Zambia Social Science Journal

Volume 1
Number 2 *Volume 1, number 2 (November 2010)*

Article 6

11-1-2010

Are Savings Working for Zambia's Growth?

Chrispin Mphuka
University of Zambia

Are Savings Working for Zambia's Growth?

Chrispin Mphuka

University of Zambia

This article analyses the effect of savings on economic growth in Zambia. Using vector auto regression, the article finds that economic growth 'Granger' causes domestic savings. This goes contrary to the neoclassical theory on the relationship between economic growth and savings. However, the article argues that a case of increasing domestic savings mobilization holds on the premise that doing so may influence growth indirectly by attracting partnerships with international capital thereby helping to inject new technology in the economy which is undoubtedly vital for growth. The argument is strengthened further by observing that East Asian countries have grown faster than Latin American countries from the 1960s. The key distinguishing factor was that the saving rate in East Asian countries was higher than the rate in Latin American countries.

1. Introduction

Zambia faces major development challenges, with the majority of the population being poor. It is estimated that 59% of the people live below the national poverty line (Government of the Republic of Zambia (GRZ), 2010). This is despite an average of about 5% real growth being recorded in the last decade (World Bank, 2007). Poverty is extreme in the rural areas where the majority of the people live. It is estimated that close to 80% of the population in rural areas live below the poverty line (GRZ, 2010). This situation calls for real growth that creates jobs for both rural and urban areas. However, for growth to have an impact on unemployment and reduce poverty, the country would require growth rates as high as 7 to 8% per annuam (United Nations Economic Commission for Africa (UNECA), 1997) . This is possible. The experience of the Asian economies and China has demonstrated that it is possible to attain such high growth rates with effective trade and investment policies.

Can Zambia grow faster by saving more? We tackle this question by briefly reviewing growth theories and doing an empirical exercise. Specifically, we analyse the role of savings in Zambia's quest to accelerate growth, reduce poverty and attain a middle-income country status by 2030. The key question is whether or not savings are working for Zambia's economic growth. The article is organized as follows. In section 2, we briefly look at savings in Zambia. Section 3 situates domestic savings within the investment-trade growth relationship. We briefly review the theoretical and empirical literature in section 4. Section 5 looks at the study methods and the estimation techniques. We look at the private savings function in Zambia in section 6 and conclude the article in section 7.

2. Savings in Zambia

Before we look at the recent history of savings in Zambia, we define what we mean by savings. Savings are normally defined as an act of not consuming a given outlay of disposable income. Through savings, present goods are transformed into future goods. Thus, savings are used to produce capital goods that produce a greater flow of consumer goods at a further point in time. Viewed this way, savings are important in the complex process of accumulation of capital. These savings include both public and private sector savings.

National savings in Zambia have been low. During the period 2000- 2009, gross domestic savings as a percentage of Gross Domestic Product (GDP) averaged 17.2%. This is lower than that of East Asian and Pacific countries. These recorded an average percentage share of 28.9% during the same period. However, Zambia's performance is slightly better than that of the Sub Saharan Africa region which recorded a percentage share of 16.3% during the same period (World Bank, 2007).

Although the theoretical support of savings affecting growth is weak, the contrast in the growth performance of the East Asian economies and Latin American countries is normally used as a strong argument for ensuring that domestic savings be increased. Between 1960 and 2000, the average savings rate in the East Asian countries was 25% while that of Latin America was 14%. Over the same period, the East Asian countries experienced high growth rates while Latin America lagged with slow growth (Aghion et. al., 2009). This is the point that amplifies the need for an increased savings rate in Zambia. If the country is to attain a middle income status by 2030, there has to be an increased growth rate. The increased growth rate may be achieved through an increased savings rate. However, there is no empirical evidence to support such a notion.

Public sector savings are largely determined by the decisions of government and very little is known on its determinants. Therefore, when looking at the key challenges to domestic savings the focus should be on private savings. In this regard, there are various means of saving in Zambia. These include formal products offered by banks and insurance companies. These are both voluntary and contractual. There are also informal products such as *Chilimba*. Sometimes savings strategies avoid using savings products and rely instead on alternatives such as hiding or burying cash, or storing value in assets such as livestock and property (Melzer, 2007). Our analysis is restricted to formal savings that involve financial intermediation of some sort.

The key problem with savings in Zambia is that only a small proportion of the population has access to saving facilities. Melzer (2007) found that only 14% of Zambians save with banks. In most areas, particularly rural ones, the low utilization of banking services is attributed to the lack of banking facilities. However, in areas where there is access to banking facilities, the main problem is the high cost of opening and maintaining a bank account.

3. Situating Domestic Savings within the Investment-Trade-Growth Relationship

It is important to show the position of domestic savings within the broader issues of growth. This helps highlight the fact that increasing domestic savings to attain higher growth is only one part of a bigger picture. To have economic growth there should be accumulation of capital and knowledge. This process is achieved through investment. In turn, investment can come from either domestic savings or foreign savings. Our analysis is further narrowed down to the role of domestic savings[1] in growth and the key determinants of private domestic savings. We concern ourselves with two questions. The first question is; does an increase in domestic savings lead to economic growth? The second question looks at some of the factors that determine private savings.

Granger causality tests are used to deduce whether there is causality between savings and growth. The determinants of the structure of savings in Zambia are evaluated using econometric techniques. Since private savings are a major determinant of gross national savings, we first focus on establishing the private savings function. The main theory underpinning this analysis is the life cycle income hypothesis. We then analyse the relationship between economic growth and gross savings and the transitional nature of the relationship in line with the neoclassical theory of growth. We then look at the relationship between gross saving rate and the investment rate.

4. Literature Review

Gross Savings, Economic Growth and Investment Relationship in Theory

The role of savings in generating growth was included in the Harrod (1939) and Domar (1946) models of growth. This model postulated that for an economy to be on an equilibrium growth path, the national savings rate (i.e., the fraction of income saved) has to be equal to the product of the capital-output ratio and the rate of growth of the (effective) labour force. One implication of the Harrod-Domar model is that doubling the savings rate may lead to the doubling of the rate of economic growth. Most economists, including the 1987 Nobel Prize Award winner, Robert Solow, were skeptical about such a result. We all know that not all savings may go into growth because part of it may go into the replacement of old obsolete capital.

Unsatisfied with the Harrod-Domar model, Solow (1957) developed the growth model that concluded that the key factor that leads to sustained economic growth is technological progress and not the savings rate. In the Solow model[2], a permanent increase in the saving rate produces a temporary increase in the growth rate of output per worker. In other words, a change in the saving rate has a level effect and not a growth effect (David, 1996). Therefore, a permanent increase in the saving rate would initially increase the capital stock through increased investment. This leads to growth in output, which is temporary because these savings in subsequent periods are only necessary for maintaining the large capital stock through the replacement of old machinery.

New endogenous growth theories come to the same conclusion that an increase in the saving rate would affect the equilibrium growth level but only

temporarily. The key thrust in these models is that the main cause of permanent growth is increases in technical progress and human capital accumulation. The assumption of increasing returns in these models means that capital flows to capital rich countries rather than capital poor countries.

Recent theoretical attempts to look at the role of savings in growth are perhaps more encouraging because they link domestic savings to a catalyst for Foreign Direct Investment (FDI) which in turn comes into the country with the latest technical advancements (Aghion et al. 2009). Therefore, having sufficient domestic savings complements international capital thereby allowing the country to 'import' technology through this channel.

In sum, all long-run growth theories imply that a country can grow faster by investing more in human resources, or physical capital or research and development but that a country with international capital cannot grow faster by saving more.

Empirical Literature on Gross Savings, Economic Growth and Investment Relationship

On an empirical level, the results on the growth-saving nexus remain inconclusive. This is partly due to varying methods used. One group of studies has relied on cross-country data[3] while the other group has relied on country detailed studies. Using a large savings data base Loayza et al (1998) find three key results: that savings rates and income levels are positively correlated, that savings rates and income growth rates are positively correlated, and that national savings and domestic investment are positively correlated.

However, these are mere correlations. There is lack of evidence of causation between the variables of interest. Hence, the need to look at studies that have analysed causality. Using a pooled cross-country sample, Rodick (1998) finds that growth Granger causes savings in the short run but does not find any long-run relationship. Another study by Mohan (2006) finds that economic growth Granger causes the growth rate of savings in Algeria, Thailand and Colombia but finds no relationship for Ecuador and India; and finds a bi-directional relationship in Cote d'Ivoire. Jappelli and Pagano (1998) find that growth of national income granger causes the saving rate.

One among the few studies that have analysed the savings-growth nexus in Africa is the study by Anoruo and Ahmad (2001). They study the causal relationship between the growth of domestic savings and economic growth in Congo, Cote d'Ivoire, Ghana, Kenya, South Africa and Zambia. They find that economic growth Granger causes the growth in domestic saving in Ghana, Kenya, Nigeria and Zambia. In the case of Congo, they find that growth rate of domestic savings Granger caused economic growth. They find bi-directional causality in South Africa and Cote d'Ivoire.

Findings by Mauricio and Escobar (1997) suggest that higher government expenditures (in relation to their permanent level) are associated with lower national saving behaviour. Changes in national savings, changes in investments

are perfectly correlated and that savings Granger cause economic growth. Increases in urbanization and the age dependency ratio have negative impact on private savings. They also find that much of the reductions in private savings are accounted for by the increase in the current government consumption as well as by the effects of higher taxation. Furthermore, they find that national savings depend negatively on foreign saving inflows and positively on public savings.

Determinants of the Private Savings Function

The private savings function is based on the life-cycle model (LCM) of Modigliani (1986). In the LPM, the accumulation for retirement is the main reason for saving. A representative agent is assumed to maximize the present value of lifetime utility subject to a budget constraint. Assuming perfect competitive markets and perfect foresight, the agent's solution is that consumption, in a particular period, depends on expected lifetime income. Thus as the current income fluctuates, the agent has to save or de-save in order to smooth consumption. As such, the agent is a net saver during his/her working period and dis-saves during retirement (Athukorala et al., 2004).

Athukorala et al. (2004) argue that extending the LCM to the national level implies that the key determinants of savings in any given country over time include the growth rate of per capita income, the age structure of the population, the real interest rate on bank deposits and wealth. The impact of the growth rate of per capita income on private savings depends on whether the savings rate is positively or negatively correlated to age. Thus, the relationship between per capita income and the savings rate is either negative or positive. They also argue that the net effect of interest rates on saving/consumption is not clear in the LCM. An increase in the interest rate leads to an increase in the present price of consumption relative to the future price and thus tends to increase consumption and decrease saving. We can, thus, postulate that savings respond positively to increases in the interest rate only if the substitution effect is stronger than the income effect. We also postulate that wealth has a negative effect on savings.

Extensions of the LCM have led to the inclusion of variables such as aid, dependency rates and so on. The results are mixed on the relationship between the private savings rate and the dependency rates. For example, Jappelli and Pangano (1998) find a negative relationship while Rodick (1998) finds no relationship. On the relationship between the private savings function and both the level and growth of disposable income, Athukorala et al. (2004) find that the saving rate increases both these variables. They also find that the real interest rate on bank deposits has a significant positive impact on private savings and that public savings are seen to crowd out private savings. Using cross-country data, Loayza et al (2000) find that the correlation between savings and the old-age dependence ratio is not robust across different saving measures. They also find that the correlation between saving and the inflation rate is not robust across different saving measures and samples. They find a similar result when studying interest rate and savings. Mauricio and Escobar (1997), using an inter-temporal framework on Colombian data, find that savings partially respond to temporary changes in output according to the permanent income hypothesis.

5. Data and Methods

Data and Variables

The data used in the study was collected from the World Development Indicators database (World Bank, 2007) and from Loayza et al (2000) savings data base. Although a study by Maimbo and Mavrotas (2003) identified increased poverty and unemployment levels, increased investment in property, foreign exchange liberalisation, absence of rural financial savings institutions, HIV/AIDS epidemic, parastatal reforms and the 1997-8 bank closures as some key determinants of savings in Zambia, we cannot include all these variables due to data constraints.

Unit Root Testing

Unit root tests are conducted to ascertain the order of integration of our variables. The tests used include the Phillip Perron and the Augmented Dickey Fuller tests.

Assuming the following model for a series X:

$$\Delta Xt = \alpha_0 + \beta_1 X_{t-1} + \delta t + \sum_{1=1}^{m} \theta_i \Delta X_{t-i} + \varepsilon_t \quad (1)$$

Where Δ is the first-difference operator, ε is the error term, t is a time trend and m is the lag length. Acceptance of the null hypothesis: $H_0 : \beta = 0$ means that the series has a unit root and so it is non-stationary. The hypothesis is tested using Augmented Dickey Fuller critical values.

Granger Causality Tests

The causality between savings, investment and growth is investigated using bi-variate vector auto-regression (VAR) estimation procedure. Since the variables are non-stationary, we use the Johansen co-integration technique to establish whether there is any long run co-integrating relationship between the two variables. Once co-integration has been established we use the Vector Error Correction Model (VECM) upon which we base our Granger causality tests. According to this procedure an economic time series Y_i is said to be "Granger-caused" by another series X_i if the information in the past and present values of X_t helps to improve the forecasts of the Y_i variable (Agrawal, 2000).

We estimate a bi-variate pth order VECM as follows:

$$Y_i = \alpha z_{t-1} + \sum_{i-1}^{p} \alpha_i \Delta Y_{t-i} + \sum_{j-1}^{p} b_j \Delta X_{t-j} + u_t \quad (2)$$

$$X_t = y z_{t-1} + \sum_{i-1}^{p} c_i Y_{t-i} + \sum_{j-1}^{p} d_j X_{t-j} + v_t \quad (3)$$

Where z_{t1} is the error correction term and u and v are error terms. More

generally the VECM may include additional relevant variables. Then the null hypothesis that X_t does not Granger cause Y_t amounts to testing

$$b_1 = b_2 = ... = b_p = 0 \quad (4)$$

This can be tested using standard methods such as an F-test. Similarly, the null hypothesis Y_t that does not Granger cause is as follows:

$$c_1 = c_2 = ... = c_p = 0 \quad (5)$$

6. The Private Savings Function

Based on the above literature review, we model the savings function. We specify it as follows:

PRS = f (GDPR, GDPPC, INF, CONS, AID, POPDEP) (6)

Where PRS is the private saving rate defined as the ratio of net private savings to GDP. The independent variables are given in table 1 with the expected sign in brackets.

Table 1: Definition of Independent Variables

Variable	Definition	Expected Sign
GDPR	Rate of Growth of per capita GDP	(+) or (-)
GDPPC	GDP per capita	(+)
INFL	Rate of Inflation	(+)
CONS	Household Consumption	(-)
AID	Ratio of Foreign Aid to GDP	(+)
POPDEP	Population Dependency Ratio	(-)

We use the general to specific modelling procedure in estimating equation (6). This aims at minimizing the possibility of estimating spurious relations while retaining long-run information. The modern techniques of co-integration are not suitable here because the set of variables used is a mixture of stationary and non-stationary variables. Moreover, based on Monte Carlo studies, this methodology is as good as, if not more appropriate than, various co-integration techniques as an alternative procedure dealing with small data samples (Athukorala et al., 2003). We therefore adopt this methodology because our sample size is too small to allow for robust estimation through co-integration.

The general to specific methodology is based on Hendry (1996). The methodology[4] can be implemented as a one step procedure or a two step procedure. Here we use a two step procedure. In the first step we use Cochrane-Ocutt transformation to estimate an ordinary least squares (OLS) version of equation (6). This gives us a long-run equilibrium specification.

In the second step we nest the OLS long-run equilibrium result in (6) by including variables that are stationary and lags of the non stationary variables. At the second stage we estimate the model, in an unrestricted fashion, with as many variables as are suggested by both theory and empirical literature. Then we progressively simplify the model by restricting statistically insignificant coefficients to zero and reformulating the lag structure where appropriate in terms of levels and differences to achieve orthogonality. To be acceptable, the final equation must satisfy various diagnostic testing procedures. Following Athukorala et al. (2003), we set the initial lag lengths on all variables to two in the unrestricted equation in step two.

Empirical Results

We present the augmented Dickey-Fuller unit root tests. In order to double check the stationarity properties of the series, we have included Phillip Perron (PP) tests[5]. We came to the same conclusion by using both the Augmented Dickey Fuller test and the PP-test. The unit root results are shown in table 2. The results show that all our variables are integrated of order 1 (i.e., they become stationary only after differencing once) and thus non-stationary in levels.

Table 2: Unit Root Test Results

Series	Level	Difference
Dependency Ratio (popdep)	-2.156	-3.769*** (1)
Exports/GDP (xgdp)	-0.533	-8.006*** (1)
Imports/GDP (mgdp)	-0.441	-7.937*** (1)
Inflation (infl)	-1.702	-6.336*** (1)
Per capita growth (gdppcgr)	-2.450	-12.250*** (1)
M3/GDP (m3gdp)	-1.247	-4.484*** (2)
Log(gdp/pop) (lgdppc)	-1.103	-6.914*** (1)
Real interest (rintrest)	-	-6.666*** (1)
Gross domestic saving (gdsr)	-1.211	-9.542*** (1)
Aid/GNI (aidgni)	-1.292	-9.772*** (1)
RSA-Cons (rsacons)	-0.395	-6.654*** (1)
Gov/GDP (govgdp)	-0.941	-9.550*** (1)

Table 2: continued

Series	Level	Difference
Consumption/GDP (consgdp)	-0.808	-9.550*** (1)
Population growth (popgr)	-0.395	-4.269*** (2)
Gross capital formation rate (gcfr)	-1.230	-7.882*** (1)

Note:

* means significant at 10% level

** means significant at 5% level

*** means significant at 1% level

The curled brackets have the order of integration of the variable.

Granger Causality Tests

The Granger Causality tests between the gross domestic saving rate and the per capita GDP growth rate and between savings and investment are presented in table 3.

Table 3: Granger Causality Tests

Null Hypothesis	Wald-Stat	No. of Lags
Ho : Growth doesn't granger cause	4.43**	1
Ho : GDS/GDP doesn't granger cause	0.83	1
Ho : Investment rate doesn't granger cause	2.13	2
Ho : Saving rate doesn't granger cause	2.39	2

Note:

** Significant at 5% confidence level.

We use a Wald statistic. We find evidence of causality from growth of per capita GDP to the gross domestic saving rate in the short run. This is in line with the findings by Anoruo and Ahmad (2001). They found that growth in income Granger causes growth in the gross saving rate in Zambia. We also find no evidence of causality in the short run between growth of investment rate as proxied by the gross capital formation and gross domestic savings.

The Savings Function

In table 4 we show the estimated parsimonious private saving function for Zambia. We also present the diagnostic tests for the model and the long-run coefficients relating to the key explanatory variables. These are shown in table 5. We note here that variables of population growth, imports, government expenditure, real interest rate and dependency ratio were all found not to be significant and so were dropped from the final parsimonious regression in table 4. We also tried to incorporate the

dummy for bank closures for 1995 and 1997/98 but these also turned out to be insignificant contrary to the assertion by Maimbo and Mavrotas (2003).

Table 4: Determinants of the Private Saving Rate in Zambia.

Independent Variable	**Co-efficient**
Constant	-126.02 (61.05)*
gY_{t-1}	-0.034 (0.011)***
Ln Y_{t-1}	0.455 (0.228)**
$Cons_{t-1}$	0.448 (0.404)
X_{t-1}	0.773 (0.667)
π_{t-1}	-0.265 (0.502)
$\Delta g\ Y_t$	0.679 (0.195)***
$\Delta\ aid_t$	0.146 (0.078)*
ΔX_t	0.759 (0.162)***
Prs_{t-1}	-0.667 (0.154)***
$R^2 = 0.6980$ F(9,34) = 8.73*** SE = 5.12	
Breusch-Godfrey LM Test LM1 - F(1,33) = 0.071 LM2 - F(2, 32) = 0.413	
RESET - F(3,31) = 1.36	
Breusch – Pagan Test x2 (1) = 0.39	

Notes:

* Significant at 10 % confidence level

** Significant at 5 % confidence level

*** Significant at 1 % confidence level.

Exports and private savings are expressed as percentages of GDP.

t-ratios are in parenthesis

The estimated regression is statistically significant as shown by the overall significance of the F statistic at the 1% level. Besides, the diagnostic tests show that there is no serial correlation and heteroscedasticity in the errors and that the model is correctly specified as shown by the regression error specification test (RESET).

The long-run coefficients indicate that private savings in Zambia depend on per capita income, the growth of per capita income, private consumption, exports and the rate of inflation. Since we have a linear-log specification between savings and per capita GDP, we can interpret the long-run coefficient of the log of per capita GDP (Y) of 49.832 as: if there is a 1% increase in per capita income, there will be a 0.498% increase in the private saving rate. This renders evidence to the Keynesian "absolute income hypothesis" since there is a positive relationship between savings and per capita income. Thus the Zambian experience supports the argument that, for countries that are in the initial phase of development, income is an important element that determines savings. However, we also find a negative relationship between saving and income growth.

Table 5: Long-Run Response of the Private Saving Rate.

Explanatory Variable	**Co-efficient**
Per capita GDP growth (gY_t)	-24.833***
Log of per capita GDP (Y_t)	49.832***
Private Consumption (Cons)	-5.82×10^{-12} ***
Export (X_t)	0.066*
Inflation (π_t)	0.062*

Notes:

*Significant at 10% level.

**Significant at 5 % level

***Significant at 1% level.

Export and Private Savings are expressed as percentages of GDP.

We also find evidence that the inflation rate has a positive impact on private savings. The coefficient of savings is statistically significant only at 10% level. Nonetheless, it supports the hypothesis that when faced with inflation; consumers attempt to maintain a target real wealth relative to income by reducing consumption (Athukorala et al., 2003). In line with this, we find that private saving is negatively related to private consumption. The coefficient of private consumption is negative though infinitesimal. Lastly, we also get a positive relationship between private savings and exports. This goes to confirm that exports are an injection of income in the economy and part of this income is saved. This could only be resolved fully if the age saving structure is known.

The parsimonious model shows that there is a contemporaneous relationship between private savings and foreign aid in the short run. The coefficient of foreign aid of 0.146 suggests that a 1% increase in foreign aid/GDP increases private savings by 0.146% in the short run. We also find evidence that exports and growth of income impact on private savings positively in the short run.

7. Conclusion and Discussion

This article has analysed the characteristics of Zambia's savings by using econometric techniques. The evidence points to the fact that growth of per capita GDP Granger causes savings. This result is in line with the findings by Anoruo and Ahmad (2001). It suggests that growth is good for savings but not vice versa. There is no evidence of any causality of investment and savings.

We estimated the private saving function. We found evidence that private savings, in the long run, depend on per capita income growth, per capita income, inflation, private consumption and exports. The evidence shows that private savings depend on per capita income positively. This supports the Keynesian "absolute income" hypothesis since there is a positive relationship between savings and per capita income. Thus the Zambian experience supports the argument that for countries that are at an early phase of development, income is an important element in determining savings.

We found evidence that inflation has a positive impact on private savings. The coefficient of private consumption is negative though very infinitesimal. We also found a positive relationship between private savings and exports. This confirms that exports are an injection of income in the economy and part of this income is saved.

The parsimonious savings model shows that there is a contemporaneous relationship between private savings and foreign aid in the short run. The coefficient of foreign aid of 0.146 suggests that a 1% increase in the foreign aid/GDP ratio increases private savings by 0.146% in the short run.

The article has shown that a permanent increase in the savings rate is cardinal for growth in Zambia because higher savings will lead to a higher growth path and an accumulation of capital. This is demonstrated theoretically and by evidence elsewhere. Domestic savings play a cardinal role especially since foreign investment may be hard to come by with the global economic problems. Domestic savings are in theory likely to attract FDI that will lead to an injection of technology. Furthermore, it has been shown that a high saving rate is good. This is confirmed by the experience of East Asian countries which have registered higher growth rates compared to Latin American countries during the period 1960-2000.

The boosting of domestic savings and investment calls for the development of efficient and prudent intermediaries – commercial banks, mutual funds, insurance companies, building societies and capital markets. These should be given incentives to extend their services to rural areas. The efficiency of the financial intermediaries, particularly commercial banks, is important. A closer examination of the cause of the wide spread between borrowing and lending rates is needed. Efficient marketing systems should ensure that the cost of both lending and borrowing money is reduced. The role of National Savings and Credit Bank should be enhanced particularly in reaching the poor in both rural and urban areas.

In an open economy, increasing private domestic savings may not necessarily lead to increased domestic investment and thereby offer better prospects for growth. This is because government must keep its borrowing in check to ensure

that it does not crowd-out private investment. Similarly, it is important to reduce the cost of doing business so as to enhance investment. In a worst-case scenario, firms may borrow on the domestic market but may end-up investing elsewhere where the returns are higher.

It has to be recognized that the key to economic growth is technology transfer through FDI. Domestic savings should play a role in strengthening this channel. The promotion of research and development (R&D) particularly in agriculture must be central. Human capital development is equally essential for a sustained level of growth. Local firms should be given incentives for R&D and government should subsidize this activity. In this regard, research institutes and university training and research should be given priority.

Notes

1. Domestic savings have to come from households and the retained earnings from the private enterprises of all sizes plus savings from public revenues by all levels of government.
2. The Solow model is the main neo-classical growth model.
3. For example Loayza et .al. (1998)
4. For a thorough exposition of this methodology see Cuthbertson et al. (1992:98-128) and Hatanaka (1996:204-218).
5. We do not show the Phillip Perron Test results here because we ended up with same conclusions.

References

Agrawal, P. 2000. “Savings, Investment and Growth in South Asia.” Indira Ghandi Institute of Development Research Working Paper, June.

Aghion, P.; D. Comin; P. Howitt.; and I. Tecu. 2009. “When Does Saving Matter for Economic Growth?” Harvard Business School Working Paper no. 09-080.

Anoruo, E. and Y. Ahmad. 2001. “Causal Relationship between Domestic Savings and Economic Growth: Evidence from Seven African Countries.” African Development Bank.

Athukorala, P. and K. Sen. 2003. “The Determinants of Private Saving in India.” *World Development* 32, no. 3: 491-503.

Cuthbertson, K.; G.S. Hall; and P. M. Taylor. 1992. *Applied Econometric Techniques*. Hertfordshire: BPC Wheattons Ltd.

David, R .1996. *Advanced Macroeconomics*. New York: McGraw-Hill.

Domar, E. D. 1946. “Capital Expansion, Rate of Growth, and Employment.” *Econometrica* 14:137-147.

Government of the Republic of Zambia. 2010. “Poverty Trends Report”, 1996-2006. Lusaka: Central Statistical Office.

Harold, R. F. 1939. “An Essay in Economic Theory.” *Economic Journal* 39:14-33. Reprinted in ed. A. Sen. 1970. *Growth Economics. Selected Readings*. Harmondsworth: Penguin.

Hatanaka, M.1996. *Time Series Based on Econometrics: Unit Roots and Co-integration*. Oxford: Oxford University Press.

Hendry, D.F. 1996. *Dynamic Econometrics*. Oxford: Oxford University Press.

Jappelli, T. and M. Pagano. 1998. "The Determinants of Domestic Savings in Latin America." Paper prepared for the Conference on Determinants of Domestic Savings in Latin America organized by the Inter American Bank, 15-17 June 1996.

Loayza, N.; K. Schmidt-Hebbel and L. Serven. 2000. "What Drives Private Saving across the World? *Review of Economics and Statistics* 82, no 2: 165-181.

Maimbo, M. S. and G. Mavrotas. 2003."Financial Sector Reforms and Savings Mobilizations in Zambia." UNU/WIDER Discussion Paper number 13, February.

Mauricio, C and A. Escobar.1997. "Determinants of Saving in Colombia: 1925-1994". Banco Inter-Americano de Desarrallo.

Melzer, I .2007. "Savings in Zambia." FINSCOPE Report, November.

Modogliani, F. 1986. "Life Cycle, Individual Thrift, and the Wealth of Nations." American Economic Review 76: 297-313.

Moore, B. 2006. "Saving is Never a Constraint on Investment." *South African Journal of Economics* 74, no 1, March.

United Nations Economic Mission for Africa (UNECA). 1997. "Accelerating Trade and Investment in Africa." Technical Preparatory Committee Report. Addis Ababa, Ethiopia. April 22.

Rodick, D. 1998 "Saving Transitions." World Bank Research Project Paper on Savings. Unpublished paper.

Solow, R. 1957. "Technical and Aggregate Production Function." *Review of Economics and Statistics* 39:312-320.

World Bank. 2007. *World Development Indicators*. Washington, D.C.: World Bank