Effects of monetary shocks in Sri Lankan economy

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Introduction

The objectives of this research study are to generate: (i) a generic model with operating targets, (ii) transmission channels with intermediate targets along with operating targets, and (iii) a composite model with all study variables.

Monetary policy is widely used by respective governing banks in various countries as an equilibrium instrument to manage their economic status, to achieve continuous and high output growth rates, and to maintain low inflation rates. In Sri Lanka, the Central Bank of Sri Lanka (CBSL) is the state authority, in charge of executing monetary policy and administrating currency within the country. Monetary policy in Sri Lanka has experienced major fluctuations in the last few decades. CBSL reviewed its monetary policy objectives, based on global developments and objectives that are now oriented toward economic and price stability and financial system stability. The new monetary policies implemented by CBSL aimed to maintain the reserve money at an acceptable-levels while maintaining interest rate and inflation rate compatible with target reserve money Governments use monetary policies to influence the level of aggregate demand in the economy, in an effort to attain economic aims of price solidity, full employment and economic development [1]. Assessing monetary variables is essential to observe the fluctuations in economic growth and the impacts of monetary policies [2].

Monetary policy tools change from one country to another based upon their legal and fiscal status. Monetary policies in developing countries are influenced by the world's major governing banks, i.e., the Federal Reserve Bank, the European Central Bank, etc. Therefore, the investigation of monetary tools in developing countries requires a model which differs from developed countries [3]. In every country, an effective fiscal administration relies on the understanding of shocks circulating within the economy and monetary policies. Therefore, it is necessary to have models to understand monetary variables affecting the economy of the country [4]. This study aims to evaluate the monetary variable shocks which affect the Sri Lankan economic activities.

Methodology

Gross Domestic Product (GDP), Consumer Price Index (CPI), Commercial Bank Loans (BL), Exchange Rate (EXR), Aggregate Money Supply (M2), Bank Rate (BR), and Reserve Money (RM) were selected as monetary variables for this study. All data were collected from CBSL publications. Seasonally adjusted monthly time series data for the period from January 2003 to December 2020 were used for this study. Augmented Dickey-Fuller unit-root tests have been used for confirming stationary. Optimum lag length criteria, residual diagnostic check and descriptive analysis were performed. Five Structural Vector Auto Regressive (SVAR) models namely: (1) Generic model (having variables GDP, CPI, BR, RM), (2) Bank lending model (having variables GDP, CPI, BL, BR, RM), (3) Exchange rate model (having variables GDP, CPI, EXR, BR, RM), (4) Money effect model (having variables GDP, CPI, M2, BR, RM) and (5) Composite model (having variables GDP, CPI, BL, EXR, M2, BR, RM) as shown in Equation 1 were used for the analysis. Impulse Response Function (IRF) and variance decompositions were obtained from the above SVAR models.

Robustness checks were performed to verify the stationary and stability of selected lag lengths.

$$\begin{pmatrix} 1 & 0 & 0 & 0 & 0 & 0 & 0 \\ a21 & 1 & 0 & 0 & 0 & 0 & 0 \\ a31 & a32 & 1 & a34 & a35 & a36 & a37 \\ a41 & a42 & 0 & 1 & 0 & 0 & 0 \\ a51 & a52 & 0 & 0 & 1 & a56 & 0 \\ 0 & 0 & 0 & a64 & 0 & 1 & 0 \\ 0 & 0 & a73 & a74 & a75 & a76 & 1 \end{pmatrix} \begin{pmatrix} \epsilon_t^{GDP} \\ \epsilon_t^{CPI} \\ \epsilon_t^{BL} \\ \epsilon_t^{EXR} \\ \epsilon_t^{M2} \\ \epsilon_t^{BR} \\ \epsilon_t^{RM} \end{pmatrix} = \begin{pmatrix} b11 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & b22 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & b33 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & b44 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & b55 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & b66 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & b77 \end{pmatrix} \begin{pmatrix} \mu_t^{GDP} \\ \mu_t^{CPI} \\ \mu_t^{BL} \\ \mu_t^{EXR} \\ \mu_t^{M2} \\ \mu_t^{BR} \\ \mu_t^{RM} \end{pmatrix} \quad (1)$$

Results and Discussion

Descriptive statistics show that skewness and standard deviation statistics show that variances of the variables are not unnecessarily large while the Jarque-Bera statistic of each variable accepts the null hypothesis of normality at one percent level of significance. Augmented Dickey–Fuller (ADF) unit root test results that the variables are stationary after differencing once. This implies that the variables are integrated of order one I (1).

IRF obtained from generic models shows that monetary policy shock conforming to an unexpected increase in the BR of about 2.9 percent causes a drop in GDP, which has lowest after 2 months at 0.1 percent below the baseline. Likewise, CPI responds to the monetary narrowing with a decreasing value. Further, it was found that a monetary shock equivalent to a 2 percent sudden increase in RM causes a rise in GDP, cresting at 0.1 percent above baseline after 6 months. CPI responds with a 2 percent increase with RM in 2 months and started to decrease after 2 months.

IRF of bank lending model shows that a BR shock equivalent to an unexpected increase in the BR about 2.9 percent causes BL to drop continuously within the horizon of 10 months. On the other hand, a RM shock, conforming to a 2 percent sudden increase in RM causes an increase in BL. However, this response is not significant. Further, an unpredicted rise in BL leads to an increase in CPI, while decreasing GDP having lowest at 0.2 percent between 3 to 5 months.

IRF of the exchange rate model shows that a monetary shock conforming to an unexpected 2.9 percent rise in the BR causes the domestic money value to escalate and it deprecates after a couple of months. However, this response is insignificant. Opposing to theoretical expectations, EXR responds to a RM shock equivalent to a 2 percent sudden increase in RM with an appreciation. An EXR shock equivalent to a depreciation of the domestic money value attracts significant responses in both CPI and GDP. CPI rises, peaking at 0.5 percent above baseline after 2 months and maintained as constant while GDP started to decline after 4 months.

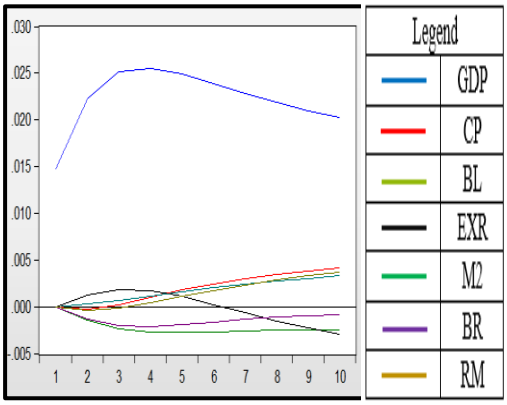

Figure 1. IRF of GDP with other monetary variables in composite model.

IRF of money effect model shows that a monetary shock equivalent to 2.9 percent unpredicted rise in BR causes to decline in M2. RM shock conforming to a sudden 2 percent increase in RM has not impacted M2. A sudden change in RM arising open market transactions and changes bank investments proportionally without expressively affecting currency. Therefore, the aggregate money supply is unimportantly affected by the RM shock. Both GDP and CPI also respond insignificantly to unpredicted changes in M2. From the composite model, a 2.9 percent unexpected increase in BR is observed. With the increment of GDP, there is a sudden decline in BR below the baseline with a reduction of 1.9 percent as shown in Figure 1.

Variance decomposition of GDP shows that in the first period, variations of GDP are entirely explained by own shocks. This denotes that variation in GDP is almost not affected by other variables in the first month. Further it was observed that contributions of other variables are insignificant throughout the other periods rather than the own contributions, GDP fluctuations can only be attributed marginally to variations in both the CPI and the BL beginning from the second month through to the tenth month maintaining an upward trend. Collectively, BR and EXR were found not to account for fluctuation in GDP until the second month when their aggregate contribution was observed less than 1 percent as shown in Table 1.

Table 1. Variance decomposition of GDP in composite model.

Period	GDP	CPI	BL	EXR	M2	BR	RM
1	100.0000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
2	99.20173	0.014796	0.291143	0.215936	0.009454	0.240354	0.026592
3	98.55814	0.012327	0.570087	0.356968	0.041293	0.444819	0.016364
4	98.16920	0.059474	0.744195	0.380196	0.095488	0.532202	0.019247
5	97.87897	0.162256	0.848150	0.333336	0.169592	0.548745	0.058955
6	97.56284	0.312865	0.913483	0.274545	0.262117	0.532334	0.141820
7	97.15401	0.500567	0.958580	0.246189	0.371653	0.503440	0.265558
8	96.63023	0.714689	0.993488	0.269896	0.496427	0.471877	0.423390
9	95.99727	0.945635	1.023801	0.350711	0.634342	0.441923	0.606319
10	95.27562	1.185291	1.052779	0.483290	0.783146	0.415203	0.804670

Conclusion

According to the findings, it can be expressed that necessary action is to be taken to implement appropriate monetary policies to keep GDP on a progressive path. Keeping GDP on a progressive path will lead Sri Lankan currency to appreciate against US dollar. Keeping reserve money in a balanced way will maintain the GDP and consumer price index in a favorable way. CBSL should implement strong monetary policies to closely monitor bank rates and commercial bank loans to keep progressive economic growth.

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