

Moreover, the income level, as proxied by the log of real GDP per capita is positive. This means that in an attempt to increase private savings, which will inject funds for increased investment and finally economic growth that is at least higher, then it becomes imperative for the government of Lesotho to try to find the channels through which they can increase the income level in Lesotho both in the long and short run. This can be in the form of boosting the level of infrastructure country-wide not just in the lowlands. On the other hand, the most crucial factor that needs much attention from the policy-makers is the development of the financial sector. The rudimentary financial market in Lesotho that is comprising mainly of banks and few insurance companies could be developed through other factors of production such as giving freedom and rights to any one willing to show up entrepreneurial competence.

Likewise, policy-makers could do justice for private saving rate by increasing the return to saving. The increased time deposit rates will encourage Basotho to increase their level of savings since they are at least expecting a higher return from that. But this should be exercised with care since interest rates are negatively related to money supply. Therefore, it should be done in a consequential manner so not as to overcrowd the level of money which is also a necessary factor that may boost savings.

It should be emphasized that this study does not mean that the included variables are the only determinants. In other words, there are still various variables that influence the private savings but are not included because of data problem. These may include bank proliferation, income tax, institutional factors such as pension funds, legal environment and many more.

In the case that financial institutions were located in many areas, if they are not efficient, the problem is not still solved. Efficient banking system has the way of encouraging people to save in their country. The inefficiency in the banking system may be shown by the long queues that do not seem to end and this discourages people from saving within the country given that we are living in a highly technological world.

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