EXAMINING THE RELATIONSHIP BETWEEN SAVINGS AND DEPOSIT RATES

Tafirei Mashamba [a,*], **Rabson Magweva**[a]

[a] Department of Banking and Finance, Great Zimbabwe University, PO Box 1235, Masvingo, Zimbabwe

ABSTRACT

Using the VECM approach, the study analysed the link between savings rates in Zimbabwe and deposit rates and other macroeconomic variables for the period 1983 to 2006. The study established a long run relationship exists between the savings and deposit rates. The speed of adjustments toward long run equilibrium was found to be 83% per annum which is a swift adjustment. It was also established that shocks to savings rates in Zimbabwe explained much of the variances even up to ten years. This implies that savings rates are less exogenous, though inflation rates and deposit rates are the independent variables which explain variability in savings rates. It is against these findings that the Zimbabwean monetary authorities vary the savings rates directly to influence the volume of capital saved as all other independent variables influence savings rates after more than 5 years.

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**Corresponding author:*
cfamashamba@gmail.com

1. INTRODUCTION

In any economy, banks primarily exist to provide intermediation services between surplus and deficit units (Olayemi & Michael, 2013). This is achieved through channelling funds from surplus to deficit units. Citing (Uremadu, 2006) Olayemi & Michael posits that for a nation to achieve meaningful economic growth there must be investable funds. These investable funds come from deposits made by economic agents with financial institutions. Acha & Acha (2011) concur with these sentiments by noting that countries that are hungry for economic growth must look into their interest rate structures since economic growth is tied to the level of investable funds in the economy.

McKinnon (1973) and Shaw (1973) are of the opinion that liberalising interest rates trigger interest rates to rise and as interest rates wax economic agents are willing to save more and these savings are pooled together by banks to create investable funds. Contrary to McKinnon & Shaw beliefs many studies which were carried out in Sub Saharan Africa (which adopted IMF's prescribed Economic Structural Adjustment Programmes (ESAP)) did not find a positive impact of interest rate liberalisation on deposit mobilisation. For example, (Ngugi & Kabubo (1998) Serieux (2008) and Onwumere et al (2012)) found a negative relationship between liberalised interest rates and savings. Contrary, (Moyo (2001), Chigumira & Masiyandima (2003)) observed that financial sector reforms were successful in improving the level of savings. Actually, Moyo's study on Zimbabwe revealed that the high interest rate regime did trigger a spiral growth in deposits by financial institutions.

Following the Global Financial Crisis (GFC) of 2007 access to foreign reserves is becoming increasingly difficult. As such domestic resources are becoming increasingly vital for the supply of the much needed finance for economic development (Aryeetey, 2009). According to Reserve Bank of Zimbabwe (RBZ) statistics an estimated US$2 billion is circulating outside the formal banking system (RBZ Press Statement, January 2014). Low deposit rates coupled with very high bank charges have been cited as the major impedes to banks' efforts to attract long term deposits (Mverecha (2011), RBZ Press Statement, (January 2014)).

In Zimbabwe the savings ratio has been very low. Such a trend has dire implications for economic growth, employment creation and poverty alleviation (UN, 2010). Although savings rose sharply in the early 1990s when financial sector reforms were introduced, these gains were reversed in the late 1990s as inflation took its ugly face (Chigumira & Masiyandima, 2003). From 1998 the savings ratio has been on a free fall with a surprise peak between 2004 & 2005. Makina (2009) attributes this abrupt change to underestimated nominal Gross Domestic product (GDP) due to price controls. On the other hand as the savings ratio plummeted from 2004, the deposit rate has been increasing at an increasing rate only to slow down in 2009 when the local currency was abandoned in favour of hard currencies. The persistent rise in deposit rates that was experienced can be attributed to hyperinflation that ensured during the period.

In response to wake up calls from the RBZ a number of commercial banks have come up with various savings investment schemes aimed at harnessing deposits from the public and the corporate world. Notable savings scheme currently in operation include; CBZ CashPlus Savings Account, FBC Pfimbi/Isiphala Savings Account and POSB EasySave Savings Account (Mashamba et al, 2014).

Mwega (1990) suggests that positive interest rates have two effects on savings; substitution and wealth effect. The former leads to higher level of savings as economic agents defer current consumption for future consumption while the latter leads to increased consumption because economic agents withdraw the interest earned.

It is imperative to note that studies on the savings-interest rate nexus have not been conclusive to date (Mwega, 1990). To further clarify the issue further research need to be done. In this study modern econometric techniques (namely Vector Error Correction Modelling) is applied to explore the issue of the savings-interest rate nexus in the Zimbabwean context.

The rest of the paper is organised as follows; Chapters two reviews related literature, chapter three provides the blue print followed to carry out the study; chapter presents the results and the conclusion and recommendations are made in chapter five.

2. LITERATURE REVIEW

2.1 THEORETIC FRAMEWORK

Two main theories attempt to describe the savings behaviour of households in an economy. These are the Life Cycle Hypothesis forwarded by Modigliani in 1954 and the Permanent Income Theorem postulated by Friedman in 1957.

The Life Cycle Theorem (Modigliani 1954)

This model attempts to explain individuals' consumption during his/her life span. The theory states that individuals plan their consumption and savings behaviour over a long period of time and intend to smoothen out their consumption behaviour over time. Individuals are expected to save less in their youthful stages and increase their savings with age. In their retirement time they are expected to feed on their savings accumulated to their retirement day.

Permanent Income Theorem PIH (Friedman 1957)

In this model individuals base their consumption patterns on their permanent (long term average income) rather than current income. As such households' consumption is determined by their real wealth rather than the current disposable income. People are expected to save when they anticipate their permanent income to be less than their current income or when their current income is higher than the forecasted permanent income level to cushion themselves against future decrease in their income. The implication of this model is that the elasticity of savings with respect to current income varies proportionately with the degree of changes in permanent income. DeJuan & Seater (2006) expects the elasticity to be higher when the fraction of variation in permanent household income is significant.

2.2 EMPIRICAL LITERATURE

Carroll & Weil (1994) investigated the relationship between income growth and savings on a sample of 86 countries using cross country and household data. At the aggregate level they found a uni-directional causal relationship running from income growth to savings. At the household level they established that households with higher income growth tend to save more than those with predominantly low income levels. Their findings refute the PIH of consumption to explain household savings. In their paper Reinhart & Ostry (1995) argue that savings have nothing to do with interest rates in poor economies. They found that in low income countries savings are inelastic to changes in interest rates hence raising the interest rates is highly unlikely to yield meaningful increase in household savings. According to the authors this is caused by subsistence considerations. Most of the households live at subsistence level so for them to save they must breakthrough the subsistence level which is very difficult to achieve.

Three key elements of real deposit rates on the level of savings in an economy were identified by Matsheka (1998). Firstly, the author notes that positive deposit interest rates are necessary to stimulate the domestic savings rate; secondly, the high deposit rates promote economic growth by increasing the level and efficiency of investments leading to a positive relationship between financial sector growth and economic growth.

Ozcan et al (2003) carried out a study in Turkey to identify the key variables that influence private savings. Their model incorporated six groups of variables likely to explain savings covering government policies, income & growth variables, financial variables, demographic variables and uncertainty variables. Using an Ordinary Least Squares model they found that the variables that determine private savings in Turkey have a strong inertia and are highly serially correlated. Also they established a negative relationship between government savings to Gross domestic Product ratio and the savings rate, a positive relationship between the income level on private savings rate and an insignificant relationship between current account deficit and private savings.

Matsheka (2010) found a strong negative relationship between domestic savings and interest rates in Botswana. From the findings the author deduces that the income effect of an interest rate rise is greater than the substitution effect hence interest income earned was not saved.

Anaripour (2011) analysed the relationship between interest rates and economic growth for a panel data of 22 countries with homogenous features for the period 2004 to 2010. Applying the Granger Causality test the author found a one-sided causal relationship between economic growth and interest rates (running form economic growth to interest rate) and a negative relationship between interest rates and economic growth. The study concluded that there is no relationship between interest rates and economic growth.

Acha & Acha (2011) studied the relationship between savings and interest rates in Nigeria for the period 1970 to 2005. The author used the Pearson's Correlation Coefficient to test the hypothesis that savings do not depend on interest rates. The results show a negative relationship between these two variables, therefore for the Nigerian economy interest rates play an insignificant role in determining savings.

3. METHODOLOGY

The study investigates short run and long run dynamic relationship between savings and deposit interest rate in Zimbabwe and other macroeconomic variables (Gross Domestic Product and inflation) for the period 1983 to 2006. All data is obtained from World Bank database on Zimbabwean statistics. We adopted the following methodology;

- Firstly, the variables were tested for the presence of unit roots and the order of integration using the Augmented Dicker-Fuller (ADF) test.
- Secondly, an unrestricted undifferenced Vector Autoregressive Model was set up to determine the appropriate lag length using the Akaike's Information Criterion (AIC) and Schwarz's Information Criterion (SIC).
- Thirdly, after identifying the variables order of integration; if they are found to be cointegrated the Johansen & Juselius (1990) co integration test is applied to determine the number of co integration vectors. However, if no co integration is established a Vector Autoregressive model is set up. In this study the variables were found to be cointegrated of order I(1).
- Fourthly, the Vector Error Correction Model is estimated to test for short run and long run dynamics in the system.
- Lastly, Impulse Response and Variance Decomposition analysis on the Vector Error Correction Model is done to study the response of the variables to shocks in the error term and other variables and analyse the proportion of the movements in the dependent variable.

3.1 UNIT ROOT TESTS

Since most of the macroeconomic time series data is non stationary with a deterministic trend regressing such data yields questionable, invalid and spurious results. To avoid such a problem the data must first be tested for stationarity (Gujarati, 2004). In this regard the ADF unit root test was used to test the presence of unit root tests and to determine the order of integration of the variables.

Under the ADF unit root test, the null hypothesis (H_0: $\beta_1 = 0(unit\ root)$) is tested using the following expression in Gujarati (2004:817)

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^{m} \alpha_i \Delta Y_{t-1} + \varepsilon_t \quad (1)$$

Where; ε_t is the pure white noise error term

$\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$

$\Delta Y_{t-2} = Y_{t-2} - Y_{t-3}$ e.t.c

Decision Rule: Reject H_0 if the t-ratio is greater than the critical values in the model and the data is assumed to be stationary.

3.2 COINTEGRATION TEST

Following Johansen & Juselius (1990) a multivariate test for co integration was done to examine the long run or equilibrium relationship between savings and IRS in Zimbabwe. This requires the calculation of trace and maximum Eigenvalue statistics to examine the presence of co integrating vectors.

The trace statistic (λ_{trace}) for testing the null hypothesis (H_0: There are at most r co integrating vectors) against the alternative hypothesis (H_1: There is a trace statistic) is given as;

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{n} \ln(1 - \lambda_i) \quad (2)$$

The maximum Eigenvalue statistic (λ_{max}) for testing the null hypothesis (H_0: There are exactly r co integrating vectors) against the alternative hypothesis (H_1: There is are $r + 1$ co integrating vectors) is given as;

$$\lambda_{max}(r, r+1) = -Tln(1 - \lambda_{r+1})$$

Where: λ_i is the estimated characteristic roots or the Eigen values.

T is the number of usable observations.

3.3 THE VECM

A Vector Error Correction model (VECM) is developed to examine the dynamic relationship among the variables in the system. In a Vector Error Correction Model we examine how each exogenous variable deviates in the short run from its long run equilibrium given by the co integrating vectors (Eruygur, 2009). In this research a Vector Error Correction Model is developed to investigate both the short run and long run relationship dynamic interactions among the co integrated variables in the system.

3.4. IMPULSE RESPONSE ANALYSIS

In order to find out how each variable in the system responds over time to a shock in itself and in another variable impulse response analysis is carried out. In light of this, an impulse response analysis was carried out to trace out the response of the exogenous variables in the system to shocks in the error terms and other variables.

4. RESULTS

4.1. UNIT ROOT TEST RESULTS

Table 4.1: Unit Root Tests Results

Variable	ADF statistic	Critical Values	Order of Integration	Decision	Significance Level
LogSR	-3.41189	-3.0810	I(1)	Stationary	5%
LogDR	-3.8588	-3.1450	I(1)	Stationary	5%
LogGDP	-4.5408	-4.5326	I(1)	Stationary	1%
LogINR	-4.6925	-4.3943	I(1)	Stationary	1%

Checking for unit roots revealed that the variables had unit root at level but after first differencing all variables became stationary. If our variables are integrated of the same order (I(1) in this case) then we can apply the Johansen-Juselius Maximum Likelihood co integration to determine the number of co integrating vectors as presented in 4.2.1.

4.2 COINTEGRATION RESULTS

To determine the number of cointegration relationships we implemented the Johansen and Juselius (1990) cointegration tests.

4.2.1 Unrestricted Cointegration Rank Test (Trace)

Table 4.2.1. Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.665388	62.36598	47.85613	0.0012
At most 1 *	0.618532	34.99641	29.79707	0.0115
At most 2	0.309828	10.90320	15.49471	0.2175
At most 3	0.063226	1.632835	3.841466	0.2013

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

4.2.2 Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Table 4.2.2. Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.665388	27.36957	27.58434	0.0532
At most 1 *	0.618532	24.09320	21.13162	0.0186
At most 2	0.309828	9.270370	14.26460	0.2643
At most 3	0.063226	1.632835	3.841466	0.2013

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

In Table 4.2.1 and 4.2.2 it is shown that both the Maximum Eigenvalue as well as Trace Statistics Tests indicates the existence of two cointegrating equations. Therefore we reject the null hypothesis that there is no co integration among the variables at 5% significance level and conclude that a long run relationship exist among the variables. The Trace Test and Maximum Eigenvalue Test indicate that there are two co integrating equations. The presence of cointegrating terms provides a room for estimating VECM in which case two error correcting terms will be established. Each equation will contribute an additional error term involving a different linear combination.

4.3 VECTOR ERROR CORRECTION MODEL (VECM)

Granger (1969) proposes that if the variables in a system are co integrated, then a valid error correction model should exist. In this context, savings and deposit rates are co integrated hence the following VECM can be estimated to show the short run dynamics in the system.

As can be noted in Table 4.3 (Appendix), the first part of the VECM shows the cointegrating equations and their coefficients where the coefficient of deposit rates is zero. This is contrary to what Abdullahi Dahir Ahmed (2007) noted from Botswana where deposit rate positively affects private savings. The coefficient for GDP being 56.64, indicating that a percentage change in GDP is likely to cause 56.64 units change in savings rates. For inflation rate the coefficient is 19.06 indicating that a percentage change in inflation is likely to result in 19 units change in savings rate considering the first cointegrating equation.

As far as the VECM estimates are concerned, we can only see that the coefficient of the first error term C(1) is negative, but we cannot determine whether its significant or not. The same can be said on the second error term and on short run coefficients. Thus we go on to generate a systems equation (so that the p-values are indicated) and concentrate on the model of interest where savings rate is the dependent variable. From the estimated VECM, the error correction terms are the C(1) and C(2) as there are two cointergrating terms (see Table 4.2 above). Considering the first error correction term, it has a coefficient of -0.827884 and is significant - looking at the p-value. This indicates that about 83% of disequilibrium is corrected each year or savings rates return to equilibrium after a change in the independent variables, at rate of 83% per year. As the error correction term is negative, significant and between zero and one, it confirms the long-run equilibrium relationship among the variables

The second error correction term is meaningless as it is a positive figure and more than 100% indicating an explosion, that's the additional error term involving a different linear combination, is meaningless and thus also insignificant.

Then the other coefficients are short run coefficients of which only first lag of savings rate (savings rate in the previous period), C(3), with a coefficient of -0.43865, first lag GDP C(7) with a coefficient of -15.13063, first lag interest rate, C(9) with a coefficient of 8.530147and the constant term are significant.

4.4 IMPULSE RESPONSE FUNCTION

Impulse Response Function (IRF) traces out the response of current and future values of each of the variables to a one unit shock in the current errors of the VAR errors, assuming that this error returns to zero in subsequent periods and all other errors are equal to zero. In this case we analyse the responsiveness of the dependent variable savings rates, to shocks to each of the endogenous variables.

Table 4.5 (Appendix) reveal that savings rates in Zimbabwe respond highly to own shocks in the first period or first year- which concurs with variance decomposition table below. In subsequent periods, savings rates respond positively to shocks in deposit rates and negatively to inflation rates as expected. Response to other variable shocks becomes more significant after the 5th year whereby the shocks to deposit rates stimulate highly changes in savings rates.

4.5 VARIANCE DECOMPOSITION

Variance decomposition reveals the proportion of the movements in the dependent variable, savings rates that are due to own shocks against shocks from other variables. That is, it separates variation in an endogenous variable into component shocks to the VAR. From Table 4.6 (Appendix), savings rates in Zimbabwe are less exogenous as even in the 10th year about 33% of its variance was explained by own shocks. That is, after 10 years, the forecast error in savings rates that can be attributed to innovations in other variables amount to approximately 67%. This concurs with what Abdih and Tanner (2009) noted in their US study when they noted that households eliminate their savings disequilibria exclusively by adjusting their primary savings, rather than the other variables.

Comparatively, deposit rates explain the maximum variance in savings rates after the 5th year. This is in line with what Matsheka (1998) discovered in Botswana where he concluded that positive deposit interest rates are necessary to stimulate the domestic savings rate

Inflation rate also explains the variance in savings rate and GDP is relatively less important in creating functions in savings rates as we go further from the current periods.

5. DISCUSSION OF RESULTS

The results from data analysis clearly show the existence of a long run relationship between the variables though deposit rates does not in the long run influence savings rates in Zimbabwe. Swift correction- in case of changes in the independent variables, or deviation from long run equilibrium, savings rate is estimated to correct the disequilibrium swiftly to the tune of 83% per annum.

Own shock explains much of the variability in savings rates- this might be an indication of inertia which implies that factors that affect saving rates will have larger long-term impacts than short-term ones Ozcan *et al* (2003) as evidenced by large variance decomposition contribution from other variables contributing significantly after 5 years. Thus, in the short run, shock to other exogenous variables in the model less effective in affecting savings rates in Zimbabwe.

6. CONCLUSION

Using the VECM approach, the study analysed the link between savings rates in Zimbabwe and GDP, deposit rates and inflation rates for the period. The study established the existence of a long run relationship between the variables. The speed of adjustments toward long run equilibrium was found to be 83% per annum which is a swift adjustment. It was also established that shocks to savings rates in Zimbabwe explained much of the variances even up to ten years. This implies that savings rates are less exogenous, though inflation rates and deposit rates are the independent variables which explain variability in savings rates. It is against these findings that the Zimbabwean monetary authorities **vary the savings rates directly** to influence the volume of capital saved as all other independent variables influence savings rates after more than 5 years.

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APPENDICES

Table 4.2.1 Unrestricted Cointegration Rank Test (Trace)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.665388	62.36598	47.85613	0.0012
At most 1 *	0.618532	34.99641	29.79707	0.0115
At most 2	0.309828	10.90320	15.49471	0.2175
At most 3	0.063226	1.632835	3.841466	0.2013

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

Table 4.2.2 Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None	0.665388	27.36957	27.58434	0.0532
At most 1 *	0.618532	24.09320	21.13162	0.0186
At most 2	0.309828	9.270370	14.26460	0.2643
At most 3	0.063226	1.632835	3.841466	0.2013

Max-eigenvalue test indicates no cointegration at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

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

Table 4.3: Vector Error Correction Estimates

Date: 04/04/15 Time: 13:55

Sample (adjusted): 1983 2006

Included observations: 24 after adjustments

Standard errors in ( ) & t-statistics in [ ]

Cointegrating Eq:	CointEq1	CointEq2		
SR(-1)	1.000000	0.000000		
LOGDR(-1)	0.000000	1.000000		
LOGGDP(-1)	56.64000	4.724117		
	(9.31583)	(1.14042)		
	[6.07998]	[4.14245]		
LOGINR(-1)	19.05713	0.178121		
	(2.56738)	(0.31429)		
	[7.42278]	[0.56674]		
C	-446.8481	-34.19502		
Error Correction:	**D(SR)**	**D(LOGDR)**	**D(LOGGDP)**	**D(LOGINR)**
CointEq1	-0.827884	0.023195	-0.008657	0.024600
	(0.20019)	(0.03319)	(0.00619)	(0.03682)
	[-4.13545]	[0.69880]	[-1.39782]	[0.66808]
CointEq2	6.463243	-0.159478	-0.117042	-0.079484
	(1.93230)	(0.32038)	(0.05978)	(0.35541)
	[3.34484]	[-0.49778]	[-1.95800]	[-0.22364]
D(SR(-1))	-0.438650	-0.022424	0.007175	-0.045267
	(0.18978)	(0.03147)	(0.00587)	(0.03491)
	[-2.31135]	[-0.71264]	[1.22207]	[-1.29679]
D(SR(-2))	-0.172141	-0.026578	-0.000102	-0.031312
	(0.19909)	(0.03301)	(0.00616)	(0.03662)
	[-0.86463]	[-0.80515]	[-0.01653]	[-0.85506]
D(LOGDR(-1))	-2.664978	0.138853	0.086449	0.231533
	(1.91199)	(0.31701)	(0.05915)	(0.35168)
	[-1.39383]	[0.43801]	[1.46158]	[0.65837]
D(LOGDR(-2))	0.065933	-0.137195	0.113848	-0.113283
	(1.90672)	(0.31614)	(0.05898)	(0.35071)
	[0.03458]	[-0.43397]	[1.93012]	[-0.32301]
D(LOGGDP(-1))	-15.13063	-0.164724	0.492810	-0.166711
	(6.95975)	(1.15394)	(0.21530)	(1.28013)
	[-2.17402]	[-0.14275]	[2.28893]	[-0.13023]

D(LOGGDP(-2))	-12.99122	-0.533431	0.162421	0.501398
	(9.21952)	(1.52861)	(0.28521)	(1.69577)
	[-1.40910]	[-0.34896]	[0.56948]	[0.29568]
D(LOGINR(-1))	8.530147	-0.059925	0.083447	-0.708448
	(2.94302)	(0.48796)	(0.09104)	(0.54132)
	[2.89843]	[-0.12281]	[0.91657]	[-1.30875]
D(LOGINR(-2))	4.713686	-0.274460	0.037540	-0.604851
	(2.25771)	(0.37433)	(0.06984)	(0.41527)
	[2.08782]	[-0.73320]	[0.53749]	[-1.45654]
C	-4.000115	0.108580	-0.051949	0.323344
	(0.96226)	(0.15955)	(0.02977)	(0.17699)
	[-4.15698]	[0.68056]	[-1.74514]	[1.82688]

Table 4.4: Dependent Variable: D(SR)

Method: Least Squares

Date: 04/17/15 Time: 19:15

Sample (adjusted): 1983 2006

Included observations: 24 after adjustments

D(SR) = C(1)*(SR(-1) + 56.6400010657*LOGGDP(-1) + 19.0571325678
LOGINR(-1) - 446.848064591) + C(2)(LOGDR(-1) + 4.72411722886
*LOGGDP(-1) + 0.178121043115*LOGINR(-1) - 34.1950165475) +
C(3)*D(SR(-1)) + C(4)*D(SR(-2)) + C(5)*D(LOGDR(-1)) + C(6)
*D(LOGDR(-2)) + C(7)*D(LOGGDP(-1)) + C(8)*D(LOGGDP(-2)) + C(9)
*D(LOGINR(-1)) + C(10)*D(LOGINR(-2)) + C(11)

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.827884	0.200192	-4.135454	0.0012
C(2)	6.463243	1.932301	3.344843	0.0053
C(3)	-0.438650	0.189781	-2.311346	0.0379
C(4)	-0.172141	0.199091	-0.864634	0.4029
C(5)	-2.664978	1.911986	-1.393828	0.1867
C(6)	0.065933	1.906718	0.034579	0.9729
C(7)	-15.13063	6.959750	-2.174019	0.0488
C(8)	-12.99122	9.219523	-1.409098	0.1823
C(9)	8.530147	2.943022	2.898431	0.0124
C(10)	4.713686	2.257710	2.087818	0.0571
C(11)	-4.000115	0.962265	-4.156980	0.0011
R-squared	0.771137	Mean dependent var		-0.962365

Adjusted R-squared	0.595088	S.D. dependent var	4.821265
S.E. of regression	3.067900	Akaike info criterion	5.383426
Sum squared resid	122.3561	Schwarz criterion	5.923367
Log likelihood	-53.60111	Hannan-Quinn criter.	5.526672
F-statistic	4.380250	Durbin-Watson stat	1.899745
Prob(F-statistic)	0.007574		

Table 4.5:
Response of SR:

Period	SR	LOGDR	LOGGDP	LOGINR
1	3.067900	0.000000	0.000000	0.000000
2	1.589383	1.918395	-2.038673	-2.556474
3	2.719303	2.592985	-0.394316	-0.911476
4	2.705846	2.171221	0.449098	-2.416551
5	2.817831	3.861749	0.523534	-2.491921
6	3.226515	4.307573	0.790331	-2.403414
7	3.016960	4.058932	0.346926	-3.053058
8	3.189725	3.776081	0.437400	-2.600146
9	3.059921	3.626351	0.311513	-2.640850
10	3.005728	3.881814	0.302905	-2.645377

Table 4.6: Variance Decomposition of SR:

Period	S.E.	SR	LOGDR	LOGGDP	LOGINR
1	3.067900	100.0000	0.000000	0.000000	0.000000
2	5.129341	45.37472	13.98792	15.79691	24.84046
3	6.435417	46.68104	25.12113	10.41100	17.78684
4	7.713093	44.80343	25.41192	7.586527	22.19812
5	9.424905	38.94516	33.80785	5.389522	21.85747
6	11.14430	36.23719	39.12084	4.357706	20.28426
7	12.61800	33.98382	40.86403	3.474841	21.67731
8	13.80577	33.72593	41.61614	3.003030	21.65490
9	14.83859	33.44680	41.99693	2.643605	21.91266
10	15.85486	32.89045	42.78003	2.352066	21.97746