Financial Deepening, Savings Mobilization and Poverty Reduction in Kenya

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Abstract

Kenya's Vision 2030 identifies the financial sector as one of the key sectors, as it plays a key role in mobilizing savings that are necessary for economic development. Financial deepening accelerates economic growth through expansion of access to finance for those who do not have adequate finance themselves. Having access to finance is a key factor in poverty reduction. This study analyzes the interrelationship between financial deepening, domestic mobilization of savings, and poverty reduction in Kenya. The study finds that there is a unidirectional causality flowing from financial deepening to both savings and poverty reduction. The effect of financial deepening on poverty reduction in Kenya is positive, though not significant. Finally, the study finds the existence of a long run equilibrium relationship between financial deepening, savings mobilization, and poverty reduction. The government should take policy measures aimed at enhancing financial deepening because it is beneficial to both savings mobilization and poverty reduction. In particular, the interest rate margin should be reduced.

Abbreviations and Acronyms

ACBF	African Capacity Building Foundation
ADF	Augmented Dickey-Fuller test
ARDL	Autoregressive Distributed Lag
ATM	Automated Teller Machine
BR	external debt service ratio
D(.)	Means the variable has been differenced once
DCP	Domestic credit to private sector
DfID	Department for International Development
FGLS	Feasible Generalized Least Squares
FSDK	Kenya Financial Sector Deepening Programme
GDP	Gross Domestic Product
GDPGR	real GDP growth rate
GI	Gini index
KIHBS	Kenya Integrated Household Budget Survey
KIPPRA	Kenya Institute of Public Policy Research and Analysis
M2	A monetary aggregate defined as 'cash and checking deposits (M1) as well as near money i.e. savings deposits, money market mutual funds and other time deposits.
M2GDP	M2 as a per cent of GDP
MFCs	mortgage finance companies
MTP	Medium Term Plan
NBFIs	Non-bank Financial Institutions
OLS	Ordinary least squire
P	inflation rate
PCHC	Per capita household final consumption
PP	Phillips-Perron test
R	real interest rate,
RGDP	real GDP
SACCOs	Savings and Credit Cooperative Organizations'
SGDP	Gross domestic savings as per cent of GDP
SSA	Sub-Saharan African
TOT	terms of trade
YPs	Young Professionals

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1. Introduction

1.1 Background

Kenya's long term national strategy, Vision 2030, identifies the financial sector as one of the country's key economic sectors. The Vision envisages Nairobi as a globally competitive financial hub. The second Medium Term Plan (MTP II) identifies the establishment of Nairobi International Financial Centre as one of its flagship projects. The first Medium Term Plan (MTP I) for Vision 2030 recommended an increase in savings to support investment. Gross national savings were expected to rise from 15.6 per cent of GDP in 2006/07 to 26 per cent in 2012/13, and projected to stand at 29 per cent of GDP by 2030. This would boost investments to 31.3 per cent of GDP by 2012/13. These savings would be mobilized through a deepened financial sector.

Financial deepening is the increased provision of financial services with a wider choice of services geared to all levels of society. It generally means an increased ratio of money supply to GDP or some price index. It refers to liquid money. The more liquid money is available in an economy, the more opportunities exist for continued and sustainable growth. It is the accumulation of financial assets at a faster pace than the accumulation of non-financial wealth and total output (Shaw, 1973).

The number of registered financial institutions has not changed significantly since December 2000 when there were 49 were commercial banks, 5 non-bank financial institutions (NBFIs), 2 mortgage finance companies (MFCs) and 4 building societies. In December 2013, there were only 43 commercial banks, 1 non-bank financial institution (NBFI) and 9 micro finance banks. The asset base increased significantly from Ksh 409 billion to Ksh 2.7 trillion and the number of branches and ATMs has grown remarkably from 407 to 1,342 branches nationwide.

The financial deepening indicators for Kenya (M2 to GDP ratio, and domestic credit to the private sector as a percentage of GDP) compare favourably to the peers in Sub-Saharan Africa such as Ghana and Uganda, but are yet to reach the desired levels such as those obtained in emerging economies such as India and developed countries such as the United Kingdom. For instance, Kenya's M2 to GDP ratio has been rising steadily from 35.8 per cent in 1998 to 50.8 per cent in 2012 compared to Ghana's rise from 22.9 per cent to 30.9 per cent in 2011, while Uganda's ratio has risen from 14.9 per cent in 1998 to 24.3 per cent in 2012. For the emerging market economies, the M2 to GDP ratio for India rose from 48.1 per cent in 1998 to 76.3 in 2012, while South Africa's rose from 56.5 per cent in 1998 to 78.3 per cent in 2012. The situation is different for the developed world, where the ratio has remained over 100 per cent over the same period as is the case for

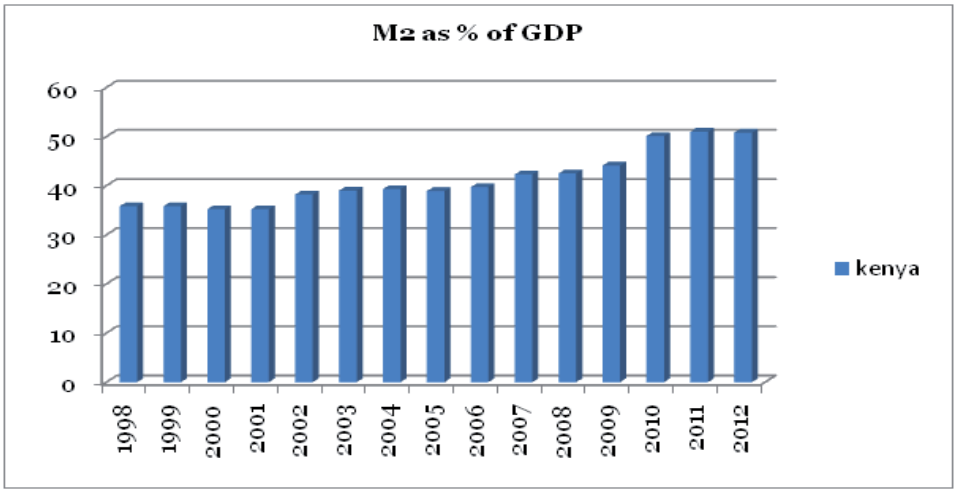
the United Kingdom. Kenya's recent trend in M2/GDP ratio growth is shown in Figure 1.1.

Since the 1980s, Kenya has been undertaking financial sector reforms, which include liberalization of interest rates between January 1988 and July 1991. In 1995, liberalization of the banking sector started with exchange controls being lifted. The reforms were both policy and institutional. Policy reforms constituted interest rate liberalization, development of the money and capital markets, enhancing efficiency of the financial intermediation process, development of more flexible monetary policy instruments, elimination of credit ceilings, and reduction of both the government's excessive reliance on domestic bank borrowing and reduction of its budget deficit. Institutional reforms were geared to setting up an efficient regulatory framework, and ensuring prudential regulation and supervision of the financial system. Further, there was emphasis on the need to restructure the troubled financial institutions, including privatization, and improvement of technical expertise at the Central Bank of Kenya (Isaksson, 2001). These developments were aimed at enhancing financial depth for the Kenyan economy.

Financial intermediation through both the banks and non-banking financial institutions plays a key role in the saving-investment process, where money forms a part of a wide spectrum of financial assets in the portfolio of wealth holders (Gurley and Shaw, 1955, 1956, 1967). Indeed, this is the role of financial deepening, which greatly determines the economic growth and development of any country.

The domestic resources of a country form a critical cornerstone for growth and development. An efficient and well-functioning financial system will play a key

Figure 1.1: Trend of M2/GDP ratio growth



role in mobilizing these resources. The improvement in the indicators of financial deepening reflects the response of Kenya's financial sector to the reforms carried out. Nevertheless, the level of domestic resources mobilized (savings included) has not been sufficient to stimulate private investments that would result in growth and poverty reduction to the desired level. The developments in the financial sector have occurred at a time when the poverty level has declined from 56 per cent in 1997/1998 Welfare Monitoring Survey to 46 per cent in 2005/2006 Kenya Integrated Household Budget Survey (KIHBS).

A deepened financial sector would influence the savings and investment behaviour of households and firms in a number of ways. It would supplement the liquidity pool of households and firms by providing credit that would otherwise be impossible in a shallow financial system. The additional liquidity would enable economic agents to use more inputs in the production process, which would result in increased net incomes. The savings capacity of the households and firms thus expands due to the increased income. At the same time, the additional liquidity permits households to maintain their consumption, undisturbed due to even flow of income. The households can also make bulky purchases of consumer durables and heavy capital goods for production. Alternatively, a deepened financial system may offer various types of saving instruments to households. Should the households get positive real returns from these instruments, they are likely to be induced to convert part of this excess liquidity into financial savings.

Before financial sector reforms were introduced, the Kenyan economy was under some form of 'financial repression' because the financial system was used as a way to extract resources by levying an inflation tax on currency, and by borrowing at less than market rates through the imposition of interest rate ceilings. It must be noted that competition in the financial sector was stifled, and flow of loanable funds was limited to some sectors without regard to their productivity. Also, demand for funds did not match supply, and non-economic considerations took priority over economic considerations in the allocation of available funds (Graham, 1996).. Also, demand for funds does not match supply, and non-economic considerations take priority over economic considerations in the allocation of available funds (Graham, 1996).

1.2 Policy Problem

One of the key features of financial deepening is that it accelerates economic growth by expanding access to finance for those who do not have adequate finance. In a poorly developed financial system, it is only incumbents who have access to financial services through relationship banking and they could finance their

growth through internal resource generation, whereas the rest of the population is marginalized. A developed financial system promotes health competition and entrepreneurship by providing credit to the budding entrepreneurs (Mohan, 2008). This is possible because elimination of information asymmetry and of financial institutions are better placed to assess and award credit to new business initiatives. Through this process, poverty reduction takes place as more poor people get involved in productive business ventures.

The financial services sector, particularly the banking industry, has been growing, with the savings deposit base standing at Ksh 1.7 trillion as at 30 June 2012. Notwithstanding the outreach of the banking sector, the formal credit system has not been able to adequately penetrate the informal financial markets; rather, it is relatively low because 32.7 per cent of the population is excluded from the credit system, while 26.8 per cent use informal sources of credit. Having no formal savings can be problematic in two respects; first, people who save informally rarely benefit from interest rate and tax advantages that people using formal means enjoy. Second, informal saving channels are much less secure than formal saving facilities. It is only 40.5 per cent of the population that is formally served by the financial sector, of which 22.6 per cent is served by banks, while 17.9 per cent is served by SACCOs.

The growth targets of the country are spelt out in Vision 2030 and MTP I. A look at the annual progress reports, especially the fourth progress report 2011/2012, shows that GDP growth and gross savings targets have not been met. Shallow finance could be one of the reasons. This study aims to extend our understanding of the nature of financial deepening in the context of a developing country, Kenya. It will inform policy makers on major areas to focus on with regard to financial deepening for poverty reduction.

1.3 Research Questions

The research questions for this study are:

(i) What is the direction of causality between: (a) financial sector development and domestic saving mobilization; (b) financial sector development and poverty reduction; and (c) domestic saving mobilization and poverty reduction?

(ii) What is the effect of financial deepening on poverty reduction for Kenya?

1.4 Objectives of the Study

The study intends to evaluate the effect of financial deepening on poverty reduction in Kenya. The specific objectives are:

(i) To examine the direction of causality between: (a) financial sector development and domestic saving mobilization; (b) financial sector development and poverty reduction; and (c) domestic saving mobilization and poverty reduction.

(ii) To evaluate the effect of financial deepening on poverty reduction for Kenya.

1.5 Justification and Policy Relevance

There is need for an assessment of the nature and extent of financial deepening in Kenya. Beginning 1990s, Kenya started implementing financial sector reforms. These reforms had an effect on financial deepening, and this was presumed to have an effect on economic growth and ultimately on poverty reduction in Kenya. In this light, it is important to test whether financial deepening in Kenya plays the causal role as postulated by the conventional supply-leading hypothesis (Darrat, 1999).

The MTP I aspired for 'a vibrant and globally competitive financial sector driving high levels of savings and financing Kenya's investment need'. It is viewed as an avenue that will facilitate private sector development and help in poverty reduction. This has been followed up in MTP II, which has identified 'investment to support growth' as one of its priority areas where new initiatives will be undertaken to encourage the financial sector to mobilize the savings necessary for investment. While notable progress has been made to improve penetration levels of financial services over the past five years, there is still need for increased efforts to enhance financial access, since only 40.5 per cent of the population is formally served by the financial sector (FinAccess Survey, 2009).

This research is of policy relevance because both the government and development partners have expended effort to address it. For instance, the Department for International Development (DfID) supported the establishment of the Kenya Financial Sector Deepening (FSDK) programme in 2005. The programme aims to stimulate wealth creation and reduce poverty by expanding access to financial services for lower income households and smaller scale enterprises. Kenya's financial sector is relatively developed compared to other Sub-Saharan African (SSA) countries, with competition having intensified among banks and other non-banking financial institutions, a fact that contributed to the success of the programme. The introduction of mobile money has further expanded the menu of financial services available to the lower income segments of the population.

2. Literature Review

2.1 Theoretical Literature

There is a host of empirical and theoretical literature in support of the view that an efficient and well functioning financial system is a necessity for sustained long term economic growth and development. Over a century ago, Schumpeter (1911) posited that the financial intermediation function carried on by commercial banks served an essential role of affecting the allocation of savings, thereby improving productivity and technological change, leading to economic development. The contemporary financial theory puts emphasis on the intermediation function by financial institutions to bridge the asymmetry of information amid borrowers and savers, thereby performing the functions of savings mobilization, capital fund allocation, monitoring use of funds, and managing risk, which support the economic growth process (Levine, 1997). While acknowledging these complex and multiple functions of finance, Stiglitz (1998) equates the financial system to the 'brain' of the economy, performing the task of allocating resources across space and time in an environment of uncertainty.

Most of the policy initiatives, particularly in low income countries, aimed to strengthen the contribution of financial development to economic development, and derived their support and justification from the causal link between finance and economic growth. The work of Shaw (1973) and McKinnon (1973) constituted the theoretical basis for the prevalent adoption of reform measures and financial liberalization in developing countries in the 1980s. The interest rates deregulation was intended to mobilize an increased volume of financial savings and allocate capital to more productive uses, both of which would enhance the volume and productivity of physical capital, thereby contributing to economic growth (Jalilian and Kirkpatrick, 2001).

2.2 Empirical Literature

In most of the empirical research on finance, growth nexus has relied heavily on cross-country econometric studies. Goldsmith (1969) stressed the connection between a country's financial superstructure and its real economic infrastructure. Goldsmith showed a strong positive trend in the ratio of financial institutions' assets to GDP for a sample of developed and developing countries. Other studies include: King and Levine (1993 a, b), Arestis and Demetriades (1997), Levine (1997), Rajan and Zingales (1998) and World Bank (2001b). This body of literature is well represented by King and Levine (1993a) that higher levels of financial development are significantly and robustly correlated with faster current

and future rates of economic growth, physical capital accumulation and economic efficiency improvements; and that finance does not only follow growth, but seems importantly to lead to economic growth.

Studies have shown that there is a very strong association between financial development and mobilization of savings. McKinnon (1973) and Shaw (1973) argue that liberalization of interest rates would put an end to financial repression and form the basis for financial deepening owing to the resulting increased efficiency of the intermediation process, and the effects of higher interest rates on savings. The two authors only differed on the transmission mechanism through which the process would take place. Models that look at the link between savings and financial development are based around the life-cycle or permanent income theory of consumption (Mavrotas and Santillana, 1999). They present an argument that liberalization of the financial sector increases competition amongst banks, hence the constraint on borrowing is eliminated making it possible for the young and budding entrepreneurs to borrow so as to attain their optimal lifetime consumption path.

Bandiera *et al.* (2000) used 1970-1994 data to estimate savings and its determinants for a number of countries such as Ghana, Indonesia, Korea, Mexico, Turkey, Malaysia, Chile and Zimbabwe using OLS. They found that the link between financial liberalization and savings mobilization is theoretically ambiguous, even though it is widely accepted that it can enhance the efficiency with which saved resources are channelled into productive use. This is because the relationship between savings and interest rate levels is unclear, and financial liberalization is a phased, multi-dimensional process, which sometimes involves reversal. The mechanisms at work are both long and short term. Having settled down, a competitive liberalized financial system will typically be characterized by improved savings opportunities, including higher deposit interest rates, a wider range of savings media with improved risk-return characteristics and, in many cases, more banks and bank branches as well as other financial intermediaries. Bank lending rates will typically be higher for those borrowers who had privileged access in the restricted regime, but access to borrowing should be wider. These long-term effects of liberalization on aggregate private savings will be felt through changes in the rates of return and in the degree of credit restrictions. Moreover, financial liberalization can have a favourable effect on the allocation of resources, which will generate increases in income that will, in turn, increase savings (Quartey, 2005).

The relationship between financial sector development and poverty reduction has been investigated by some researchers. The interaction between these variables can be studied by first considering the effect of financial development

on economic growth, which in turn has implications for changes in the poverty level within the economy. Growth has been beneficial for the poor (Dollar and Kraay, 2001). They used data of 137 countries between 1950 and 1999. Through their analysis of income data on the lowest quintiles, they show empirically that the poor have benefited from growth as the other quintiles of the population. The incomes of the poorest quintile moved almost one-for-one with average incomes overall. These results seem to imply that sound macroeconomic policies, openness and globalization have a positive and direct impact on the income of the poor.

Jalilian and Kirkpatrick (2001) studied the relationship between financial development and poverty reduction by analyzing data from 26 countries, of which 18 were developing countries. They found that 1 per cent change in financial development raises growth in the incomes of the poor in developing countries by almost 0.4 per cent.

By supporting economic growth, financial development can also have an indirect impact on the living standards of the poor (World Bank, 2001b). The growth-poverty nexus has received substantial consideration in recent years (World Bank, 2001; Ravallion, 2001; Squire, 1999). Any given scenario of growth has a potential of spawning different poverty outcomes. For any specified growth rate, the degree of poverty decrease will vary depending on how the income distribution varies with variation in growth and on initial income inequalities, assets and access to opportunities so as to let the poor share in growth. Growth that is equi-proportional leaves the distribution of income unchanged, and reduces poverty by boosting the situation of some of those at the lower scale of distribution (World Bank, 2001b).

Inoue and Hamori (2012) carried out a study in India using unbalanced panel data of 28 states for seven time periods (1973, 1977, 1983, 1987, 1993, 1999 and 2004). The variables used were poverty, financial deepening, trade openness and inflation. He applied the dynamic panel Generalized Method of Moments (GMM) to the data, and his main findings are that financial deepening significantly leads to poverty reduction in the whole economy for urban and rural areas, and that economic growth helps increase the income of the poor. Also, globalization (international openness) significantly leads to increase in poverty ratio, and inflation has adverse effect on poverty.

Odhiambo (2010a) focused on the Kenyan economy to analyze the relationship between financial deepening, savings and poverty reduction. He used time series data between 1968 and 2006 and the dynamic trivariate granger causality model based on error correction mechanism. His main findings were that there is a distinct causal flow from financial deepening to both poverty reduction and

savings, and that there is bi-directional causality between savings and poverty reduction.

Odhiambo (2010b) focused on Zambia and used annual time series data between 1969 and 2006 of financial deepening (used 3 proxies) and poverty reduction. He applied the Autoregressive Distributed Lag (ARDL) bounds testing procedure. The main findings of this study were that when the ratio of M2 to GDP (M2/GDP) is used as a proxy for financial deepening, poverty reduction causes financial development. When the ratio of domestic credit to the private sector to GDP (DCP/GDP) and the domestic money bank assets are used as proxies for financial development, then financial development causes poverty reduction, hence sensitivity to the proxy used for financial development.

Financial deepening narrows income inequality and reduces poverty. Huang and Singh (2009) focused on 37 Sub-Saharan African (SSA) economies to analyze the relationship between financial deepening and poverty using panel data from 1992-2006. Four indicators of poverty were used in the study: the head count index, the poverty gap, the Gini coefficient, and the income of the poorest quintile. To address heteroskedasticity, they used the Feasible Generalized Least Squares (FGLS) method, and results show that financial deepening leads to significant reduction of the head count index, the poverty gap, income of the poorest quintile increase, while the Gini reduces insignificantly. Thus, financial development has a positive impact on the poor.

There is a strong evidence that financial sector deepening contributes to the reduction of rural poverty rates across India by enabling more entrepreneurship in the rural areas and enticing inter-state migration into the tertiary sector (Ayyagari, *et al.*, 2013). However, financial depth had no effect on urban poverty rates in India. Thus, financial deepening may result in significant structural effects, such as through structural reallocation and migration, with consequences for poverty reduction. Important policy repercussions inferred from this study are that pro-poor effects of financial deepening come through more efficient and deeper financial systems rather than necessarily through more inclusive financial systems. Critically, the poorest of the poor benefit through indirect structural effects of financial deepening as well as directly from financial deepening by accessing financial services.

2.3 Overview of the Literature

Studies have shown that where there is low financial depth, there is a high chance of information asymmetry for financial intermediaries, which result in market failure. As such, market imperfection leads to imbalanced credit access. For

instance, a group of talented entrepreneurs may fail to productively invest due to lack of sufficient wealth for collateral. More people may fall below the poverty line in instances such as when a bank collapses. This is not only as a result of them being clients of the failed bank thus losing their savings, but because of the contagion effects that lead to failure of related financial firms, non-financial firms, and the effect on consumption and employment. Jalilian and Kirkpatrick (2001) have shown that the poorest of the poor have benefited from financial deepening.

Odhiambo (2010a) analyzes the relationship between financial deepening, savings mobilization, and poverty reduction in Kenya. He used time series data between 1968 and 2006. Concerning the causality between financial deepening and poverty reduction, he found that there is sensitivity with regard to the proxy used for financial deepening. This study extends the work of Odhiambo (2010a) by showing the link between savings mobilization due to financial deepening that affects poverty reduction.

3. Data and Methodology

This chapter seeks to develop a suitable model that will be used to analyze the interrelationship between the variables of interest in this study. The variables are defined as follows:

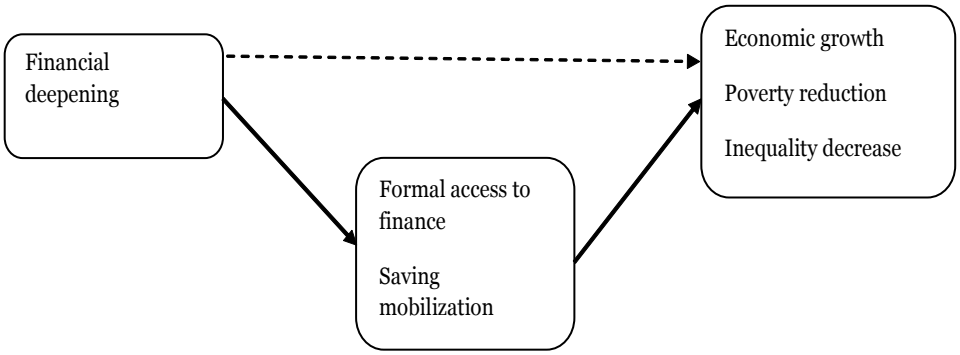
- Poverty reduction indicator: Per capita household final consumption (PCHC);
- Saving mobilization indicator: Gross domestic savings as per cent of GDP (SGDP); and
- Financial deepening indicator: M2 as a per cent of GDP (M2GDP).

The other control variables that will be used in the study include: real GDP (RGDP), real GDP growth rate (GDPGR), real interest rate (R), inflation rate (P), external debt service ratio (BR), terms of trade (TOT) and the Gini index (GI).

3.1 Conceptual Framework

The concept of financial deepening can be associated with savings mobilization and poverty reduction. A deep financial sector will ensure that a large proportion of the population has access to formal financial services such as banking, insurance and capital markets. Access to formal financial services will facilitate the mobilization of savings, which then can be used to start business enterprises, thus pulling people from poverty and helping reduce inequality. Financial deepening can also have an indirect effect on poverty reduction by accelerating economic growth, which is beneficial to the poor.

Figure 3.1: Conceptual framework



3.2 Model Specification

3.2.1 Granger causality test

First, we carry granger causality test between the variables of interest. The results of granger causality test are important because they will be used to guide the choice of the appropriate model for analysis. Therefore, the following variables will be subjected to pair wise granger causality test: PCHC, SGDP and M2GDP.

3.2.2 Step wise model estimation

Since the results of granger causality tests indicate a unidirectional causality from financial deepening indicator to both savings and poverty reduction, we estimate a two step approach using OLS as follows:

Step One

Estimate savings as a function of financial sector deepening as specified in equation 1.

$$SGDP=\beta_1+\beta_2 M2GDP+\beta_3 RGDP+\beta_4 GDPGR+\beta_5 R+\beta_6 P+\beta_7 BR+\beta_8 TOT+\varepsilon \ldots\ldots\ldots\ldots\ldots (1)$$

From equation 1, we obtain the fitted values of SGDP, which will be used as an explanatory variable in the second equation.

Step Two

$$PCHC = \beta_1+\beta_2 SGDPF+\beta_3 RGDP+\beta_4 R+\beta_5 P+\varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2)$$

Estimate poverty reduction as a function of the fitted values of SGDP as in equation 2.

The method of estimation of both equation 1 and 2 will be Ordinary Least Square (OLS).

3.3 Data Sources and Measurement of Variables

The data used in this study was obtained from the World Development Indicators published by the World Bank. The government has taken a number of measures to deepen the financial sector. Some of the initiatives include expansion of the

capital markets, reforms in pension administration, and insurance regulatory reforms. However, since the banking industry constitutes the largest proportion of the financial sector, this study uses one proxy for financial deepening, that is M2 as a percentage of GDP, which covers developments in the banking industry.

Concerning a measure for poverty reduction, the study uses per capita household final consumption expenditure because consumption expenditure is accurately reported and it represents an individual's welfare.

3.4 Time Series Characteristics of the Data

The study now turns its focus towards investigating the time series characteristics of the data to assess the possibility of cointegration in the data and to ensure consistency in subsequent stationary econometric modelling. The Augmented Dickey-Fuller and Philips-Perron unit root tests are the standard tests of the null hypothesis that p=1 in the regression.

$$y_t=\alpha_o+py_{t-1}+\mu\sim(o,\sigma^2);\ y_o = o \quad \text{.....(3)}$$

Failure to reject p=1 indicates that y is non-stationary and will need to be differenced at least once to render it stationary.

4. Data Analysis and Discussion

4.1 Descriptive Results

The Jarque-Bera test statistic tests the null hypothesis that the distribution of the variables is not significantly different from normal. The resultant *p* values from the test were higher than the conventional *p* value of 0.05 for the eight variables (PCHC, M2GDP, SGDP, RGDP, TOT Index, interest rate R, GDP growth rate GDPGR and Debt service ratio BR), which indicate that there was a high probability that the null hypothesis is true. It therefore implies that the eight variables are normally distributed at 5 per cent. Only inflation and Gini index series are not normally distributed.

4.2 Granger Causality Tests

Granger causality test was conducted on the three key variables: PCHC, M2GDP and SGDP. The granger causality results indicate that there is a unidirectional causality from financial deepening indicator to both savings mobilization and poverty reduction. Therefore, financial deepening can lead to increased savings and help in poverty reduction. There is no causality between savings mobilization and poverty reduction indicators, that is SGDP and PCHC.

4.3 Unit Root Tests

Prior to testing for a causal relationship and cointegration between the time series, the first step is to check the stationarity of the variables used in the model. The aim is to verify whether the series have a stationary trend and, if non-stationary, to establish orders of integration. The study used both Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests.

Results in Table 4.2 indicate that eight variables are non-stationary (that is presence of unit roots) at 1 per cent, 5 per cent and 10 per cent levels of significance except for interest rate and inflation, which are stationary. This calls for first differencing of the non-stationary variables.

Table 4.3 displays the unit root tests after first differencing. It is clear from the results in Table 4.3 that all the variables become stationary (unit root disappears) on first differencing.

Table 4.1: Descriptive results

	PCHC	M2GDP	SGDP	RGDP	TOT INDEX	INTEREST RATE R	INFLATION P	GINI INDEX	GDPGR	DEBT SERVICE RATIO
Mean	25,599.06	36.25	12.99	955×109	90.54	7.90	10.31	46.10	0.04	20.97
Median	25,746.00	35.81	10.71	920×109	90.04	6.82	9.55	46.39	0.04	20.56
Maximum	30,272.00	50.62	22.56	1,610×109	114.02	21.10	41.99	57.46	0.07	39.77
Minimum	20,137.00	26.68	2.89	548×109	70.15	(5.78)	0.93	42.07	(0.01)	4.31
Std. Dev.	2,395.78	6.63	5.94	299×109	10.64	6.30	7.53	3.02	0.02	11.97
Skewness	(0.10)	0.55	0.03	0.58	0.37	0.37	2.49	1.46	(0.13)	0.09
Kurtosis	2.66	2.59	1.55	2.42	2.52	2.49	10.96	7.03	1.99	1.66
Jarque-Bera	0.21	1.89	2.90	2.30	1.05	1.11	121.05	33.93	1.50	2.54
Probability	0.90	0.39	0.23	0.32	0.59	0.57	-	-	0.47	0.28
Sum	844,769.00	1,196.20	428.51	31.5×1012	2,987.85	260.59	340.15	1,521.27	1.16	691.87
Sum Sq. Dev.	184×106	1,405.93	1,129.41	2,870×1021	3,622.14	1,269.11	1,814.99	291.83	0.01	4,587.92
Observations	33	33	33	33	33	33	33	33	33	33

Source: Eviews computation

Table 4.2: Unit root tests-level

Variable Name	ADF test	PP test	1% level	5% level	10% level	Comment
PCHC	-0.652779	-0.598448	-3.653730	-2.957110	-2.617434	Non-Stationary
SGDP	-0.999197	-0.773268	-3.653730	-2.957110	-2.617434	Non-Stationary
M2GDP	-0.019255	0.282007	-3.653730	-2.957110	-2.617434	Non-Stationary
RGDP	1.048107	0.621784	-4.273277	-3.557759	-3.212361	Non-Stationary
TOT INDEX	-1.968746	-2.214998	-3.653730	-2.957110	-2.617434	Non-Stationary
INTEREST RATE	-3.824145	-3.783579	-3.653730	-2.957110	-2.617434	Stationary
INFLATION	-3.903551	-3.986120	-3.653730	-2.957110	-2.617434	Stationary
GINI INDEX	-2.850509	-2.824224	-3.653730	-2.957110	-2.617434	Non-Stationary
GDPGR	-3.307604	-3.307604	-3.653730	-2.957110	-2.617434	Non-Stationary
DEBT SERVICE RATIO	-0.484013	-0.467789	-3.653730	-2.957110	-2.617434	Non-Stationary

Source: Eviews computations

Table 4.3: Unit root tests-first differences

Variable Name	ADF test	PP test	1% level	5% level	10% level	Comment
PCHC	-6.180775	-6.323806	-3.661661	-2.960411	-2.619160	Stationary
SGDP	-6.223113	-6.616228	-3.661661	-2.960411	-2.619160	Stationary
M2GDP	-6.947377	-6.869387	-3.661661	-2.960411	-2.619160	Stationary
RGDP	-3.396106	-3.432903	-4.284580	-3.562882	-3.215267	Stationary*
TOT INDEX	-6.029627	-6.002518	-3.661661	-2.960411	-2.619160	Stationary
GINI INDEX	-5.938466	-10.79547	-3.661661	-2.960411	-2.619160	Stationary
GDPGR	-6.118937	-7.012728	-3.661661	-2.960411	-2.619160	Stationary
DEBT SERVICE RATIO	-5.880232	-5.950737	-3.661661	-2.960411	-2.619160	Stationary

* tested at 10%

Source: Eviews computations

4.4 Cointegration Tests

After ascertaining the stationarity properties of the series, cointegration analysis was done. The Johansen Cointegration test was conducted, since it is more accurate and superior to Engle Granger test of cointegration. Johansen results indicate that the null hypothesis of at most two cointegration equations for the

model linking PCHC series to SGDP and M2GDP was rejected at 5 per cent significance level. The trace statistic for the null hypothesis of the existence of at most two cointegration equations was larger than the z critical values at 5 per cent level. Similar results are reported for the Max-Eigen value statistic. This implies that more than two cointegrating equations exist, implying that all the three variables under consideration converge to an equilibrium in the long run (that is, are cointegrated).

4.5 Discussion of the Long Run Results - Step One

Table 4.4 presents the regression of long run results for step one. The Adjusted R-squared of 0.726 for equation 1 indicates that the overall goodness of fit of the models was satisfactory. This implies that 72.6 per cent of the variances in savings as a percentage of GDP (dependent variable for step one) is explained by the variances of the following variables lagged by one period: M2 as a ratio of GDP, GDP growth rate (GDPGR), debt service ratio, TOT INDEX, and real GDP (RGDP) (independent variables). The F statistic of 17.44 (p value 0.0000) indicates that the independent variables have good joint explanatory power. There is no serial autocorrelation because the Durbin Watson statistic is within the acceptable range.

The relationship between domestic saving mobilization and financial deepening is positive and significant. This is supported by regression coefficients of 0.638478 (p value of 0.0179). This implies that an increase in financial deepening by 1 unit leads to an increase in savings mobilization by 0.638478 units.

Table 4.4: Savings function

Dependent Variable: SGDP (-1)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
M2GDP(-1)	0.638478	0.252500	2.528631	0.0179
GDPGR(-1)	30.38787	25.90174	1.173198	0.2514
DEBTSERVICERATIO(-1)	0.060725	0.114290	0.531324	0.5997
TOT_INDEX(-1)	-0.195176	0.070775	-2.757712	0.0105
RGDP(-1)	-2.60E-11	6.30E-12	-4.128515	0.0003
C	30.04364	10.96773	2.739276	0.0110
Adjusted R-squared	0.726248			
Durbin-Watson stat	1.375583			
F-statistic	17.44820			
Prob(F-statistic)	0.000000			

Source: Eviews computation

The relationship between domestic saving mobilization and GDP growth rate is positive, but not significant. This is supported by regression coefficients of 30.38787 (p value of 0.2514), which is in line with the Life-Cycle Model (Modigliani, 1970), safe for the significance. However, the relationship between domestic saving mobilization and real GDP is negative and significant. This is supported by regression coefficients of -2.60E-11(p value of 0.0003), implying that an increase in real GDP by one unit leads to a reduction in domestic savings by -2.60E-11 units.

The relationship between domestic saving mobilization and debt service ratio is positive and not significant. This is supported by regression coefficients of 0.060725 (p value of 0.5997). On the other hand, that of domestic saving mobilization and terms of trade (TOT) is negative and significant. This is supported by regression coefficients of -0.195176 (p value of 0.0105), implying that an increase in terms of trade by one unit leads to a decrease in domestic saving mobilization by 0.195176 units.

4.6 Discussion of the Long Run Results- Step Two

Table 4.5 presents the regression results for long run step two. The adjusted R squared of 0.7151 for the model indicates the overall goodness of fit was satisfactory. This implies that 71.51 per cent of the variances in per capita household consumption (dependent variable for step two) is explained by the variances in forecasted savings as a ratio of GDP, M2 and GINI INDEX all lagged by one (independent variables). The F statistic of 26.10 (p value 0.00000) indicates that the independent variables have good joint explanatory power.

Table 4.5: Consumption function

Dependent Variable: PCHC(-1)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
SGDPFL(-1)	-306.5904	88.30322	-3.472019	0.0018
M2GDP(-1)	73.07369	66.84724	1.093144	0.2840
GINIINDEX(-1)	-51.85905	86.88930	-0.596840	0.5556
C	29383.96	5030.591	5.841055	0.0000
Adjusted R-squared	0.715114			
Durbin-Watson stat	1.009578			
F-statistic	26.10179			
Prob (F-statistic)	0.000000			

Source: Eviews computation

The relationship between per capita household consumption and forecasted savings as a ratio of GDP is negative and significant. This is supported by regression coefficients of -306.5904 (p value of 0.0018). This implies that a one unit increase in forecasted savings as a ratio of GDP leads to a decrease of 306.5904 units in per capita household consumption. As economic agents increase their savings, what remains for consumption decreases. Increased savings will be channelled to investment projects, which will lead to poverty reduction.

The relationship between per capita household consumption and M2 as a ratio of GDP is positive but not significant. This is supported by regression coefficients of 73.07 (p value of 0.2840). This is in line with Quartey (2005) who found a positive but insignificant relationship between financial deepening and poverty reduction. The granger causality tests above indicated that financial deepening granger causes poverty reduction. This implies that financial development in Kenya leads to poverty reduction as the financial intermediaries increase the proportion of loan portfolios issued and the sectors of the economy that are closely linked to poverty reduction.

The relationship between per capita household consumption and Gini index is negative and not significant. This is supported by regression coefficients of -51.85905 (p value of 0.5556).

Table 4.6: Differenced saving function

Dependent Variable: D(SGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(M2SGDP)	0.279869	0.235402	1.188900	0.2461
D(GDPGR)	49.59015	24.55999	2.019143	0.0548
D(DEBTSERVICERATIO)	-0.094810	0.129864	-0.730075	0.4724
D(TOT_INDEX)	-0.091546	0.078409	-1.167539	0.2545
D(RGDP)	-3.16E-11	2.15E-11	-1.472162	0.1540
INTEREST_RATE	0.050989	0.080631	0.632373	0.5331
ERROR1	-0.558334	0.203183	-2.747945	0.0112
C	-0.066396	1.135739	-0.058461	0.9539
R-squared	0.419024			
Adjusted R-squared	0.249573			
Durbin-Watson stat	1.966460			
F-statistic	2.472828			
Prob(F-statistic)	0.046241			

Source: Eviews computation

4.7 Discussion of the Short Run Results - Step One

Table 4.6 presents the regression results for short run step one. The adjusted R-squared of 0.2496 for the model indicates that the overall goodness of fit was not satisfactory. This implies that about one quarter of the variances in the differenced savings function are explained by variances in D(M2), D(GDPGR), D(DEBTSERVICERATIO), D(TOT_INDEX), D(RGDP), INTEREST_RATE and ERROR1. The F statistic of 2.5 (p value 0.0462) indicates that the joint explanatory power of the independent variables, though relatively weak, is acceptable.

The relationship between domestic saving mobilization and financial deepening in the short run is positive but not significant. This is supported by regression coefficients of 0.2798 (p value of 0.2461). The degree of financial deepening does not influence savings in the short run.

The relationship between domestic savings mobilization and the GDP growth rate in the short run is positive and significant. This is supported by regression coefficients of 49.59 (p value of 0.0548). However, the relationship between domestic saving mobilization and real GDP is negative and not significant. This is supported by regression coefficients of -3.16E-11 (p value of 0.1540).

The relationship between domestic savings mobilization and the debt service ratio as well as the terms of trade is negative and not significant. This is supported by regression results -0.094810 and -0.091546 (p value 0.4724 and 0.2545), respectively.

Table 4.7: Differenced consumption function

Dependent Variable: D(PCHC)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SGDPFS)	-266.0960	110.9691	-2.397928	0.0246
D(M2GDP)	32.69520	86.84575	0.376474	0.7099
D(GINIINDEX)	-2.900438	66.29180	-0.043753	0.9655
INTEREST_RATE	-0.182674	36.03807	-0.005069	0.9960
INFLATION	-63.73776	34.75892	-1.833710	0.0791
ERROR2	-0.450024	0.159729	-2.817424	0.0095
C	745.1305	595.3118	1.251664	0.2228
Adjusted R-squared	0.253999			
Durbin-Watson stat	2.060708			
F-statistic	2.702406			
Prob(F-statistic)	0.037806			

Source: Eviews computation

The error correction term has the negative sign as expected and is significant. This is supported by regression results -0.558334 (p value 0.0112).

4.8 Discussion of the Short Run Results - Step Two

Table 4.7 presents the regression results for short run step one. The adjusted R-squared of 0. 2539 for the model indicates that the overall goodness of fit was not satisfactory. This implies that about one quarter of the variances in the differenced consumption function are explained by variances in D(SGDPFS), D(M2), D(GINIINDEX), INTEREST_RATE, INFLATION and ERROR2 (independent variables). The F statistic of 2.7024 (p value 0.0378) indicates that the joint explanatory power of the independent variables, though relatively weak, is within acceptable range as evidenced by the Durbin-Watson statistic of 2.060708.

The relationship between per capita household consumption and domestic saving mobilization in the short run is negative and significant. This is supported by regression coefficients of -266.096 (p value 0.0246), which implies that a one unit increase in forecasted savings will lead to a decrease in consumption by 266 units.

The relationship between per capita household consumption and financial deepening is positive but not significant. This is supported by regression coefficients of 32.69 (p value 0.7099). The relationships between per capita household consumption and Gini index is negative and not significant. This is supported by regression coefficients of -2.9 (p value 0.9655). Similarly, the relationship between per capita household consumption and interest rate is negative and not significant. This is supported by regression coefficients of -0.1826 (p value 0.9960).

The relationship between per capita household consumption and inflation is negative and significant, as supported by regression coefficients -63.73 (p value 0.0791). This implies that a one unit increase in inflation will decrease consumption by 63 units. Inoue and Hamori (2012) found the relationship between inflation and the poverty index to be positive and significant.

The error correction term, which measures the speed of adjustment to the long run equilibrium in the dynamic model, has a negative sign as expected and is significant. This is supported by regression results -0.45 (p value 0.0095). This result implies that there is a negative gradual adjustment (convergence) to the long run equilibrium. The coefficient of -0.45 indicates that 45 per cent of the disequilibria in short run consumption function achieved in one period is corrected in the subsequent period.

5. Conclusion and Policy Recommendations

5.1 Summary of the Findings

With the exception of inflation and the Gini index, all the other variables involved in the study were normally distributed at 0.05 per cent level of significance. All the variables are non-stationary except for interest rate and inflation. The non-stationary variables all become stationery on first differencing at 5 per cent level, with the exception of real GDP, which is tested at 10 per cent significance level.

Both equations had a satisfactory overall goodness of fit for the long run models with an adjusted R^2 of 72.6 per cent and 71.5 per cent for equation 1 and 2, respectively. The relationship between domestic savings mobilization and financial deepening is positive in both the long and short run. However, it is significant only in the long run. The relationship between per capita household consumption and M2 as a ratio of GDP is positive and not significant both in the long run and short run, while the relationship between per capita household consumption and forecasted savings as a ratio of GDP is negative and significant in both cases.

5.2 Conclusion

This study sought to examine the inter-relationship between financial deepening, domestic savings mobilization and poverty reduction in Kenya. The theoretical underpinning is that if financial sector deepening causes savings mobilization and savings cause poverty reduction, intuitively then, a deepened financial sector will encourage poverty reduction. To carry out the empirical analysis for this relationship, the study used annual time series data from 1980 to 2012 and made the following findings. First, financial deepening granger causes both savings and poverty reduction in Kenya. Second, the effect of financial deepening on poverty reduction in Kenya is positive, though not significant, and that there is a long run relationship between financial deepening, savings mobilization and poverty reduction.

5.3 Policy Recommendations

Based on the above findings, the study suggests some key issues for policy consideration. The government should take policy measures aimed at enhancing financial deepening because it is beneficial to both saving mobilization and poverty reduction. Since the interest rate margin between lending and borrowing is too high in Kenya, measures should be taken to reduce it so as to encourage savings.

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Appendix I

Results final

Pairwise Granger Causality Tests

Date: 06/19/14 Time: 15:36

Sample: 1980 2012

Lags: 2

Null Hypothesis	Obs	F-Statistic	Probability
M2 does not Granger Cause CONS	31	3.68601	0.03897
CONS does not Granger Cause M2	2.47168	0.10406	
SAVINGS does not Granger Cause CONS	31	1.06531	0.35919
CONS does not Granger Cause SAVINGS	1.21775	0.31222	
SAVINGS does not Granger Cause M2	31	2.39050	0.11142
M2 does not Granger Cause SAVINGS	7.29962	0.00305	

Dependent Variable: SAVINGS(-1)

Method: Least Squares

Date: 06/19/14 Time: 13:44

Sample (adjusted): 1981 2012

Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
M2(-1)	0.638478	0.252500	2.528631	0.0179
GDPGR(-1)	30.38787	25.90174	1.173198	0.2514
DEBTSERVICERATIO(-1)	0.060725	0.114290	0.531324	0.5997
TOT_INDEX(-1)	-0.195176	0.070775	-2.757712	0.0105
RGDP(-1)	-2.60E-11	6.30E-12	-4.128515	0.0003
C	30.04364	10.96773	2.739276	0.0110
R-squared	0.770401	Mean dependent var		13.30049
Adjusted R-squared	0.726248	S.D. dependent var		5.748388
S.E. of regression	3.007634	Akaike info criterion		5.207545
Sum squared resid	235.1925	Schwarz criterion		5.482371
Log likelihood	-77.32073	F-statistic		17.44820
Durbin-Watson stat	1.375583	Prob(F-statistic)		0.000000

Dependent Variable: D(SAVINGS)

Method: Least Squares

Date: 06/19/14 Time: 14:39

Sample (adjusted): 1981 2012

Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(M2)	0.279869	0.235402	1.188900	0.2461
D(GDPGR)	49.59015	24.55999	2.019143	0.0548
D(DEBTSERVICERATIO)	-0.094810	0.129864	-0.730075	0.4724
D(TOT_INDEX)	-0.091546	0.078409	-1.167539	0.2545
D(RGDP)	-3.16E-11	2.15E-11	-1.472162	0.1540
INTEREST_RATE	0.050989	0.080631	0.632373	0.5331
ERROR1	-0.558334	0.203183	-2.747945	0.0112
C	-0.066396	1.135739	-0.058461	0.9539
R-squared	0.419024	Mean dependent var		-0.475716
Adjusted R-squared	0.249573	S.D. dependent var		2.923000
S.E. of regression	2.532113	Akaike info criterion		4.908303
Sum squared resid	153.8783	Schwarz criterion		5.274737
Log likelihood	-70.53286	F-statistic		2.472828
Durbin-Watson stat	1.966460	Prob(F-statistic)		0.046241

Dependent Variable: CONS(-1)

Method: Least Squares

Date: 06/19/14 Time: 15:02

Sample (adjusted): 1982 2012

Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
SAVINGSFL(-1)	-306.5904	88.30322	-3.472019	0.0018
M2(-1)	73.07369	66.84724	1.093144	0.2840
GINIINDEX(-1)	-51.85905	86.88930	-0.596840	0.5556
C	29383.96	5030.591	5.841055	0.0000
R-squared	0.743603	Mean dependent var		25470.77
Adjusted R-squared	0.715114	S.D. dependent var		2315.463
S.E. of regression	1235.871	Akaike info criterion		17.19685
Sum squared resid	41239197	Schwarz criterion		17.38188

Log likelihood	-262.5512	F-statistic	26.10179
Durbin-Watson stat	1.009578	Prob(F-statistic)	0.000000

Dependent Variable: D(CONS)

Method: Least Squares

Date: 06/19/14 Time: 15:05

Sample (adjusted): 1982 2012

Included observations: 31 after adjustments

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
D(SAVINGSFS)	-266.0960	110.9691	-2.397928	0.0246
D(M2)	32.69520	86.84575	0.376474	0.7099
D(GINIINDEX)	-2.900438	66.29180	-0.043753	0.9655
INTEREST_RATE	-0.182674	36.03807	-0.005069	0.9960
INFLATION	-63.73776	34.75892	-1.833710	0.0791
ERROR2	-0.450024	0.159729	-2.817424	0.0095
C	745.1305	595.3118	1.251664	0.2228
R-squared	0.403199	Mean dependent var		231.0968
Adjusted R-squared	0.253999	S.D. dependent var		1115.950
S.E. of regression	963.8611	Akaike info criterion		16.77545
Sum squared resid	22296679	Schwarz criterion		17.09925
Log likelihood	-253.0195	F-statistic		2.702406
Durbin-Watson stat	2.060708	Prob(F-statistic)		0.037806

Cointegration Results

Date: 02/27/14 Time: 10:20

Sample (adjusted): 1983 2012

Included observations: 30 after adjustments

Trend assumption: Linear deterministic trend

Series: CONS SAVINGS M2

Lags interval (in first differences): 1 to 2

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.631364	46.32869	29.79707	0.0003
At most 1 *	0.398993	16.39029	15.49471	0.0366
At most 2	0.036511	1.115840	3.841466	0.2908

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.631364	29.93840	21.13162	0.0022
At most 1 *	0.398993	15.27445	14.26460	0.0345
At most 2	0.036511	1.115840	3.841466	0.2908

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

CONS	SAVINGS	M2
-0.000631	0.121931	0.372470
-0.000870	-0.372521	-0.122793
-0.000105	-0.165986	0.077024

Unrestricted Adjustment Coefficients (alpha):

D(CONS)	668.7099	96.01877	110.4956
D(SAVINGS)	-1.651657	1.051218	0.127709
D(M2)	-0.299391	-0.737251	0.317140

1 Cointegrating Equation(s):	Log likelihood	-369.6163

Normalized cointegrating coefficients (standard error in parentheses)

CONS	SAVINGS	M2
1.000000	-193.3664	-590.6899
	(89.8960)	(97.9905)