Research Journal of Finance and Accounting
ISSN 2222-1697 (Paper) ISSN 2222-2847 (Online)
Vol.9, No.16, 2018

Effectiveness of the Interest Rate Channel for Controlling Price Level in Relation to Sri Lanka

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Abstract
The study focuses on examining the effectiveness of interest rate channel as a main monetary transmission channel to achieve price stability in Sri Lanka using the data for the period from 1977 to 2010. Vector Error Correction model was used for the analysis. According to the test results, there is a positive relationship between interest rate and price level in the long run. This estimated coefficient is significant but inconsistent. The results prove that interest rate channel in the transmission mechanism of monetary policy is not effective in the Sri Lankan context. Price level has a positive relationship with money supply and exchange rate, and a negative relationship with income in the long run. Coefficients estimated in the long run inflation model are statistically significant and consistent. According to the Vector Error Correction test, price level has a long run relationship with other related variables in the system but not short run dynamics.
Key words; interest rate channel, inflation, coefficients, co-integration test, vector error correction model

1. Introduction

The aim of this study is to examine the effectiveness of interest rate channel as a main monetary transmission channel to control the price levels in Sri Lanka to achieve price stability in the economy. The central elements of this consent are that the instrument of monetary policy ought to be the short term interest rate, that policy should be focused on the control of inflation, and that inflation can be reduced by increasing short term interest rates. Economic and price stability is a situation which helps achieve sustainable economic growth. When the prices fluctuate at a low rate, it would have a significant effect on economic decisions of consumers and producers of an economy. Therefore, stable prices would not distort the economic decisions on consumption and investments. Recently, there has been a great revival of interest rate channel in regard to the issue of how to conduct monetary policy. Over the past several years many leading macro economists have either proposed specific policy rules or have at least argued on what the general course of monetary policy should take. John Taylor's interest rate rule is a well-known example for this revival.

Monetary policy generally adjusts the supply of money in the economy to achieve some combination of inflation and output stabilization. Most economists agree that in the long run, output (GDP) is fixed and any changes in the money supply only cause prices to change. But in the short run, changes in the money supply can affect the actual production of goods and services because prices and wages usually do not adjust immediately. This is why monetary policy is a meaningful policy tool for achieving both inflation and growth objectives. A central bank should be able to adjust its policy interest rate carefully to achieve its inflation target to a level which is steady with growth objectives of the economy. In the meantime, the effect of changes of central bank policy rates on long-term interest rates would depend on future inflation expectations of economic agents such as consumers and investors. (Bernanke, 2012). An increase in the policy rates could lead to expectations that inflation would slow down in the future. It is important to note that while a good monetary policy yields good macroeconomic performances such as sustained growth and low inflation, a bad monetary policy yields bad macroeconomic performances such as low growth and high inflation.

The relationship between the monetary policy decisions and changes in the level of output and price level of the economy is explained by the monetary policy transmission mechanism. Monetary transmission is a very complex and attractive topic for researches because there are many channels. According to Mishkin (1996) the monetary transmission mechanism with interest rate channels had been a standard feature in the literature for over sixty years going back to the period of Keynes and it is the primary mechanism at work in conventional macroeconomic models. According to him, real long term interest rates have a major impact on consumer and investment spending. Changes in interest rates affect savings and consumption decisions of households, and the investment decisions of firms.

According to Keynesian interpretations, an expansionary monetary policy decreases nominal interest rates due to

a liquidity growth, and a fall in short term real interest rates. This depends critically on the assumption of sticky prices in the short-run. The lower short term real interest rate leads lower long term real interest rates, decreases the cost of capital and increases investments and thereby increases aggregate demand and raises output. In the long time lower real interest rates increases the price level. Higher interest rates would raise the cost of financing and discourage investments specially financing through the banks. On the other hand, firms holding interest-bearing instruments could earn more and could discourage investments. If a house hold acts as a borrower, higher interest rates imply larger interest payments for debt such as housing loans and credit card payments which leads to lower price level.

If a country expects to achieve price stability and to maintain economic growth through the monetary policy, it should examine the effectiveness of monetary policy in controlling macro-economic variables. In the context of Sri Lanka, low economic growth with high inflation is experienced for a long time period. (Central Bank Sri Lanka, various years). There is a doubt whether Sri Lanka could perform monetary policy targets through the interest rate operations. If the interest rate channel of monetary policy is effective in Sri Lanka, interest rate could be able to control inflation and to maintain economic growth through investment. However, empirical studies which examine this interest rate channel of monetary transmission mechanism are few in Sri Lanka. Thus the main objective of this study is to expand the literature by investigating the effectiveness of interest rate transmission channel to control price level in the Sri Lankan context.

2. Theoretical and Empirical background

Monetary policy is the process by which the monetary authority of a country controls the supply and availability of money and interest rates for the purpose of promoting economic growth and stability. If aggregate demand falls below a desired level, monetary policy is relaxed to increase the demand by encouraging people to consume more and save less. An expansionary monetary policy increases the total supply of money in the economy more rapidly than usual. Expansionary policy is used to combat unemployment in a recession period by lowering interest rates. Monetary policy rests on the relationship between the rates of interest in an economy and the total supply of money. Monetary policy uses a variety of tools to control one or both of these, to attain a set of monetary policy goals such as economic growth, low inflation, stable exchange rates with other currencies and low unemployment.

If consumers and firms believe that policy makers are committed to achieving low inflation, further lower prices would be anticipated by consumers and firms. If an employee expects prices to be high in the future, it leads to an expectation of high wage to match these prices and bring about demand pull inflation due to higher demand with higher wages as well as cost pushed inflation due to the higher cost of workers. But with the expectation of lower prices, an employee expects lower wages and employers pay less in wages. There would be no demand pull or cost pushed inflation. Policy makers should be able to make credible announcements for achieving a low level of inflation as targeted in economic policies. Private agents believe these announcements and they suppose that it will reflect on actual figures. If consumers and firms not believe the announcement, they expect higher level inflation, and inflation will rise in the future. Hence, if a policymaker's announcements are not credible, an economy will not be able to achieve the expected results of monetary policy on economic goals such as national output and inflation.

As a goal of economic policy, policy makers are more concerned with a stable price level. The price stability is viewed as the most important goal for monetary policy because inflation creates uncertainty in the economy, and this uncertainty in the economy might hamper economic growth.

Thiessen (1998) describes that Monetary Transmission Mechanism takes place in four stages. First, Central Bank actions affect short term interest rates via the banking sector liquidity. In the second step these short term interest rates affect other interest rates and exchange rates. In the third step interest rates and exchange rates affect aggregate economic activities such as consumption, investment and national income. At the last the aggregate demand and supply affect inflation. Dakila and Paraso (2004) also describe these stages of transmission mechanism as the interest rate channel. Thenuwara (2010) describes it as a strong monetary discipline which promotes low interest rates as well as low inflation that are necessary to achieve high economic growth.

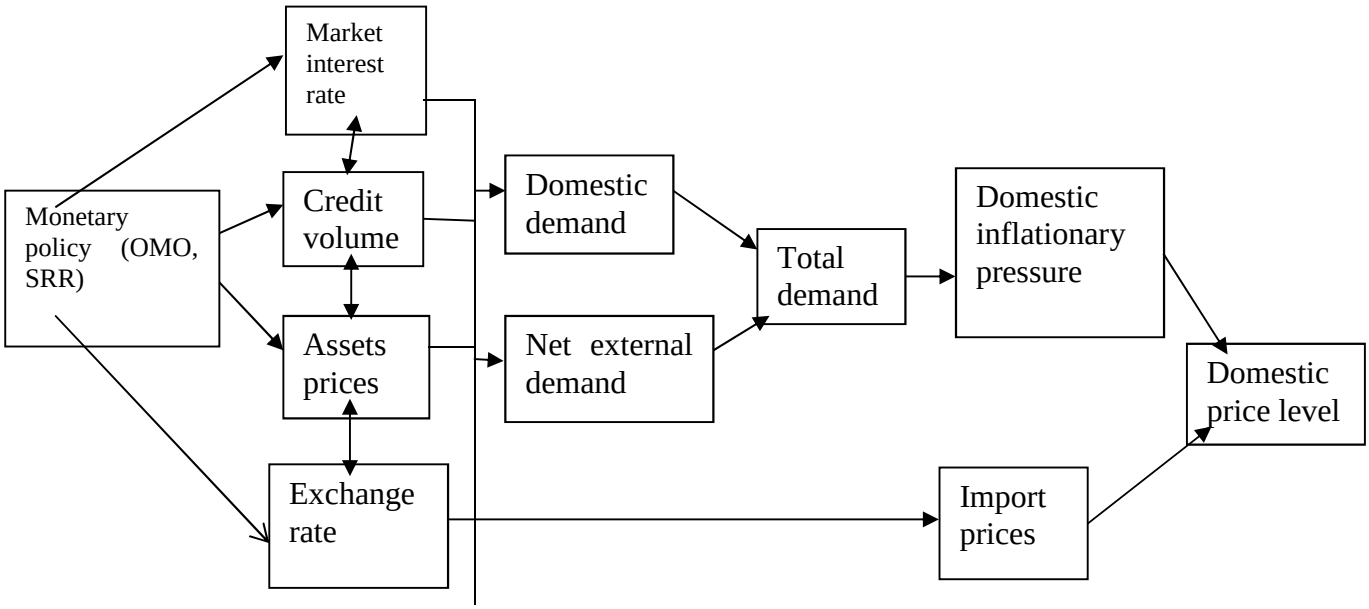

Figure 1: Transmission Mechanism of Monetary Policy

Source: Central bank of Sri Lanka (2005).

2.1 Effects of interest rate channel in the transmission mechanism

The study done by Angeloni, Kashyap, Mojon and Terlizzese, (2003) provides a comprehensive description of how monetary policy affects the euro area economy. According to their study, for the euro area, the interest rate channel is a prominent channel in the monetary policy transmission. The study done by Francisco Dakila and Paraso (2004) has concentrated on the impact of interest rate changes on the economy in the Philippines. This analysis has identified the significant impact on investment, the rate of economic growth and inflation. They have found in their study as expected that three months T-bill rates generate a lagged reduction in the level of fixed capital formation and a fall in GDP growth. GDP growth (economic growth) was strongest about four quarters after the interest rate shock, according to them. The results of the study also have shown that there was an increase in the inflation rate and in the eighth quarter after the interest rate shock, inflation had fallen. Chirinko and Kalckreuth's (2003) paper which examined the monetary transmission mechanism in Germany reveals that the interest rates channel of monetary policy can be quite potent in Germany. This study reveals a statistically and economically significant price sensitivity of investment spending. They examined the importance of the interest rate and the credit channels on fixed investment in businesses in Germany. The study has uncovered a statistically significant interest rate channel. Following a quarterly structural vector auto regression (SVAR) model, Mohanty (2012) has found through his study that policy rate increases have a negative effect on output growth with a lag of two quarters and a moderating impact on inflation with a lag of three quarters underlining the importance of interest rate as a potent monetary policy tool in India.A survey done by Taylor (1995) provides details of strong empirical evidence in regard to substantial interest rate effects on consumer and investment spending.

Hossain and Chowdhury (1996) explained how the effectiveness of monetary policy depends on the controllability of money supply and reliability of the link between money supply and the ultimate targets of inflation, output and balance of payment. According to his study money supply in developing countries is largely endogenous. The absence of a well-developed capital market is the main cause leading to the link between the monetary base and budget deficit. Due to the absence of a developed capital market, budget deficits are often financed by borrowing from the Central bank. Yi-ding and Shuang- hong (2007) explains that incompletely liberalized interest rate system weakens the transmission effect. Further this study has explained that economic transition leading to changes in consumption behavior of Chinese urban residents is a key obstacle to the monetary policy transmission.

Wijeweera and Dollery (2008) show in their study done for examining the impacts of monetary policy changes

on the exchange rate in Sri Lanka over the period 1950 to 2004 that Sri Lankan macroeconomic variables do not relate to the interest rate adjustments. Furthermore they explain that this situation may suggest that monetary policies are not highly effective for controlling the economy in Sri Lanka. This study states that the underdeveloped financial market and the dramatic changes in the structure of economy of Sri Lanka disturb the monetary transmission mechanism. The central bank's ability to control the short - term real interest rate depends on a slow responsiveness to inflation. Without a slow inflation to a change in the nominal policy rate, real rate will be unchanged. A slow responsiveness can come from the presence of nominal rigidities such as wage or price stickiness, which blunt the impact of demand on firms' cost. According to Taylor (2000) the most important thing is that a movement in monetary policy can change the real interest rate temporarily due to sticky price assumption which describes that people cannot change their prices rapidly. This change of the real interest rate affects expenditure and employment and then the output of the economy.

The study done by Amarasekara (2008) that analyzes the effects of interest rate, money growth and the movements of nominal exchange rate on real GDP growth and inflation in Sri Lanka for the period from 1978 to 2005 examines the result of a series of recursive VARs for various sample periods with different monetary policy variables. He observes that when the interest rate is considered as the monetary policy variable, a positive innovation in interest rate reduces the GDP growth and inflation. The behavior of monetary policy indicators, which relate interest rate, money growth and exchange rate can be explained as a combination of both anticipated and unanticipated monetary policy. According to Amarasekara, unanticipated monetary policy is relatively a small portion to overall monetary policy moves. The large majority of monetary policy moves is explained by reactions to economic development taken by the Central Bank of Sri Lanka. It was also observed that anticipated monetary policy contractions (a rise in interest rate or money growth reduction) are negatively correlated with GDP growth with lag of 0-9 months. As well as, the anticipated and unanticipated monetary policy contractions negatively correlated with inflation with a lag of 28-36 months.

The paper done by Bernhardsen (2008) describes the relationship between the key policy rate and macroeconomic variables in Norway. This study revealed that the interest rate depends on the lagged interest rate and the interest rate deviations from the long term solution. The Central bank normally would change the interest rate in small steps. The study has taken the expected negative signs to interest rate with inflation and GDP gap and, the parameters are significantly different from zero.

3. Methods

3.1 Data and variables

This study investigates the effectiveness of the interest rate channel of the transmission mechanism of monetary policy to control price level in the Sri Lankan context. Annual data of the period 1977 -2009 are used for the study and all the original data series (see table 01) are converted to log variables.

The variables include in the inflation model going to estimate are Consumer Price Index (CPI) as price indicater, Nominal broad money supply (M2) as money supply indicater, Real GDP (RGDP) as income indicater, Fixed Deposit Rate (For one year) (FDR) as interest rate indicater, and nominal exchange rate (ER).

A good time series modeling should describe both short-run dynamics and the long-run equilibrium simultaneously. In this manner, the study employs an econometric technique of co-integration and error correction modeling (ECM) to estimate more sophisticated relationships. Unit root testing as a pre-testing method for co-integration test will be carried out in order to determine the degree of stationarity of data series. The sources of data are the Central bank Of Sri Lanka and International Financial Statistics (IFS) of International Monetary Fund.

Table 1: Original series used for the analysis

Time series of	Denotation	Units	Data span	Note
Colombo Consumer Price Index	CPI	Rupees Base (2002)	1977 - 2009	annually
Gross domestic product at constant price	RGDP	Rs. Millions Base(2002)	1977 - 2009	annually
Fixed Deposit Rate	FDR	Percentage	1977 - 2009	annually
Nominal Exchange Rate	ER	SLRs per Dollar	1977 - 2009	annually
Nominal Money Balance	M2	Rs. Millions	1977 - 2009	annually

Table 2: The transformation form and transformed series

Time series of	Denotation	Units	Data span	Transformation form
Log of CPI	LCPI	Rupees	1977 - 2009	Log(CPI)
Log of Gross Domestic Product at constant price	LRGDP	SLRs. Millions 2002 as Base year	1977 - 2009	Log(RGDP)
Log of Fixed Deposit Rate	LFDR	Percentage	1977 - 2009	Log(FDR)
Log of Exchange Rate	LER	Rupees	1977 - 2009	Log(ER)
Log of money supply	LM2	Rs. Millions	1977 - 2009	Log(M2)

Vector error correction methodology is used for the analysis of interest rate channel. VAR method does not capture non-linear elements that exist with certainty in level variables because a VAR is a linear model. The better way to respond to this problem is to linearize the data by taking the logs of the levels. For this testing purpose, the original data of all series: CPI, RGDP, FDR, ER and M2 were transformed to log, and the transformation form and the new variables are described in the Table 02.

3.2 Specification of the empirical model

According to the above theoretical and empirical discussion presented in the literature survey, the long run investment function for Sri Lanka can be specified in the following manner:-

$$LCPI_t = \beta_0 + \beta_1 LM2_t - \beta_2 LRGDP_t - \beta_3 LFDR_t + \beta_4 LER_t \quad (1)$$

Where,

LCPI - Log of Colombo Consumer Price Index (base year 2002)

LM_2 – Log of Nominal broad money supply.

LRGDP - Log of gross domestic product at constant prices (base year 2002)

FDR – Fixed Deposit Rate For one year.

LER - Nominal Exchange rate

β_0 - Constant of inflation function

β_1 – Money elasticity of inflation (Expected to be positive)

β_2 – Income elasticity of inflation (Expected to be negative) (As the output)

β_3 - Interest rate elasticity of inflation (Expected to be negative)

β_4 - Exchange Rate elasticity of inflation (Expected to be positive)

$\mu 2_{t-1}$ – Deviation of inflation from the long run equilibrium in the previous year.

Error correction form equation can be represented as;

Because co-integration equation of inflation model is

$$\mu 2_{t-1} = LCCPI - \beta_0 - \beta_1 LGDP + \beta_2 LNER + \beta_3 CBR - \beta_4 LM1 \quad (2)$$

Vector error correction model

$$\Delta LCCPI_t = \gamma_0 - \alpha_2 (\mu 2_{t-1}) + \gamma_1 \Delta LCPI_{t-1} + \gamma_2 \Delta LM2_{t-1} - \gamma_3 \Delta LGDP_{t-1} - \gamma_4 \Delta LFDR_{t-1} + \gamma_5 \Delta LER_{t-1} + \upsilon 2_t \quad (3)$$

$$\Delta LCCPI_t = \gamma_0 - \alpha_2 (LCCPI - \beta_0 - \beta_1 LGDP + \beta_2 LNER + \beta_3 CBR - \beta_4 LM1) + \gamma_1 \Delta LCPI_{t-1} + \gamma_2 \Delta LM2_{t-1} - \gamma_3 \Delta LGDP_{t-1} - \gamma_4 \Delta LFDR_{t-1} + \gamma_5 \Delta LER_{t-1} + \upsilon 2_t$$

Where,
α_2 - Speed of adjustment to disequilibrium of inflation equation
$\beta_0's$ - Coefficients of long run inflation equation
γ's - Short term adjustment Coefficients of inflation.
υ_{2t} – Error term of VECM of inflation model
The coefficients α_1 and α_2 represent the measure of the speed of adjustment through which the system moves towards its equilibrium.

3.3 Hypotheses

The main objective in the study is to test whether empirical evidence on the effectiveness of interest rate transmission channel to control price level in the Sri Lankan context accords with the existing theoretical explanations. The study tests followings, using the t- test.

$$H_0;\ \beta_3 \geq 0$$
$$H_1;\ \beta_3 < 0$$

β_3= Interest elasticity of inflation.

$$H_0;\ \beta_1 \leq 0$$
$$H_1;\ \beta_1 > 0$$

β_1= Money supply elasticity of inflation.

$$H_0;\ \beta_2 \geq 0$$
$$H_1;\ \beta_2 < 0$$

β_2= Income elasticity of inflation.

$$H_0;\ \beta_4 \leq 0$$
$$H_1;\ \beta_4 > 0$$

β_4= Exchange Rate elasticity of inflation.

4. Results and discussion

4.1 Unit root test.

In real world, non-stationarity is extremely common in macroeconomic time series such as income, consumption, money, prices and trade data. Supposing that non-stationary data series as they were stationary will bias the Ordinary Least Squares (OLS) and leads to spurious estimations. To ignore spurious results, the unit root test, which is to determine whether the data series are stationary or non-stationary, was conducted firstly. Plotting the levels and differences of the five series suggests that the data are non-stationary in levels, but stationary in differences. (See graph 01 and graph 02)

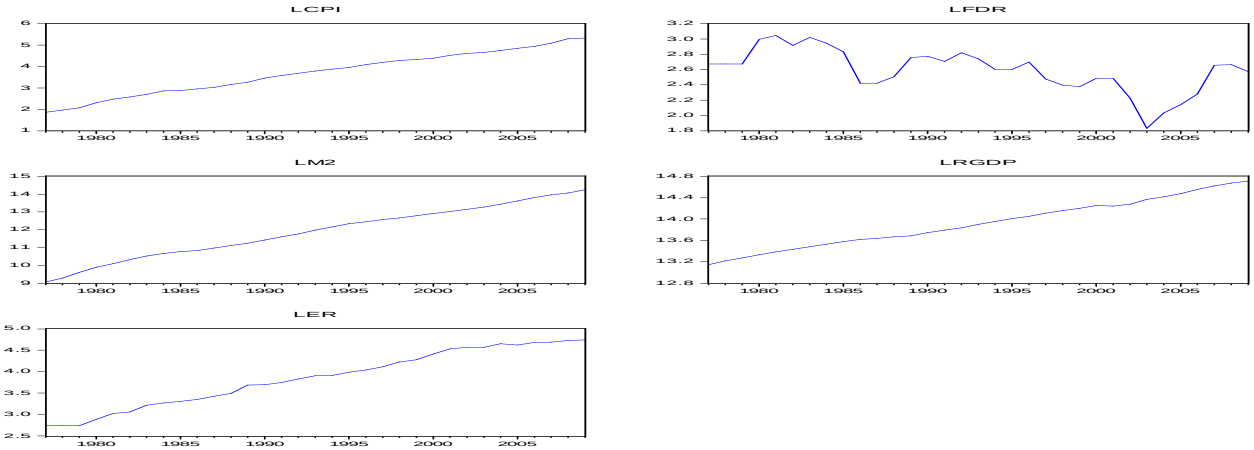

Figure 2; Variables used for inflation model: In levels

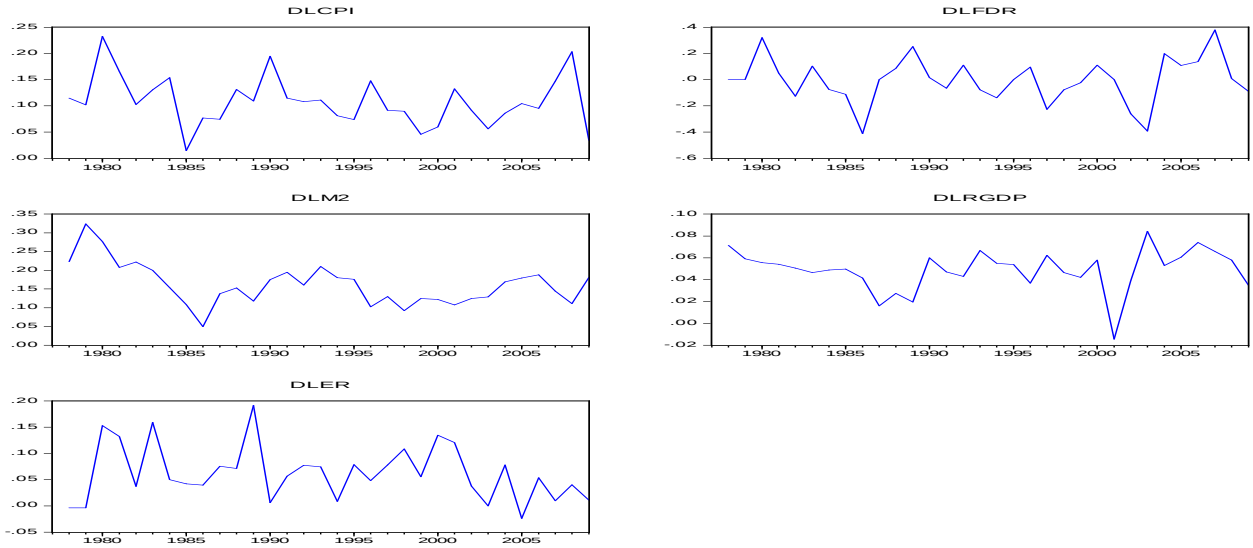

Figure 3: In differenced order one

The test was done using Augmented Dickey Fuller (ADF) test. The ADF approach tests the null hypothesis that a series does contain a unit root (non-stationary) against the alternative hypothesis that there is not a unit root (stationary). The ADF test can be used to overcome the problems with serial correlation. According to the Akaike information criterion (AIC) and Schwartz Bayesian criterion (SBC), the optimal lag length is selected as lag one.

Table 3: ADF test results (level- Intercept)

Variable	ADF Test statistics	Critical values 1%	Critical values 5%	Critical values 10%
LCPI	-1.3811	-3.6576	-2.9591	-2.6181
LRGDP	0.4657	-3.6576	-2.9591	-2.6181
LFDR	-2.2354	-3.6576	-2.9591	-2.6181
LNER	-1.9011	-3.6576	-2.9591	-2.6181
LM2	-0.9818	-3.6576	-2.9591	-2.6181

Table 4: ADF test results (1st difference- Intercept)

Variable	**ADF Test statistics**	**Critical values 1%**	**Critical values 5%**	**Critical values 10%**
LCPI	-3.6508*	-3.6661	-2.9627	-2.6200
LRGDP	-3.6249*	-3.6661	-2.9627	-2.6200
LFDR	-4.1699**	-3.6661	-2.9627	-2.6200
LNER	-4.0172**	-3.6661	-2.9627	-2.6200
LM2	-3.4201*	-3.6661	-2.9627	-2.6200

Note: sign ** for Rejecting at 1% significant level, and sign * for rejecting at 5% significant level.

Stationarity of each series was tested using the Augmented Dicky Fuller (ADF) unit root test including a constant. Table 03 reports the results on 1%, 5% and 10% significant levels. Unit root tests were conducted for each variable; LCPI, LRGDP, LFDR, LER and LM2 that used for the analysis on level log variables and null hypotheses were accepted for all variables. It means that all the variables were non-stationary (I(1)) indicating that they are having either time varying means and variances and would be differenced for making stationary. The first difference of all variables have been rejected the null hypothesis of there is a unit root, at 1% and 5% significant levels, portraying that differenced variables are stationary. (See table 04) Therefore, ADF unit root test indicate that these variables are integrated of order 1, [I(1)] and those are suitable for a VEC model through co-integration test to examine both long run co-integration relationship and short run dynamics. If the time series data used in the analysis are non-stationary, then VAR framework should be modified to allow consistent estimation of the coefficients of the variables. The vector error correction (VEC) model is just a special representative of VAR for variables that are stationary in their difference (I(1)). The VECM can also estimate any co-integrating relationships among the variables.

4.2 Co-integration test for inflation

Johanson co-integration methodology would be conducted to test whether there are any long run relationships among the set of non-stationary variables. Johansen test is performed using the likelihood ratio tests. Number of co integrating relations is calculated assuming that there is no linear time trend.

The table 5 reports the values of likelihood test statistics. To test the null hypothesis; the number of co-integrating vectors is zero (r=0) against the alternative hypothesis r = 1, 2, 3 or 4, the likelihood statistics were used. Since the null hypothesis $r = 0$ and there are five variables, the test runs from 1 to 4. Since likelihood statistic of $r = 0$ is 90.39 and it is larger than the critical value of 68.52, the null hypothesis is rejected at the 5% significance level. This test confirmed that the variables are co-integrated and there is one co-integrating equation at the 0.05 significant levels.

Table 05: Values of likelihood test statistics

Hyphothesized No of CE(s)	Eigen value	Likelihood Ratio	5 Percent Critical value	1 Percent Critical value
None **	0.790917	90.39025	68.52	76.07
At most 1	0.534743	43.43960	47.21	54.46
At most 2	0.379326	20.48462	29.68	35.65
At most 3	0.166456	6.176133	15.41	20.04
At most 4	0.023521	0.714070	3.76	6.65

* denotes rejection of the hypothesis at the 0.05 level

Finally, co-integration test shows that there are maximum of one co-integrating relationship in the system. The presence of one co-integration vector implies that Granger-causality should exist in one direction among the variables.

4.4 Estimated long run inflation model

Several significant findings are to be gathered from this analysis and the results would prove these findings. In the long run, one co-integration relationship exists among the set of series. The long run equilibrium equation of inflation, estimated by the co-integration methodology is given below.

$$LCPI = -1.51 + 0.59LM2 - 0.28LRGDP + 0.13LFDR + 0.45LER + \mu 2_{t-1} \quad (6)$$
(-13.1238) (2.66855) (-5.21984) (-7.12245)

According to the existing theories, expected coefficient of interest rate in the long run inflation model would be negative. With higher interest rates, demand for money for the transactions motive will drop and this would lead inflation to decline. The positive sign of the coefficient of interest rate in the estimated inflation model shows that the impact of 1% increase in FDR would increase inflation by 0.13% *ceteris paribus*. This estimated coefficient is significant but inconsistent. With open market operations to contract money supply, central bank announces higher repo rates, and Central Bank Rate also goes up. In one hand commercial banks and private sector will trend to buy bonds, and on the other hand people trend to save money on savings and time deposits. Money keeping hands on non-bank people is the massive part of money supply in Sri Lanka. With higher interest rates and higher savings would leads to raise money creation activities of the commercial banks due to higher liquidity of the banks. In the meanwhile higher investment and consumption lead higher price level. In contrast, with lower market interest rates, investment would be decreased through the lower credit supply and inflation would be decreased. This result indicates that the credit channel of the transmission mechanism of monetary policy is more effective to control price level than the interest rate channel in relation to Sri Lanka.

In the meanwhile the RGDP influences negatively to the CPI and this negative sign is consistent with expected model shown in the chapter four. When the RGDP increases, price level would go down. The estimated coefficient of the RGDP in the long run inflation model is -0.28 and it is significant. This negative coefficient describes the income sensitivity of inflation. This indicates that 1% increase in the RGDP decreases price level by 0.28% ceteris paribus. The effect of an innovation in RGDP on investment is greater than its effect on inflation.

Movements in the exchange rate could influence the price level and investment directly and indirectly, through the changes in the pattern of spending. There is a long history behind the belief that nominal exchange rate depreciation is closely linked to price inflation (Mishkin, 2008). The coefficient of Nominal Exchange Rate (ER) in the long run inflation model also is statistically significant. The estimated results show that ER makes positive impact on inflation. The coefficient of ER variable in the long run inflation model is 0.45 and the coefficient is consistent with the expected result. A higher exchange rate leads to raise domestic prices in one hand due to importation of goods and other hand higher money supply with higher balance of payment surplus. The exchange rate elasticity of inflation represents the impact of 1% increase in ER rises inflation by 0.45%. In contrast, 1% decrease in ER will decrease inflation by 0.45%. The effect of exchange rate innovations on investment is greater than this effect on the price level. According to a positive innovation of exchange rate, investment would be influenced negatively and inflation would be effected positively. A positive innovation of exchange rate would affect badly for economic environment in Sri Lanka. Exchange rate granger cause interest rate (FDR) in Sri lanka and it is a negative relationship. If monetary policy instruments can control exchange rate, the exchange rate transmission channel of monetary policy is more effective that the interest rate channel in Sri Lanka. According to granger causality test interest rate does not granger cause ER, but M1 granger cause ER, and ER granger cause FDR. As a policy tool M1 (Monetary aggregate) is more effective for performance of the exchange rate channel of the transmission mechanism of monetary policy in Sri Lanka.

The other variable appearing in the long run inflation equation is broad money aggregate (M2), and the coefficient of M2 is highly significant at 5% level. Money supply is highly related to the change in price level in Sri Lanka. The estimated coefficient has taken the correct sign as expected in the model in chapter 4, and highly significant. The estimated coefficient of M2 in the long run inflation model is 0.59 and it reflects the money supply elasticity of inflation. This indicates that 1% increase of M2 increases the inflation by 0.59% ceteris paribus.

4.5 Short run dynamics of inflation

The results of vector error correction model for inflation, which was done to analyze the short run dynamics of the system is presented in this part. Each error correction model (ECM) obtains an error correction coefficient (α) called the speed of adjustment in which the system moves towards its equilibrium. The co-integration equation established in the previous co-integration test is presented below, and vector error correction results are presented in the table 06. Each column in table 06 includes the error correction model for each variable in the

inflation model. First row of the table present estimated error correction parameters for each variable.

Table 6 : Vector error correction estimates

	D(LCPI)	D(LM2)	D(LRGDP)	D(LFDR)	D(LER)
$\mu 1_{t-1}$	-0.241655	0.745584	-0.009195	1.753301	1.001945
	(-0.72362)	(2.53830)	(-0.05434)	(1.28102)	(2.28057)
D(LCPI(-1))	-0.106412	-0.272031	0.008687	-1.595356	-0.943216
	(-0.30041)	(-0.87312)	(0.04840)	(-1.09892)	(-2.02403)
D(LCPI(-2))	-0.116564	-0.203725	0.153303	-1.395891	-0.569949
	(-0.49786)	(-0.98927)	(1.29227)	(-1.45471)	(-1.85038)
D(LM2(-1))	0.456312	0.691061	-0.026732	2.153199	0.494343
	(2.25126)	(3.87626)	(-0.26029)	(2.59199)	(1.85386)
D(LM2(-2))	-0.083003	0.165651	0.103527	-0.492508	0.599425
	(-0.30691)	(0.69636)	(0.75548)	(-0.44433)	(1.68473)
D(LRGDP(-1))	-0.228739	-0.382519	-0.050095	0.990243	-0.888054
	(-0.43712)	(-0.83108)	(-0.18894)	(0.46173)	(-1.28998)
D(LRGDP(-2))	-0.345010	0.038392	-0.248133	0.329135	-0.873159
	(-0.67232)	(0.08506)	(-0.95431)	(0.15650)	(-1.29337)
D(LFDR(-1))	0.101871	0.026156	0.036787	0.264570	0.045297
	(1.58645)	(0.46311)	(1.13065)	(1.00531)	(0.53621)
D(LFDR(-2))	0.031066	0.021613	-0.028382	0.106254	0.043733
	(0.48918)	(0.38692)	(-0.88205)	(0.40824)	(0.52345)
D(LER(-1))	-0.036714	0.188637	-0.189615	0.369963	0.168557
	(-0.17471)	(1.02059)	(-1.78085)	(0.42957)	(0.60971)
D(LER(-2))	-0.305909	0.203655	0.009071	-0.383036	0.235397
	(-1.58019)	(1.19603)	(0.09248)	(-0.48277)	(0.92428)
C	0.124380	0.060608	0.044308	-0.001658	0.116478
	(2.33854)	(1.29556)	(1.64413)	(-0.00761)	(1.66464)
R-squared	0.616122	0.665402	0.315183	0.521603	0.386983

Note: (t)

Error correction term is considered as a measure if the value in between 0-1, and Error correction term should be negative value. If this term is positive or more than one, it means that it is not reasonable. According to VEC test above, when some ECTs are significant those are not reasonable. It means that inflation would not be adjusted in the short run. Inflation has a long run relationship with other related variables but not short run dynamics in the system.

This study investigates the validity of the above view (on interest rate channel) in the context of Sri Lanka and this would contribute to the pool of empirical literature on the interest rate channel of the transmission mechanism of monetary policy in the Sri Lankan context.

5. Conclusions

The study focuses on examining the effectiveness of interest rate channel as a main monetary transmission channel to achieve price stability in Sri Lanka. This study investigates the validity of the above view on interest rate transmission channel in the context of Sri Lanka, and the analysis is done using the data for the period from 1977 to 2010. According to the test results, this estimated coefficient interest rate is significant but inconsistent. According to the data, higher interest rate leads higher price level. Higher interest rates lead people to save money in the fixed deposits in the Sri Lankan experience. With higher interest rates and higher savings would leads to raise money creation activities of the commercial banks due to higher liquidity of the banks. In the meanwhile higher investment and consumption lead higher price level. This result indicates that the credit channel of the transmission mechanism of monetary policy is more effective than the interest rate channel to achieve price stability as well as the growth stability, in relation to Sri Lanka.

A positive innovation of income or output leads lower price level. Movements in the exchange rate could influence the price level directly and indirectly, through the changes in the pattern of spending. A higher exchange rate leads to raise domestic prices in one hand due to importation of goods and other hand higher aggregate demand with higher export earnings. If Central bank can control exchange rate through the monetary aggregates as a monetary policy tool, the exchange rate transmission channel of monetary policy is more

effective than the interest rate channel in Sri Lanka. According to granger causality test in this analysis, interest rate does not granger causes ER, but M1 granger cause ER, and ER granger cause FDR. As a policy tool M1 (Monetary aggregate) is more effective for performance of the exchange rate channel of the transmission mechanism of monetary policy in Sri Lanka. The other variable appearing in the long run inflation equation; broad money aggregate (M2) is highly positively related to the change in price level in Sri Lanka. These other three coefficients estimated in the long run inflation model are statistically significant and consistent.
According to the Vector Error Correction model inflation would not be adjusted in the short run and sticky prices assumption in the short run is proved. Price level has a long run relationship with other related variables in the system but not short run dynamics.

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