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## SHORT COMMUNICATION

### Interest rate dynamics on savings: Evidence from Sri Lanka

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#### ABSTRACT

Economists believe the interest rate is an interim agent for savings, which promotes the people to lose their present consumption continuously. So, this study also assumed that there was a relationship between the interest rate and savings. Based on that, the objective of this study was to explore the interest rate dynamics on savings in Sri Lanka over the period of 1977 to 2017. In this study annual time series data for the following variables: interest rate, savings, and gross domestic product were used, and the Johansen and Juselius cointegration technique was employed to test the cointegration relationship between the variables. In this study, interest rate was considered as key independent variable and savings was dependent variable. Both Augmented Dickey-Fuller (ADF) and Kwiatkowski – Phillips – Schmidt – Shin tests were employed to test the stationarity of the variables. In terms of these tests, all variable were stationary at first difference level. Furthermore, interest rate and savings had the long run relationship and there was short-run causality between interest rate and savings which was confirmed by the results of Vector Error Correction model (VECM). Therefore, the interest rate had long - run and short - run relationship on the savings in Sri Lanka. Finally, this study recommends the policy makers should consider interest rate friendly policy to boost the savings in Sri Lanka.

**Keywords:** Economists, Policymakers, Interest rate, Savings, Dynamics, Sri Lanka

## **1. INTRODUCTION**

People earn a lot of money from the different channels and try to save them for use in future wants. Therefore, the people think to save their money in monetary assets. Thus, interest rate in an economy acts the interim mechanism between the thought of people and savings. So that, from this statement there is an issue that arises what are the relationship between the interest rate and savings or how to influence the interest rate on savings. On this issue, the scholar day by day concentrate how to get the answer to this issue. Based on that, they have been using a different econometric technique on their data. In terms of that, they got different conclusion that was limited between positive and negative relationship.

Interest is an economic term which is a gift for losing the present consumption of a person. It would have attained through the term of savings. On the other hand, saving is an economic term which establishes through losing current consumption of a person. Therefore, it is confirmed that there is a relationship between the interest rate and savings. The payment of interest for saving is measured by a percentage that is called rate. Thus, the payment of interest for saving is called as the interest rate. The Economists believe that the increasing interest rate promotes the savings, on the other hand, increasing savings stimulate the country's economic growth, and so, the economists encourage the savings by increasing interest rate. On the other hand, according to the thought of Keynes, excess savings may formulate saving paradox.

Sri Lanka is a small economy which has long-term history in savings. In 1977, Savings was USD 30.4 million in Sri Lanka which was suddenly increased USD 1685 million in 2017. On the other hand in 1977 the interest rate 6.5 percent which changed as 15percent in 2017. In these years the gross domestic product (GDP) was USD 4.1 million and USD 8.76 million respectively. Therefore, it concludes that interest rate and savings have a relationship between them. So that, this study is to examine the impact of interest rate on the savings. Based on that, the following subsections are discussed: introduction, review of the literature, research method, results and discussion, and conclusion and recommendation.

## **2. REVIEW OF LITERATURE**

Very rare of empirical studies focused on the impact of interest rate on savings using different analytical techniques. In those studies, they found inconclusive decisions about the impact of interest rate on the savings. Some of them have found that the interest rate positively affects the savings, while a small number of studies concluded that the interest rate negatively effects on the savings. So, among those researchers, there is no strong conclusion. But, the theory of economic on the interest rate and savings said that there is the positive relationship. Therefore, this study considered some selected and recently published articles to highlight the relationship between the interest rate and savings. On that basis, Ostry and Reinhart (1995) examined the impact of interest rate on the savings using developing countries data. In this study, the Intertemporal Elasticity of Substitutes (IES) technique was employed and they have examined that if the interest rate increase by 1%, the savings will be increased by 2%. Khan et. al., (2014) investigated the relationship between the interest rate and savings in Pakistan. They employed the Johansen cointegration and Vector Error Correction technique. In this study, they found that there were long – run and short-run

relationship between the interest rate and savings. The interest rate promotes household savings. Onwumere et. al., (2012) concluded that the interest rate negatively correlates with savings in Nigeria. Chinyere,(2015) examined the impact of interest rate on savings in Nigeria. They concluded that the interest rate positively effects on the savings. Athukorala, (1998) investigated the role of interest rates on saving and investment in India. This study concluded that the interest rate stimulated the savings. Aizenman et al., (2017) explored the link between interest rates and private savings using 135 countries data. They found that the real interest rate has the substitution effect on private savings. Furthermore, Imoughele and Ismaila (2014) evaluated the determinant of private savings in Nigeria using cointegration and Error Correction Mechanism. In this study, they examined that the interest rate positively effects on savings. Another study was made by Hashim and Isa (2017). They investigated the factors which are influencing savings rate in Malaysia using multiple regression techniques. Based on the output of the technique, the P – the value of the coefficient of interest rate was less than 5% and coefficient was the positive sign. Therefore, this study concluded that the interest rate boosts the savings. While, Chen (2002) investigated the causal relationship between the interest rate and savings in China using the cointegration and Bayesian Vector Autoregressive (BVAR) techniques. In terms of results from the estimation techniques, the interest rate has the stable positive relationship with savings. Further, the BVAR test shows that there is no causality between the interest rate and savings. Based on the literature of this study, there is no stable decision on the relationship between the interest rate and savings. In addition to that, in Sri Lankan environment none of the researcher studied the relationship between the interest rate and savings. Therefore, we hope this is the first study on the relationship between interest rate and savings in Sri Lanka.

### **3. RESEARCH METHOD**

#### **i) Variable and Data**

In this study, annual time series data during the period of 1977 to 2017 were considered which were gathered from the World Development Indicator (WDI) and World Economic Outlook (WEO). Further, savings, interest rate, and gross domestic product were considered as variables.

#### **ii) Model and estimation technique**

In order to test the impact of interest rate on savings, the following function based on the study of Chinyere (2015). In his study, savings was used as dependent variable and following variables: interest rate and gross domestic product were considered as independent variables. Therefore, the relationship between interest rate and savings can be written as follows:

$$\text{Sav}_t = f(\text{INT}_t \text{GDP}_t) \dots\dots\dots (1)$$

$$\log(\text{Sav}_t) = \gamma_0 + \gamma_1 \log(\text{INT}_t) + \gamma_2 \log(\text{GDP}_t) + \varepsilon_t \dots\dots (2)$$

where:  $Sav_t$  is savings;  $INT_t$  is interest rate;  $GDP_t$  is gross domestic products;  $\gamma_0, \gamma_1$  and  $\gamma_2$  are coefficients,  $\epsilon_t$  is error term and  $t$  is time.

In order to confirm the integration order of the variables, the Augmented Dickey Fuller and KPSS unit root tests were used. Further, to test the cointegration relationship between the variables, the Johansen and Juselius cointegration technique was employed.

#### 4. RESULTS AND DISCUSSION

In time series analysis the behaviour of the series is very important. So that, most empirical studies used the summary statistics for delivering the behaviour of their series. Based on that this study also used the summary statistics to highlight the series behaviours. Therefore, the following table shows the summary statistics of the variables.

**Table 1.** Summary For variables (1977 – 2017)

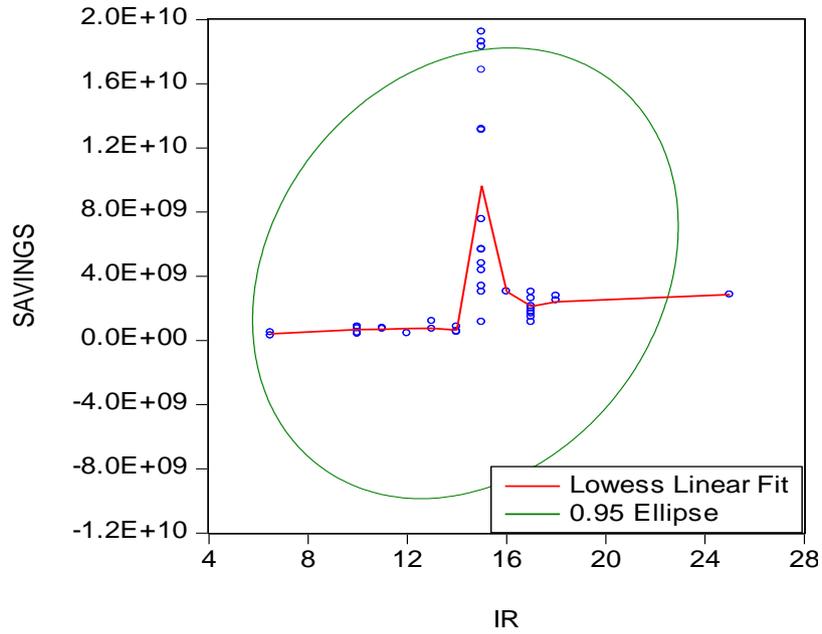
Variable	Statistics							
	Mean	Median	Maximum	Minimum	SD	Skewness	Kurtosis	J.Bera
<b>Savings</b>	4.19	1.99	192	3.07	5.52	1.79	4.84	27.8
<b>Interest rate</b>	14.3	15.0	25.0	6.50	3.37	0.00	4.61	4.48
<b>GDP</b>	2.54	1.51	8.76	2.73	2.64	1.25	3.08	10.7

Source: summarized by Author from E – views

Based on the above table, the mean value of the interest rate is higher than savings and GDP. In the meantime the GDP is in less volatility compared to savings and interest rate, because, the standard deviation of the GDP is less than savings and interest rate. All three series have been positively skewed. According to the coefficients of kurtosis, they are not normally distributed. Further, in order to test the correlation between the key independent variable and the dependent variable, the confidential ellipse is used and to confirm the relationship between entire independent variables and the dependent variable, the correlations matrix is also considered. The following figure shows the relationship between the key independent variable and the dependent variable, likewise, the subsequent table indicates the association between the entire independent variables and the dependent variable.

Both Figures 1 and Table 2 jointly show the correlation between independent and the dependent variables. Accordingly, all variables have positive relationship between each other, especially, the interest rate has positive correlation with the savings. Further, the table indicates that all the variables are not suffering from the serial correlation effect.

Next this study confirms the trend of the series that uses in this study, because, the trend of the series explains the stationarity position of the series. Therefore, the following figures delivers the stationarity position of the series.



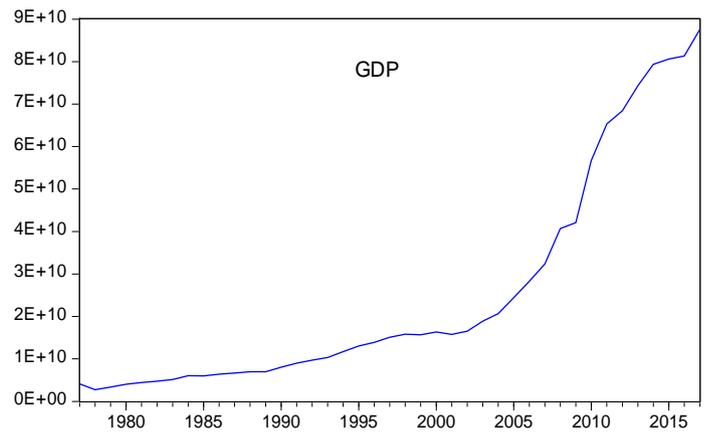
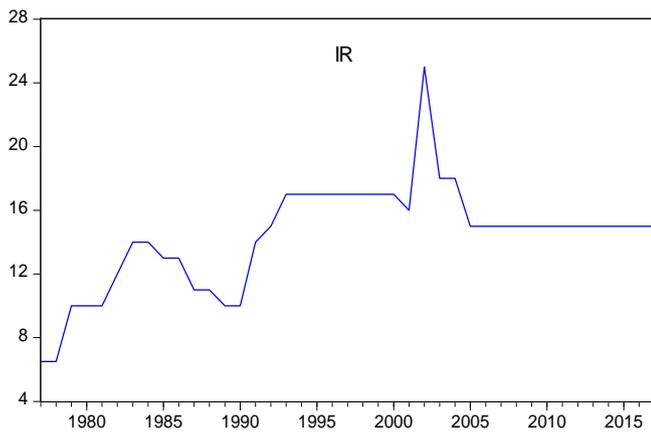
**Figure 1.** Association between IR and Savings

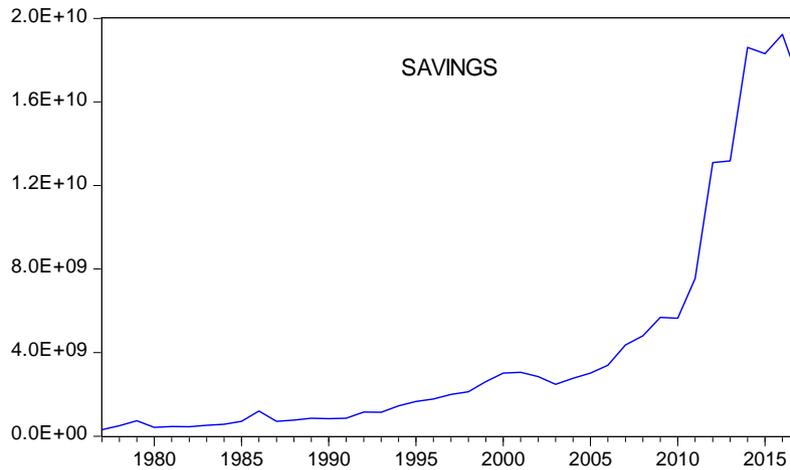
Source: summarized by Author from E – views

**Table 2.** Correlation matrix between variables

Variables	IR	GDP	Savings
IR	1.0000	0.2536	0.2089
GDP	0.2536	1.0000	0.9572
Savings	0.2089	0.9572	1.0000

Source: summarized by Author from E – views





**Figure 2.** Trend of the series  
 Source: summarized by Author from E – views

In order to confirm the integrated order of the variables numerically, this study uses some recommended tests as mentioned in research methods. The Table (3) shows the integrated order of the variables.

**Table 3.** Unit root test results

Variable	Level intercept with trend		First difference intercept and trend		Conclusion
	ADF	KPSS	ADF	KPSS	
<b>Log(Savings)</b>	-2.636	0.172	-3.565*	0.082*	I(1)
<b>Log(In. rate)</b>	-2.877	0.183	-8.929*	0.114*	I(1)
<b>Log(GDP)</b>	0.169	0.189	-4.992*	0.087*	I(1)

Source: summarized by Author from E – views

Table 3 presents the results of integrated order of variables. The null hypothesis in all variables is that the series has a unit root. Based on the test statistics all variables in this study are stationary at 1<sup>st</sup> difference level because the test statistics are significant at 5% level. On the other hand all series are in non – stationary at level, because, the test statistics are not significant at 5% level. Thus, this study concludes that all the series in this study are integrated in the same order.

Table 4 presents the result for lag selection. This study finds that several lag selection criteria, including AIC and SBIC, all criteria except LL indicate that the lag - 1 has the optimum lag model.

**Table 4.** Lag selection

Lag	LL	LR	FPE	AIC	SBIC	HQIC
0	-32.22036	NA	0.001281	1.853703	1.982986	1.899701
1	105.3472	246.1736*	1.48e-06*	-4.913012*	-4.395879*	-4.729020*
2	110.3096	8.096502	1.85e-06	-4.700505	-3.795523	-4.378519
3	112.3771	3.046888	2.73e-06	-4.335638	-3.042807	-3.875659

Source: summarized by Author from E – views

In Table 5, it presents the results of cointegration analysis. In terms of the table 5.5, there are three cointegration equations in which the probability value of equation none is less than 5%, therefore, the Null hypothesis (there is no cointegration vector) is rejected and the alternative hypothesis (there is cointegration vector) is accepted. This study, therefore, concluded that there is a cointegration vector, which means that the series of interest rate is cointegrated with the series of savings and GDP.

**Table 5.** Cointegration analysis.

Number of Cointegration	Test statistic					
	Trace statistic			Max – Eigen statistic		
	statistic	Critical value	Eigen value	statistic	Critical value	Eigen value
<b>None*</b>	30.472	29.797	0.449	22.663	21.131	0.449
<b>At most 1</b>	7.8089	15.494	0.185	7.8085	14.264	0.185
<b>At most 2</b>	0.0003	3.8414	9.400	0.0003	3.8414	9.400

Source: summarized by Author from E – views

In terms of the identified equation in Table 5, the long –run equation highlights that the interest rate and GDP have the positive relationship with savings.

The long – run equilibrium equation can be written as follows:

$$\log(\text{Sav}_t) = 6.64 + 0.07\log(\text{INT}_t) + 1.19 \log(\text{GDP}_t)$$

Based on the long – run equation, if the interest rate goes up, the savings also goes up. On the other hand, if the interest rate goes down the savings also goes down. This situation confirms the theoretical relationship between the interest rate and savings. Further, in the Vector Error Correction Model, the coefficient of speed of adjustment is (-0.740) and its P – Value is (0.000) which is less than 5%.

Therefore, this study determines that there is long run causality from interest rate and GDP on the savings that means the interest rate and GDP jointly influence on the savings in long – run. Moreover, the Chi- square value of the savings in the Wald test is 0.098 and its P – value is 0.95 which is more than 5%. Therefore, the null hypothesis is not rejected that means there is no short - run causality between interest rate and savings. Similarly, the Chi – square value of the GDP in the Wald test is 7.18 and its P – value is 0.02 which is less than 5%. In this case, the null hypothesis, therefore, is rejected that means there is short – run causality between the GDP and savings.

In order to test the serial correlation effect of the model, this study uses the Breusch – Godfrey serial correlations LM test. Based on the test, the value of the observed R – squared is 6.286 and its P – value is more than 5%. This study, therefore, concludes that the model is not suffering from the serial correlation effect. Further, in order to test the Heteroskedasticity, this study considers the Breusch – Pagan – Godfrey test, in terms of this test, the observed R – squared is 4.25 and its P – value is 0.811 which is more than 5%. Therefore, this model is not suffering from the Heteroskedasticity. Moreover, in order to test the normality distribution of the residuals, this study employs the Jarque – Bera test. The P - value of the Jarque – Bera test is 0.99 which is more than 5%. Therefore, this residuals of VECM model is also normally distributed. Therefore, this study confirms that the model is healthy.

## **5. CONCLUSION AND RECOMMENDATION**

In Sri Lankan context, this study provides a new empirical evidence regarding the connection between the interest rate and the savings that means till the current study has established there is no study that made on dynamics of the interest rate on the savings. Based on the findings, this study confirms that all the series such as savings, interest rate, and GDP have trend and after converting to the first difference they are stationary at I(1).

So as to test the long – run association, this study uses the likelihood cointegration technique, based on this technique the P-value of Trace and Max – Eigen statistic at none are less than 5%. Therefore, this study finds one cointegration equation and this equation tells the interest rate has the positive relationship on the savings. Further, the result of VECM indicates that the value of the speed of adjustment is the negative and significant that means the key independent variable the interest rate and control variable GDP have short-run causality on the savings.

Therefore, the interest rate promotes the savings in long – run as well as short – run. Based on the overall findings, this study recommends to the policymakers when they formulate any financial development policies, should consider the positive interest rate policy to boost the savings and to introduce the saving habits in the door to door between the peoples in Sri Lanka.

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