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Research Article


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ABSTRACT

It is a stylized fact that financial sector liberalization would result into higher interest rates, which would attract savings desirable for increased investments through enhanced efficiency in financial resource allocation. This paper examines this posture in the Uganda’s case using the Granger and Engle framework and structural change analysis. The results indicate that, liberalization of the financial sector results into higher financial savings which operate through the rate of return on savings, financial deepening and foreign exchange rate channels. This provides some support for first part of the crux of McKinnon and Shaw financial liberalization thesis, confirming the potential for payoffs relating to ongoing financial deepening and a shift to an out-ward oriented growth strategies.

Consistent with the predictions made in the Life cycle model, the results indicate that higher growth in income stimulates private savings which reinforces the fact that the ability of the country to mobilize financial savings.

Keywords: Private financial Savings, Financial sector Liberalization, MacKinnon and Shaw.

INTRODUCTION

Saving is widely regarded as a key vehicle for promoting long-run economic growth (Aghion et al., 2006). Higher saving increases funds available for investment projects, which can be translated into capital accumulation and economic growth. In order to encourage saving, financial sector policies should be geared towards providing more incentives to save.

McKinnon and Shaw (1973) argue for Financial Liberalization to increase financial savings. They contend that in a "repressed" financial system, real deposit rates of interest on monetary assets are often negative and the rates also become highly uncertain. Added to the former, are the fear of expected persistent inflation and devaluation of the currency leading to capital flight, which discourages savings. The paucity of savings forces imposition of lending restrictions and mandatory interest rate ceilings that are always below the market clearing levels. As a consequence, it provides explicit subsidy to preferred borrowers who are powerful enough to gain access to the rationed credit. Hence, higher real interest rates can increase the supply of loanable funds in the market by attracting higher household savings and converting them into bank deposits which leads to higher investment and accelerates economic growth in the economy.

Related to the above, Solow (1987) argues that, a permanent increase in savings enables a country to reach a higher steady state growth. Thus adequate savings is an essential precondition for sustained economic growth. A higher rate of savings means moving more money through time rather than living from hand to mouth in return for increased wealth and future consumption. The increased wealth will reflect reduced foreign liabilities and where concerns about foreign indebtedness are constraining economic growth, like in Uganda; increased domestic savings will mean more domestic investments, Obwona & Ddumba (1995). While the basic objective of financial reform is to improve the extent and efficiency of the financial system, which in principle may lead to higher saving, the impact of financial liberalization cannot be determined by a priori since financial deregulation also eases borrowing constraints and may therefore reduce the incentive to save (see Bayoumi, 1993).

In the quest to foster economic growth and development, Uganda started the liberalization of her financial sector as part of her broad structural reforms, implemented in the early 1990s, and was intended among other objectives, to facilitate the increase in mobilization of domestic financial savings. It's however, not instantaneously recognizable as to whether this objective is being achieved substantially. Thus, the main objective of this paper is to investigate the relationship between financial sector liberalization and financial savings mobilization.

In the literature, financial sector reforms or liberalization embody eight main factors (for example see Abiad et al. (2007), Agca et al. (2007)). The first relates to deregulation of credit controls to ensure efficient
allocation of credit among competing sectors of the economy. The second relates to less reliance on direct monetary control, such as the use of reserve requirements, and encouragement of indirect monetary control instruments. The third relates to deregulation of interest rate controls so that they are conducive to savings mobilization to overcome financial repression. The fourth relates to removing bank entry barriers so as to increase competition and efficiency in the banking sector. The fifth area concerns bank privatization with a view that the private sector is best placed to intermediate financial resources compared to government. The sixth area of financial sector reforms involves supporting the growth and development of the securities markets so as to foster the development of government and corporate bond markets as well as other financial equity markets so as to encourage savings mobilization in support of long-term investment and growth on one hand, and also support the conduct of monetary policy on the other. The seventh aspect relates to strengthening bank supervision and regulation, so that there is orderly entry and exit in the financial sector based on Basel capital regulation, including specific efforts aimed at strengthening bank supervisory system, consolidating and granting high degree of independence of the banks supervisory authority/agency to ensure effectiveness of on-site and off-site examinations of banks by supervisory agency. Finally, liberalization of the foreign exchange market, including opening of the current and capital account aimed at encouraging high economic growth based on outward oriented policies.

Financial sector reforms in Uganda

At independence (1962), Uganda had one of the most vigorous and promising economy in Sub Saharan Africa (SSA), and the years following independence only demonstrated this Economic potential. Export earnings not only financed the countries import requirements but also resulted in a Current Account surplus. Fiscal and monetary policy was said to be effervescent and domestic savings averaged about 15% of GDP, enough to finance a respectable level of Investment, World Bank (1993).

The political crisis that Uganda underwent during Amin’s Regime and the period that immediately followed led to significant economic slowdowns. After the period of sowing the mustard seed (1980-1986), in the quest to redress the turbulent economic situation, Uganda has been implementing an ambitious and successful program of financial sector reforms as part broader macroeconomic adjustment and structural reform since 1987, with strong support from multilateral and bilateral creditors and donors, IMF (2000).

Kihangire (2008) notes that, Uganda undertook a gradual approach in implementing the financial sector reforms. She adopted from the experience of other countries that had undertaken similar reforms. This allowed Government to assess and correct for potential errors that could be avoided. The strategy for undertaking trade and financial sector reforms was a well-sequenced gradual approach that included simultaneous adoption of several complimentary policies, which were subjected to quarterly reviews. New reforms were only introduced to consolidate the performances achieved with earlier reforms.

He further notes that, Uganda undertook several financial sector and other trade reforms as part of the wider structural adjustment programs (SAPs) that it had been implementing since 1987. SAPs aimed at addressing the then prevailing internal and external macro-economic imbalances evidenced by hyper inflation, low economic growth, and unsustainable balance of payments position. The key elements regarding financial sector reforms included reduction in the overvaluation of the exchange rate, liberalization of the foreign exchange market, introduction of a market for government securities in April 1992; complete liberalization of interest rates in 1993; consolidation of the regulatory and supervisory framework for banks and financial institutions in 1993; and de facto opening up of the capital account in 1997. In addition, Bank of Uganda shifted from a strategy of direct monetary control (such as credit ceilings and interest rate ceilings on lending to that of indirect monetary control using market-related monetary instruments (e.g. treasury bills, REPOS and Treasury Bonds) in 1994. BOU also started setting non-market related instruments such as rediscount rate and bank rate putting into account market developments. And finally the privatization of the major government owned commercial bank in 1996. Financial sector reforms in Uganda were meant to allow for efficient allocation of resources in various sectors of the economy. The reforms also aimed at increasing the openness and overall growth of the economy through trade orientation.

Financial sector environment in Uganda


Kihangire (2008) explains that Uganda’s financial sector comprises nine categories of financial institutions, i.e. the Central Bank, Commercial Banks, Credit institutions, Insurance companies, Development Banks and Foreign Exchange Bureaus, Microfinance institutions, a national social security fund, and one stock exchange. By January 2008; there were 18 commercial banks and 21 by January 2009, 7 credit institutions, 2 development banks, 16 insurance companies, 28 insurance brokers, 96 micro finance institutions, one stock
exchange, one social security fund, and 70 operational foreign exchange bureaus. Uganda’s financial system is still small, in terms of value and the volume of transactions undertaken, as well as outreach. The financial sector, although very strong and resilient, is still undiversified in terms of the type of transactions that it undertakes. The banking sector is still dominated by retail commercial banking that is concentrated mainly in the capital city, absence of medium to long term financing, segmentation and over concentration on the corporate customers. The sector lacks other important specialized institutions, such as the pension funds, mortgage financing, merchant banking and discount houses.

**Trends in savings and Interest rates in Uganda**

As depicted from Figure 1, in the pre-reforms era, Private financial savings ratio to GDP was generally decreasing with a highly volatile growth in financial savings. The period 1993-2007 however, posted a 6.9 percent average increase in the same ratio which has been quite stable apart from the period 1997-1999 in which a bank crisis was experienced witnessing closure of some banks (see Figure 2). On quarterly basis on average, private financial savings increased by 11.1 percent between 1993 and 2008. The ratio of private financial savings to GDP seems to have leveled off at an average of 4.1 percent since 1993, a level so low to foster private sector led growth.

Contrary to McKinnon (1973) and Shaw (1973) posture, the observed trend in private savings after liberalization seems not have been through a channel of increased return on financial savings. As seen from Figure 1 and Figure 3, whereas the ratio of private financial savings to GDP is trending upwards, the return on financial savings is generally trending downwards or stagnant on average. By visual analysis this appears paradoxical. The interest rate spread which should have narrowed due to competition after liberalization of the financial sector remained persistently wide posting higher lending rate around 20 percent compared to a 4% average return on savings. This creates a very big difference between return on deposits to depositors and a return on credit to banks, by large not as big as before liberalization.
Figure 3: Quarterly trend for the average return on savings and lending rate

Review of literature on Determinants of savings

A number of theories have been advanced on factors influencing savings. These theories have been tested in many empirical studies conducted in other countries. Below is a highlight of some of these theories and the empirical work on the determinants of savings.

The Classical savings function

The crucial assumption made by classical saving theory is that the propensity to save out of profits is significantly higher than the propensity to save out of wage as postulated by Ricardo adopting Malthusian principal of population, Kaldor and Lewis. In effect they explicitly argued that low savings is as a result of small capitalistic sector. The theoretical justification for this type of saving behavior has been based on two assumptions. First, most workers receive a wage rate which is barely sufficient to maintain their consumption at the conventional subsistence level. Second, capitalist save a large portion of their income either because of the requirement for competition, a justification given by Karl Marx or because of their ambition to build a family empire (see, for example Mathew, 1973).

The managerial savings function

A slight digression from the classical argument emerged due to the development of the thesis of managerial capitalism. Mathew (1973) concludes that managers will operate their firm so as to maximize its rate of growth subject to the constraint of safe valuation by the stock market. A firm can grow either by ploughing back its own profits or by borrowing from capital markets. Management-controlled corporations have a strong preference for financing their investments internally. This preference translates Mariss's Managerial objective into the rule ‘Maximize the retention rate subject to distributing enough dividends to maintain the minimum safe stock market valuation. Thus classical theory becomes relevant in contemporary capitalism in its ‘Managerial’ form which emphasize that ‘It is the Macroeconomic distribution of Private income between Corporations and households that is an important determinant of savings rather than the distribution between wages and profits (see, Mathew, 1973 for further reference and details).

Keynesian saving theory

Keynes (1936) introduced a short run consumption function, known as absolute income Hypothesis. He postulated that as incomes increase, people tend to spend a decreasing percentage of income, or conversely tend to save an increasing percentage of their disposable income, Ceteris Paribus. He predicted that MPC<APC so that as income is raised, Average propensity to consume falls, thus increasing MPS. Kuznets (1946) empirical study found some support for Keynesian theory in the shot run but not in the long run.

The Life cycle Hypothesis

After the Keynesian absolute income theory failure to explain real world savings behavior, the life cycle (LCH) developed by Ando and Modigliani (1963) and the Permanent Hypothesis (PIH) developed by Friedman (1957)
became the main framework in analyzing consumption and savings functions which are based on inter-temporal optimization depending on life time resources.

The lifecycle model builds on the notion that individuals save mainly to smooth their consumption path over time in accordance to their expected lifetime income. Subsequent extensions of the basic lifecycle model of savings incorporate the idea that individuals save for bequest motives and for unexpected expenses (see for example Blanchard and Fischer, (1989)). According to the general life cycle theory, house holds savings depend crucially on lifetime income, wealth, expected return on savings and the various social demographic characteristics such as, life expectancy, age distribution, family size, the normal age of retirement and the share of the population that is of working age and is not working. The implications of this Hypothesis are that the larger the proportion of working age population the greater the aggregate savings and the rate of output growth should have a positive effect on savings. Indeed empirical studies that have managed to include growth of real output (GDP) in the savings function have found it to have a positive effect on the savings rate (see for example Obwona & Ddumba, 1995)).

Financial sector developments

There are a number of ways in which financial liberalization is likely to have effects on savings (both domestic and foreign). These mechanisms can be direct or indirect. The direct mechanism is discussed below;

Liquidity constraints

McKinnon (1973) and Shaw (1973) contend that financial deregulation helps ease the liquidity constraint on households and business by encouraging competition in, and entry to, the financial system. This greater access to credit accelerates the motion of capital which leads to greater income and hence increased savings. However, the greater access to borrowing by easing the liquidity constraints due to deregulation may reduce the incentive to save (see Bayoumi, 1993; Jappelli and Pagano, 1994).

Variety of savings products

The variety of savings products created by competition in financial institutions in a liberalized Economy provides consumers with greater choice in terms of products and institutions determining where they invest their savings. This may encourage them to save by providing a broader range of risk/return options from which to select. Also, sound savings products become available from depository institutions, such as banks, credit unions and building societies, all being subject to prudential regulation.

Interest rate

Interest rate can be viewed as the price of borrowed money or as the opportunity cost of lending money for a specified period of time. During this period, inflation can erode the real value and return of financial assets and lenders need to be compensated for an expected decrease in the purchasing power of these assets as noted by Bascom (1994). The real interest rate, the rate adjusted for anticipated inflation, is thus vital for the supply and demand for loanable funds.

Lewis (1992) in his study of Financial Repression and Liberalisation in a General equilibrium Model with financial Markets, holds the view that raising interest rates on deposits held in the banking sector will have two beneficial effects - the savings effect and the portfolio (investment) effect. Raising the real return available to income-earners, cause consumption to fall and the supply of savings to increase. This savings effect alleviates the chronic shortage of investment resources. An increase in the rate of return to deposits relative to returns on other assets will elicit a portfolio response as wealth holders’ move out of other assets into deposits in the banking system.

Hadjimichael et al. (1995) also used real interest rate as another measure of financial deepening and liberalization though it was highly correlated with inflation an indication that in African countries, nominal interest rates adjusted rather slowly to economic fundamentals and that changes in inflation were dominant in real interest rates due interest rate rigidity, government controls and Oligopolistic nature of the banking system for the period reviewed. These results were in agreement with the findings of Obwona & Ddumba (1995) and Naiwumbwe (2003) for their study in Uganda.

McKinnon (1973) and Shaw (1973) further assert that higher real interest rate also helps channel the funds to the most productive enterprises and facilitate technological innovation and development. They maintain that by paying a rate of interest on financial assets that is significantly above the marginal efficiency of investment in existing techniques, one can induce some entrepreneurs to disinvest from inferior processes to improved technology and increased scale in other high yielding enterprises. The release of resources from inferior production mode is as important as generating new net savings. Savings provides the resources for investment in
physical capital. Hence, it is an important determinant of growth. Increased savings is also beneficial in reducing foreign dependence and insulating the economy from external shocks.

The financial liberalization theory hypothesizes the positive effects of interest rate on savings and investment. Shrestha and Chowdhury (2005), The World Bank (1987) give evidences from several developing countries where interest rate deregulation generated increased savings and investment. However, subsequent studies do not support this finding. Most of the empirical studies have reported the interest rate effect on savings to be either inconclusive or negative (see Ang and Sen (2009)). The removal of controls on interest rates contributes to the restoration of interest rates on deposits to positive real levels. Furthermore, financial deregulation contributes to a reduction in operating costs for most types of financial institutions. The degree to which this efficiency gain is passed on to customers gives an upward impetus to interest rates on deposits. Higher interest rates, however, have both an income and substitution effect on saving behavior. Therefore, beyond the removal of the obvious disincentive to save, associated with negative real interest rates, it is unclear whether higher interest rates per se are associated with a greater level of savings.

Fry (1988) demonstrated that when real deposit interest rates have any significant effect on national savings ratios, the magnitude was of no great policy significance. He argued that only in countries where the real deposit rate was negative by a considerable margin could there be much scope for increasing savings directly by raising the deposit rate.

Bayoumi (1993) examined the effects of interest rate deregulation on personal savings in the eleven regions of the United Kingdom. He argued that deregulation produces an exogenous short-run fall in savings, some of which is recouped over time. Kimani (2002) and Mwega et al. (1990) also found interest to have a negative but a significant effect on savings in Kenya.

Bandiera et al. (2000) examined the effects of various financial liberalization measures in eight selected countries from 1970-1994. They found that there was no evidence of positive effect of the real interest rate on savings. In most cases the relationship was negative. Loayza et al. (2000) also documented that the real interest rate had a negative impact on the private savings rate. They used a sample of 150 countries with data spanning from 1965 to 1994. They found that a 1 per cent increase in the real interest rate reduced the private saving rates by 0.25 per cent in the short run.

Reinhart and Tokatidis (2001) used data of 50 countries consisting of 14 developed and 36 developing ones over the period 1970-1998. They found that in the majority of cases, higher real interest rates were associated with reduced savings in the sampled countries. Similarly, Schmidt-Hebbel and Serven (2002) argued that the sign of the interest rate elasticity of savings was ambiguous, both theoretically and empirically. Higher interest rates increased savings through the substitution effect, but could ultimately reduce the savings rate if the associated income and wealth effects were sufficiently strong. This theoretical ambiguity has not been resolved as yet, and the direction of the response of aggregate savings to an exogenous increase in the interest rate still remains vastly controversial.

Improved macro economic management

Financial liberalization provides scope to assign monetary policy more fully to price stabilization. Hadjimichael et al. (1995) suggest that macro economic stability plays an important role in stimulating savings and private investment. Thus, the rate of savings and private investment are enhanced in an environment where the rate of inflation and budget deficit ratio are low though studies by Schmidt-Hernbel et al. (1992) found mixed and generally insignificant effects of inflation on savings in developing countries. In addition, Macro economic uncertainty, as measured by the standard deviation of inflation and the standard deviation of the rate of the change in real effective exchange rate, has adverse effects on savings and private investment (see Hadjimichael et al., 1995). This has an implication that uncertainties about the returns or the direction of policies have deleterious effects on savings. Thus, progress towards macro-economic stability play a very crucial role in affecting domestic savings as confirmed by Ozler and Rodrik (1992).

Wealth effects

The easing of the liquidity constraint on households from financial deregulation may have an indirect impact on the level of domestic savings as households take advantage of their increased capacity to borrow in order to acquire additional physical and financial assets. The aggregate value of these assets, raise household net wealth. As a result, savings may fall due to the higher likelihood that households consume a larger proportion of their current income, (Common wealth Treasury of Australia).

Ratio of Broad Money

Hadjimichael et al. (1995) uses broad money as a measure of financial sector developments and reveals that, there exists positive and significant effect of ratio of broad money to GDP on savings and investment. They confirm this in the results of their study on growth, investment and savings as evidence for potential payoffs
relating to the ongoing financial deepening in African economies. Odhiambo (2006) in his study on financial liberalization and savings in South Africa in which he uses two proxies of financial liberalization, namely, real deposit rate and financial depth (M2 to GDP), found supports for significant effect of financial liberalization on savings through financial deepening but fail to support the effect through interest rates.

**External debt**

Hadjimichael et al. (1995), Aghevli et al. (1990) concur with the debt overhang Hypothesis for which increase in the ratio of external public debt to exports dampens domestic savings and private investment. Hadjimichael et al. (1995) also contend that this variable has non-linear effects on domestic savings since their results show that even at very low levels of ratios of external public debt have counterproductive effects on domestic savings and investment. Schmidt-Hebbel, Webb, and Corsetti (1992) found statistically significant negative effects of foreign savings on household savings in the context of developing economies. This may be due to the fact that existence of a debt overhang may trigger capital flight which imperils macroeconomic stability, investments and thus savings, Montiel (2003).

**Definition and Measuring savings**

Schreiner (2004) remarks that; Production requires natural resources, tools, and human capital. These factors of production come from saving the ‘choice to move resources through time rather than to use them up now’. Without saving, people are hunters and gatherers who live hand-to-mouth. With saving, people can build steadily on the past to improve the future. In short, saving drives development.

Schreiner (2004) also contends that, resources received in a given time period are income; resources controlled at a point in time are assets or savings. Both income and assets refer to resources; they differ only in the frame of reference. If resources received as income are not immediately consumed, then they become assets. Moving resources through time is saving. The definition includes both conscious and unconscious failure to consume. Thus, examples of saving include putting cash in a bank rather than buying hamburgers as well as failing to take cash out of a bank account to buy hamburgers.

Moving money through time is financial saving. This has three stages as explained by Beverly et al. (2003). The first is "putting in". "Putting in" means "depositing" changes cash into bank account balances. Although many people equate "depositing" with "saving", "saving" is a far broader concept than just "depositing". The second stage of financial savings is maintaining balances, or "keeping in". Although not always recognized as saving, failure to consume assets does move resources through time. The third stage is "taking out". Resources "taken out" may be consumed (dissaved) or kept in another form (saved). For bank accounts, "taking out" means making withdrawals.

Each stage is a distinct aspect of financial savings. Savings might be high in one stage but low in another, so measurement should look at all three stages. For example, savers with large deposits may have high savings in terms of "putting in", but, if they make quick withdrawals, they may have low savings in terms of "keeping in". Likewise, savers with low deposits might nonetheless maintain balances for a long time. Finally, savers with high savings in terms of "putting in" and/or "keeping in" might-if withdrawals are consumed rather than converted to other assets-have low savings in terms of "taking out". Financial savings must explicitly include time. Changes in resources in a period of time are flows, and resources at a point in time are stocks. Stocks and flows describe two stages of financial savings, "putting in" as flows of deposits and "taking out" as flows of withdrawals (or "keeping in" as stocks of balances to be withdrawn later). Stocks and flows, however, describe "keeping in" inadequately. Measuring the resources held through time requires a "flow-field stock" Asset accumulation occurs if saving consistently exceeds dissaving.

**In Conclusion,**

Whether the various indicators of financial sector liberalization encourage or retard private financial savings is an issue which cannot be determined a priori and their effects are indecisive from one case study to another in the literature reviewed. Macroeconomic stability is also not very exceptional to the same conclusion. However the theoretical and empirical literature confirms the incentive effect of income on financial savings. The complexity of measuring financial savings is recognizable although it becomes clear that the balances on the savings and fixed deposits Accounts provide a better measure of keeping in. Given the fact that, from the reviewed studies where Uganda is used as a case study, none investigated the determinants of private financial savings in light of financial sector liberalization. Thus this case study becomes a novelty addition to the strand of existing literature by investigating the specifics of the response of private financial savings to financial sector developments and the related determinants.
Data issues and Specification of Variables

The sample used to examine the effects of financial liberalization on private financial savings covers the period 1980-2007. The data is drawn from different sources and is used collaboratively so that gaps in one source can be corrected by data from another. Most data is from IFS (international financial statistics) online database. Other sources are Ministry of Finance Planning and Economic development for data on budget deficit and Economic Policy Research Centre for data on other variables that could not be obtained from the first sources. In cases where quarterly data was not available, annual data was transformed to quarterly. The variables studied are; Private savings rate (S), Per capita GDP (Y), Interest rates (IR), Government deficit as a ratio to GDP (GDEF), External debt as a ratio to total exports (DEX), Broad Money as a ratio to GDP (BMR), Real Effective Exchange rate (REER) and A dummy variable to capture the effect of financial Liberalization (DL).

Model specification

A number of models have been used to study the behavior and response of savings. The Economic model to be employed in this study takes the form of the model estimated by Hadjimichael et al. (1995) as stated below.

\[ S_t = f(Y_t, GDEF_t, REER_t, BMR_t, DEX_t, IR_t, DL) \] ................................. (1)

Theory and empirical work a priori depicts that \( f_1, f_4 \) and \( f_7 > 0 \) and while \( f_2 \) and \( f_5 < 0 \); \( f_3 \) and \( f_6 \) are not conclusive a priori, where \( f_i \) is the partial derivative with respect to the \( i^{th} \) variable \( \forall \ i = 1, 2 \ldots 7 \) in the order they are arranged in equation (1). The statistical model will take the form of;

\[ S_t = \beta_0 + \beta_1 Y_t + \beta_2 GDEF_t + \beta_3 REER_t + \beta_4 BMR_t + \beta_5 DEX_t + \beta_6 IR_t + \beta_7 DL + \epsilon_t. \]

Where \( t \) is indexing time, \( \beta_i \ \forall \ i = 0,1,2 \ldots 7 \) are corresponding variables’ parameters estimated in the static model.

\( DL \) is a dummy variable to capture the effect of financial liberalization on savings.

Thus, \( DL = \begin{cases} 1 &; t > 1993 : 4 \\ 0 &; t \leq 1993 : 4 \end{cases} \) is used to investigate if financial liberalization brought about a structural change in private saving.

Integration analysis of the variables

Empirical work based on time series data assumes that the underlying time series is stationary. That is the process generating that series has a normal distribution with constant mean and variance over time and the value of the covariance between two time periods depend only on the lag between these periods but not the actual period at which the covariance is computed, Gujarati (2003). However, most macroeconomic and financial data is non stationary and use of non stationary data may generate spurious results and or poor forecast. The simplest way of testing for stationarity of the variable is by using the Augmented Dick Fuller (ADF) unit root test and its basic equation is given by \( \Delta Y_t = \alpha + \lambda t + \gamma Y_{t-1} + \sum_{i=1}^{p} \beta_i \Delta Y_{t-1} + \epsilon_t. \)

The null hypothesis \( H_0: \gamma = 0 \), ‘the series has a unit root’ is rejected if the absolute value \( |ADF| > |ADF^*| \).

Where;

\( ADF \) is the computed value of the statistic and \( ADF^* \) is the critical value.

Cointegration Analysis

Granger (1986) contends that, at the least sophisticated level of economic theory lies in the belief that certain set of economic variables should not diverge from each other by too great an extent, at least in the long-run. Thus, such variables may drift apart in the short-run or according to seasonal factors, but if they continue to be far apart in the long-run, then economic forces, such as market mechanism or government intervention, will begin to bring
them together again. Angel and Granger (1985) two step procedure will be used to test for cointegration in which
the ordinary least squares estimation method is used to estimate the both long-run and short-run ration ships.

In the first step, \( y_t = \mathbf{Ax} \).

Where \( y_t \) is the endogenous variable in this case the private savings rate, \( \mathbf{A} \) is the set of cointegrating
parameters to be estimated using OLS and \( \mathbf{x} \) is a set of exogenous variables as explained in equation 1.
Equation 2 is considered to be the long-run or equilibrium relationship.

\[ z_t = y_t - \mathbf{Ax}, \]

Equation 3 is thus known as the ‘equilibrium error’ which describes the tendency of the economic system to
move towards particular region of the possible outcome space. It is the distance that the system is away from
equilibrium. Thus for an equilibrium relation ship to exist in equation 2, it is necessary that \( z_t \) be \( I(0) \) otherwise
the variables will be drifting apart.

In the second step, if \( y_t \) and \( \mathbf{x} \) are both \( I(1) \) without trends in mean and are cointegrated it has been
proved by Granger (1983) and Granger and Engel (1985) that there always exist a generating mechanism having
what is called the ‘error-correcting’ form

\[ \Delta y_t = -\rho z_{t-1} + \text{lagged } (\Delta y_t, \Delta \mathbf{x}) + d(B)\varepsilon_t, \]

Where, \( d(B) \) is a finite polynomial in the lag operator B and \( \varepsilon_t \) must be white noise for cointegrating a model.
Equation 4, indicates the amount and direction of change in \( y_t \) and \( \mathbf{x} \) taking into account the size and sign of
previous equilibrium error, \( z_{t-1} \). After estimating the ECM, Hendry and Mizon (2000)’ general to specific modeling
philosophy of reparameterisation of the model is invoked to come up with a parsimonious model that can be well
interpreted. The following theoretical implication about cointegratedness of variables is worth noting;

i) If \( y_t \) and \( \mathbf{x} \) are cointegrated, so is \( k y_t \) and \( h \mathbf{x}_{t-1} + w_t \) for any \( k \) and \( w_t \sim I(0) \) with a possible change
in the cointegrating parameters.

ii) If \( y_t \) and \( \mathbf{x} \) are \( I(1) \), there must be granger causality in at least one direction, as one variable can help
forecast the other.

RESULTS

Time series properties of the variables

Table 1 shows that, real effective exchange rate was stationary at 1% while Ratio of government deficit to GDP
was stationary at 5%. Private saving rate, per capita GDP, Nominal interest rate, ratio of broad money to GDP
and ratio of debt to exports were all non-stationary in levels which might have been due to structural breaks. All
variables were stationary at 1% in first difference. This implies that whereas most of the variables in levels are not
stable, the growth rates for all the variable are mean reverting and thus estimating the static model to undertake
cointegration test is warranted.

The resulting residual term generated from the static pooled model in Panel A Table 2, labeled ECT in
Table 1 was stationary at 1% in levels an implication that there exist a stable long run relationship between the
private savings rate as a dependent variable and the per capita GDP, Real effective exchange rate, the nominal
interest rate, ratio of budget deficit to GDP, ratio of public debt to exports and the ratio of broad money to GDP as
exogenous variables.
Table 1: Unit root tests for the Variables

<table>
<thead>
<tr>
<th>Macro variable</th>
<th>ADF in levels</th>
<th>ADF in difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ADFc</td>
<td>Order of Integration</td>
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<tr>
<td>LS</td>
<td>-1.0126</td>
<td>I(1)</td>
</tr>
<tr>
<td>LIR</td>
<td>-1.3391</td>
<td>I(1)</td>
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<td>LREER</td>
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</tr>
<tr>
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<td>-1.2895</td>
<td>I(1)</td>
</tr>
<tr>
<td>LGDEF</td>
<td>-3.3612</td>
<td>I(0)</td>
</tr>
<tr>
<td>ECT</td>
<td>-3.0702</td>
<td>I(0)</td>
</tr>
</tbody>
</table>

Notes:
1. L stand for Natural logarithm
2. Critical values in levels -3.4922, -2.8884 and -2.5809 at 1%, 5% and 10% respectively
3. Critical values in first differences are -3.4928, -2.8887 and -2.5811 at 1%, 5% and 10% respectively
4. MacKinnon critical values for rejection of hypothesis of a unit root.

Results of the static models and Error correction models

The pooled model in Table 2 panel A, presents the static model estimates assuming no policy shift. Although cointegration theoretical implication requires that a shift in parameters does not interfere with cointegration, it may not be prudent to interpret the parameters in the pooled model, since the liberalization of the financial sector might have caused a parameters shift in the long run equation. Thus, it’s in this respect that, after establishing cointegration, a structural change analysis was conducted.

Table 2: OLS estimation of Private financial savings static equation

<table>
<thead>
<tr>
<th>Pooled model (A)</th>
<th>Model before liberalization (B)</th>
<th>Model after Liberalization (C)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>P-value</td>
</tr>
<tr>
<td>C</td>
<td>2.651</td>
<td>0.001</td>
</tr>
<tr>
<td>LY</td>
<td>-0.233</td>
<td>0.007</td>
</tr>
<tr>
<td>LREER</td>
<td>-0.229</td>
<td>0.000</td>
</tr>
<tr>
<td>LIR</td>
<td>-0.516</td>
<td>0.000</td>
</tr>
<tr>
<td>LGDEF</td>
<td>0.107</td>
<td>0.107</td>
</tr>
<tr>
<td>LDEX</td>
<td>-0.011</td>
<td>0.772</td>
</tr>
<tr>
<td>LBMR</td>
<td>0.680</td>
<td>0.000</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.820</td>
<td>0.652</td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>6.062</td>
<td>2.892</td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
<td>0.603</td>
<td>0.684</td>
</tr>
<tr>
<td>Akaike info criterion</td>
<td>0.046</td>
<td>0.125</td>
</tr>
<tr>
<td>Schwarz criterion</td>
<td>0.216</td>
<td>0.378</td>
</tr>
<tr>
<td>F-statistic</td>
<td>85.544</td>
<td>18.185</td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

The pooled model Panel A was subjected to the chow-break point test. The results of this test in Table 3 confirmed the existence of a structural change in the savings relationship. This conclusion owes to the strong evidence in favor of presence of a structural break at 1993:4 due to the rejection of the null hypothesis of no
structural change (see Table 3). This implies that financial sector liberalization has had an effect on savings. From the investigation of the possibility of the source of the structural change and the direction of the effect, it's concluded that both the intercept and the slope vector shifted due to liberalization of the financial sector.

Table 3: Stability tests

<table>
<thead>
<tr>
<th>Null Hypothesis</th>
<th>F-statistic</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No structural change</td>
<td>14.3493</td>
<td>0.0000</td>
</tr>
<tr>
<td>Equality of Intercepts</td>
<td>35.6384</td>
<td>0.0000</td>
</tr>
<tr>
<td>Equality of slope vectors</td>
<td>13.6402</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

The shift was in a direction of positive effects on savings by the different financial sector development indicators as confirmed from Table 2. Appendices I and II provides necessary information for deriving the statistics in Table 3 below. The evidence of presence of structural change warranted the estimation of separate regressions.

Table 4: OLS estimation of ECM for savings rate

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>P-value</th>
<th>Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Long run Relationship (Dep= ∆ IS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>0.006</td>
<td>0.757</td>
<td>0.005</td>
<td>0.463</td>
</tr>
<tr>
<td>∆ LS(-4)</td>
<td>0.331</td>
<td>0.004</td>
<td>0.250</td>
<td>0.023</td>
</tr>
<tr>
<td>∆ LY</td>
<td>-0.207</td>
<td>0.406</td>
<td>-0.899</td>
<td>0.000</td>
</tr>
<tr>
<td>∆ LY(-1)</td>
<td></td>
<td></td>
<td>1.044</td>
<td>0.000</td>
</tr>
<tr>
<td>∆ LY(-3)</td>
<td>1.013</td>
<td>0.003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>∆ LY(-4)</td>
<td>-1.089</td>
<td>0.001</td>
<td></td>
<td></td>
</tr>
<tr>
<td>∆ LIR</td>
<td>-0.213</td>
<td>0.050</td>
<td>0.060</td>
<td>0.084</td>
</tr>
<tr>
<td>∆ LIR(-4)</td>
<td></td>
<td></td>
<td>0.098</td>
<td>0.011</td>
</tr>
<tr>
<td>∆ LREER</td>
<td>0.090</td>
<td>0.159</td>
<td>0.055</td>
<td>0.734</td>
</tr>
<tr>
<td>∆ LREER(-1)</td>
<td>0.231</td>
<td>0.003</td>
<td>0.307</td>
<td>0.053</td>
</tr>
<tr>
<td>∆ LREER(-2)</td>
<td></td>
<td></td>
<td>0.272</td>
<td>0.098</td>
</tr>
<tr>
<td>∆ LGDEFR</td>
<td>0.012</td>
<td>0.824</td>
<td>0.011</td>
<td>0.520</td>
</tr>
<tr>
<td>∆ LDEX</td>
<td>0.141</td>
<td>0.466</td>
<td>0.044</td>
<td>0.028</td>
</tr>
<tr>
<td>∆ LDEX(-3)</td>
<td></td>
<td></td>
<td>0.046</td>
<td>0.015</td>
</tr>
<tr>
<td>∆ LDEX(-4)</td>
<td></td>
<td></td>
<td>0.043</td>
<td>0.020</td>
</tr>
<tr>
<td>∆ LBMR</td>
<td>0.145</td>
<td>0.186</td>
<td>0.966</td>
<td>0.000</td>
</tr>
<tr>
<td>∆ LBMR(-3)</td>
<td>0.377</td>
<td>0.005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>∆ LBMR(-4)</td>
<td>0.228</td>
<td>0.066</td>
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<td></td>
</tr>
<tr>
<td>ECT(-1)</td>
<td>-0.505</td>
<td>0.000</td>
<td>-0.240</td>
<td>0.012</td>
</tr>
<tr>
<td>Adjusted R-squared</td>
<td>0.535</td>
<td></td>
<td>0.563</td>
<td></td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
<td>2.110</td>
<td></td>
<td>2.014</td>
<td></td>
</tr>
<tr>
<td>Akaike info criterion</td>
<td>-1.264</td>
<td></td>
<td>-3.627</td>
<td></td>
</tr>
<tr>
<td>Schwarz criterion</td>
<td>-0.734</td>
<td></td>
<td>-3.080</td>
<td></td>
</tr>
<tr>
<td>F-statistic</td>
<td>5.433</td>
<td></td>
<td>5.969</td>
<td></td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.000</td>
<td></td>
<td>0.000</td>
<td></td>
</tr>
</tbody>
</table>

The Error correction term at a lag of one for the model before liberalization in Table 2 Panel D has a coefficient of -0.505 which is highly significant and has the expected sign. Thus before liberalization, the short-run converges to the long-run at a rate of about 50.5%. This is a reasonably high adjustment speed. The implication of this is that before liberalization, it took nearly 2 quarters to restore the equilibrium savings rate whenever there was any deviation from the equilibrium rate. On the other hand the Error correction term at a lag of one after liberalization has a significant coefficient of -0.24 with the expected sign. Thus after liberalization, the short-run converges to the long-run at a rate of 24%. This implies that it take nearly 5 quarters to restore the equilibrium savings rate if there is any deviation from the long-run equilibrium path. Compared to the before liberalization adjustment
speed, this shows that market forces adjust rather more slowly than repressionistic policies to restore equilibrium though at a lower cost. The model diagnostics in Appendix III, IV and V proved that the models were free from serial correlation, Normality and model specification problems.

DISCUSSION OF THE RESULTS

Effect of per capita income

Table 2 shows that, before liberalization, a one percent increase in per capita income caused about 0.57% significant decline in private savings on average, as opposed to 0.25% significant increase after financial sector liberalization. The before liberalization effect is inconsistent with theory (see Table 4). The negative effect also existed in the short-run contrary to the findings of Naiwumbwe (2003), Kiman (2002) and Obwona & Ddumba (1995). The partial explanation of this paradox is the effects of political instabilities that marred the greater part of the period before liberalization causing economic agents to lose confidence in the economy thus behaving contrary to economic fundamentals. This caused loss of confidence in the financial sector let alone the sector being narrow and thin. The after liberalization effect is consistent with economic theory and the findings of (Hadjimichael et al, 1995) implying that the ability of the country to mobilise savings depend in part on the level of its development. This can be partly explained by the restoration of confidence in the financial sector so that private actors can behave in accordance to economic fundamentals and the widening of the market size.

Effect of interest rates

Before liberalization, a one percent increase in the nominal interest caused about 0.22% marginally insignificant decline in private savings on average. In the short-run, a one point increase in the growth of interest rate is accompanied by a 0.21% decrease in the growth rate of savings. This agrees with Obwona & Ddumba (1995) and Naiwumbwe (2003) to mention but a few. Opposed to this, the model after liberalization reveals a 0.11% significant increase in savings in respect to a one percent increase in interest rate, (see Table 2 and Table 4). These results collaborate with the findings of Shrestha & Khorsheed (2005) and Lewis (1992) and therefore supports the crux of the first part of McKinnon and Shaw financial liberalization hypothesis in the Ugandan case though in total contradiction with earlier findings of (Reinhart & Tokatlidis, 2001) and (Loayza et al., 2000) in the their studies conducted in other countries.

Effect of Real effective Exchange rate

Before liberalization, a one percent depreciation of the real effective exchange rate caused about 0.11% significant decline in private savings rate on average in the long-run. In the short-run however, a one point increase in the growth of the REER causes 0.23% increase in the growth of savings rate at a lag of one quarter. In the post liberalization era, a one percent depreciation of the REER brings about 0.57% significant increase in the private savings rate (see Table 2 and Table 4). This is partly due to income effect leading to increased savings from earnings and reduced consumption of imports due to a price increase associated with the exchange rate depreciation. The implication of this is that liberalization of the financial sector is associated with out-ward growth oriented benefits to Uganda which could not happen before liberalization due to possibility that the shilling might have been overvalued.

Effect of financial deepening

Table 2 shows that, before liberalization, a one percent increase in the broad money to GDP ratio caused about 0.34% insignificant increase in private savings on average, as opposed to 1.34% highly significant increase after financial sector liberalization. The effect of broad money ratio to GDP before liberalization is not unexpected given the thin and narrow financial market that existed unlike the witnessed continuous financial sector widening and deepening in the after liberalization era. This is in agreement the findings Hadjimichael et al. (1995), Schmidt-Hebbel & Serven (2002) and Odhiambo (2006) confirming the potential for payoffs relating to ongoing financial deepening whose outlook for growth is only bright with widening to the rural sector.

Effect of public external public debt

Before liberalization, a one percent increase in the external debt to exports ratio caused about 0.05% insignificant decrease in private savings on average and a 0.04% marginally significant increase after financial sector liberalization. The effect of external debt on private savings after liberalization is significant in the short-run in the directions of its long-run relationship unlike before liberalization (see Tables 2 and 4). Thus the there exists a negligible evidence for the presence of a debt overhang before liberalization and its rejection after Liberalization.
which totally contradicts the findings of Hadjimichael et al (1995) and Green & Delano (1991). The post liberalisation results can be partly attributed to the multilateral debt relief initiatives that improved the debt sustainabilty position for Uganda and the continous improvement in the debt management strategy which prioritize borrowing for infrastructural development, which is pro growth and desirable for enhancing savings.

**Effect of budget deficit**

Before liberalization, a one percent increase in the budget deficit to GDP ratio caused about 0.05% insignificant increase in private savings on average, as opposed to 0.03% insignificant decline after financial sector liberalization (See Table 2). These results point to the negligible possibility that Ugandans were Recardian before liberalization and after liberalization in the short-run but insignificantly behave in a Keynesian manner in the long-run after liberalization. This implies that in a financially liberalized Uganda, consolidation of the fiscal environment is good for private savings as the opposite may crowd out private investments which in turn lead to lower deposits in the banks. The after liberalization effect of budget deficit though insignificant is in agreement with Hadjimichael et al. (1995).

**CONCLUSIONS**

Several implications for the understanding of the determinants of private financial savings in Uganda emerge from the analysis of this study. Firstly, the results are by large consistent with McKinnon and Shaw posture that financial liberalization stimulates financial savings. This suggests that relaxation of financial restraints imposed on the Uganda’s financial systems has had efficiency-enhancing effects stimulating financial savings. Secondly, an interesting finding that emerges from this analysis consistent with the predictions of the life cycle model is that income growth has a positive effect on private saving. This suggests that the relationship between private saving and economic growth is likely to be bi-directional: faster economic growth leads to increased private financial saving, which in turn is expected to lead to higher economic growth. Thirdly fiscal policy is revealed to be less important for increased savings. Lastly the exchange rate has a significant effect on savings which is an indication of increasing financial integration with the rest of the world.

**REFERENCES**


CWTOF. The Roles of Financial Liberalisation in promotion and Allocation of domestic savings in australia. 9th APEC Finance Ministers' Process.


Appendices

Appendix I: Model with different intercepts

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>3.141634</td>
<td>0.702345</td>
<td>4.473065</td>
<td>0.0000</td>
</tr>
<tr>
<td>B</td>
<td>2.457509</td>
<td>0.698281</td>
<td>3.519373</td>
<td>0.0006</td>
</tr>
<tr>
<td>LY</td>
<td>-0.486630</td>
<td>0.085162</td>
<td>-5.714185</td>
<td>0.0000</td>
</tr>
<tr>
<td>LIR</td>
<td>-0.152115</td>
<td>0.070611</td>
<td>-2.154258</td>
<td>0.0335</td>
</tr>
<tr>
<td>LBMR</td>
<td>0.646520</td>
<td>0.112604</td>
<td>5.741548</td>
<td>0.0000</td>
</tr>
<tr>
<td>LDEX</td>
<td>-0.132987</td>
<td>0.050791</td>
<td>-2.618315</td>
<td>0.0102</td>
</tr>
<tr>
<td>LREER</td>
<td>0.060766</td>
<td>0.057566</td>
<td>1.055589</td>
<td>0.2936</td>
</tr>
</tbody>
</table>

R-squared 0.873513  Mean dependent var 2.252473
Adjusted R-squared 0.865000  S.D. dependent var 0.567065
S.E. of regression 0.208353  Akaike info criterion -0.230414
Sum squared resid 4.514752  Schwarz criterion -0.036236
Log likelihood 20.90321  Durbin-Watson stat 0.709602

Note: A is a dummy variable for after Liberalization and B for after liberalization.

Appendix II: model with varying intercepts and slope vectors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>-6.756767</td>
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<td>-1.978438</td>
<td>0.0507</td>
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<tr>
<td>B</td>
<td>3.933485</td>
<td>0.811852</td>
<td>4.845076</td>
<td>0.0000</td>
</tr>
<tr>
<td>A*LY</td>
<td>0.252452</td>
<td>0.239495</td>
<td>1.054099</td>
<td>0.2944</td>
</tr>
<tr>
<td>A*LIR</td>
<td>0.112726</td>
<td>0.105432</td>
<td>1.069178</td>
<td>0.2876</td>
</tr>
<tr>
<td>A*LBMR</td>
<td>1.341111</td>
<td>0.380473</td>
<td>3.524849</td>
<td>0.0006</td>
</tr>
<tr>
<td>A*LDEX</td>
<td>0.038862</td>
<td>0.054780</td>
<td>0.709414</td>
<td>0.4798</td>
</tr>
<tr>
<td>A*LREER</td>
<td>0.574195</td>
<td>0.093910</td>
<td>6.069431</td>
<td>0.036236</td>
</tr>
<tr>
<td>B*LY</td>
<td>-0.569981</td>
<td>0.093910</td>
<td>-6.069431</td>
<td>0.0000</td>
</tr>
<tr>
<td>B*LIR</td>
<td>-0.215343</td>
<td>0.094364</td>
<td>-2.282055</td>
<td>0.0246</td>
</tr>
<tr>
<td>B*LBMR</td>
<td>0.335877</td>
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<td>B*LDEX</td>
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<td>0.053106</td>
<td>-0.874562</td>
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<td>B*LREER</td>
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<td>0.052257</td>
<td>-2.051098</td>
<td>0.0429</td>
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<tr>
<td>B*LGDEF</td>
<td>0.050443</td>
<td>0.060468</td>
<td>0.834212</td>
<td>0.4062</td>
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</tbody>
</table>

R-squared 0.873513  Mean dependent var 2.252473
Adjusted R-squared 0.865000  S.D. dependent var 0.567065
S.E. of regression 0.208353  Akaike info criterion -0.230414
Sum squared resid 4.514752  Schwarz criterion -0.036236
Log likelihood 20.90321  Durbin-Watson stat 0.709602

Appendix III: Diagnostic checking for the ECM model after liberalization

<table>
<thead>
<tr>
<th>Test</th>
<th>F-statistic</th>
<th>P-value</th>
<th>Obs*R-squared</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breusch-Godfrey Serial Correlation LM Test</td>
<td>0.8005</td>
<td>0.5329</td>
<td>4.4923</td>
<td>0.3435</td>
</tr>
<tr>
<td>ARCH</td>
<td>0.8338</td>
<td>0.5107</td>
<td>3.4478</td>
<td>0.4859</td>
</tr>
<tr>
<td>White Heteroskedasticity Test</td>
<td>0.6845</td>
<td>0.8363</td>
<td>23.3392</td>
<td>0.7159</td>
</tr>
<tr>
<td>Ramsey RESET Test</td>
<td>1.5781</td>
<td>0.2196</td>
<td>4.3883</td>
<td>0.1114</td>
</tr>
</tbody>
</table>
Appendix IV: Diagnostic checking for the ECM model after liberalization

<table>
<thead>
<tr>
<th>Test</th>
<th>F-statistic</th>
<th>P-value</th>
<th>Obs*R-squared</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breusch-Godfrey Serial Correlation LM Test</td>
<td>0.8005</td>
<td>0.5329</td>
<td>4.4923</td>
<td>0.3435</td>
</tr>
<tr>
<td>ARCH</td>
<td>0.8338</td>
<td>0.5107</td>
<td>3.4478</td>
<td>0.4859</td>
</tr>
<tr>
<td>White Heteroskedasticity Test</td>
<td>0.6845</td>
<td>0.8363</td>
<td>23.3392</td>
<td>0.7159</td>
</tr>
<tr>
<td>Ramsey RESET Test</td>
<td>1.5781</td>
<td>0.2196</td>
<td>4.3883</td>
<td>0.1114</td>
</tr>
</tbody>
</table>

Appendix V: Normality test for the ECM model before Liberalization

Series: Residuals
Sample 1981.2 1993.4
Observations 51
Mean -4.22E-18
Median 0.011133
Maximum 0.274767
Minimum -0.223141
Std. Dev. 0.098690
Skewness -0.110569
Kurtosis 3.365945
Jarque-Bera 0.387090
Probability 0.824033