The Relationship between Money Demand and Interest Rates: An Empirical Investigation in Sri Lanka

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Introduction

The interest elasticity of the demand for money is an important indicator in considering an effective anti-inflationary monetary policy (Hossain and Younus, 2007). Identifying the empirical relationship between money demand and interest rates is important in effective formulation of monetary policy in Sri Lanka. The relationship between money demand and interest rates has been explained by various theories including classical quantity theory approach, Cambridge approach, Keynes's liquidity preference theory, Baumol-Tobin money demand theory and Friedman's modern quantity theory of money. In liquidity preference theory, Keynes postulated that there are three motives behind the demand for money: the transactions motive, the precautionary motive, and the speculative motive. Baumol (1952) and Tobin (1956) independently developed similar models for demand for money, which demonstrated that even money balances held for transactions purposes are sensitive to the level of interest rates. As interest rates increase, the amount of cash held for transaction purposes will decline, which in turn means that velocity will increase as interest rates.

A few studies for money demand relations have been done for Sri Lanka since 1990 (Wijewardena, 1985). However most of these studies explain fiscal and monetary policy issues and behavior of interest rates. There is a dearth of empirical studies which examined the relationship between money demand and interest rates using Baumol- Tobin Model for Sri Lanka. Some studies examined the relationship between money demand and interest rates using Keynesian theory.

Objectives

The objective of this study is to examine the nature and extent of the relationship between money demand and nominal interest rates in Sri Lanka on the basis of Baumol-Tobin theory of the demand for money. The study aims to find out the impact of nominal interest rates on money demand using Baumol-Tobin Model. This paper has developed hypotheses to test the empirical relationship and this hypotheses have been tested by empirical tests, Unit root test, Cointegration tests with the ARDL approach to evaluate the overall impact of interest rates on money demand in Sri Lanka. Furthermore this paper also investigates the implication of money demand and interest rates relationships on effective implementation of monetary policy.

Methodology

The Baumol-Tobin model specifies that

$$\frac{Md}{P} = \frac{1}{2}\left(\frac{2bq}{i}\right)^{\frac{1}{2}} \qquad \ldots\ldots\ldots\ldots \quad (1)$$

$\frac{Md}{p}$ - Real money demand; $bq -$ Cost of holding money; $i -$ interest rate

Equation (1) can be re-specified as a regression equation as follows:

$$log\left(\frac{Md}{p}\right)_t = a_0 + a_1 log\left(\frac{Md}{p}\right)_{t-1} + a_2 log(Q)_t + a_3 logi_t + U_t \qquad \ldots\ldots\ldots\ldots (2)$$

$log\left(\frac{Md}{p}\right)_t$ = log of real money demand at time t, $log\left(\frac{Md}{p}\right)_{t-1}$ = Log of lagged real money demand at time t, $log(Q)_t$ = Log of real GDP at time t,

$logi_t$ = Log of nominal interest rates at time t, U_t = disturbance term

This study used quarterly data from 1977, 1st quarter to 2007, 4th quarter. The data was taken from annual reports of the Central Bank of Sri Lanka for different years. Quarterly data for M_1 is deflated using the GDP deflator to obtain the real M_1. Six alternative interest rates are utilized in the estimates. These variables have been converted into a natural log form to standardize empirical analysis. Since quarterly published data for GDP and GDP deflator are not available, the study transformed annual time series data into quarterly series using six disaggregation techniques. (They are the NAIVE procedure, the LS procedure, the BFL-FD procedure, the BFL-SD procedure, the WS procedure and Chow-Lin procedure).

Augmented Dickey Fuller (ADF) and the Phillips-Perron (PP) Tests are used to check stationarity of data. The Autoregressive Distributed Lag (ARDL) approach (Pesaran and Shin, 1996) contains three steps. The first step is ARDL bound test procedure. The second step of the analysis is to estimate the coefficients of the long-run relationship. The third is the estimation of the short-run elasticity of the variables with the error correction representation of the ARDL model. According to this study, there are two steps to analyze the relationship between money demand and interest rates. These are the relationship between money demand and deposits rates and the relationship between money demand and lending rates.

Results

The results of the unit root test show that only the variable LIBCLR (Inter bank call loan rates) is stationary in level from (I(0)). SR (saving rates), FDR$_3$, FDR$_6$, FDR$_{12}$ (3 month, 6 month and 12 month fixed deposit rates), TBR (Treasury bill rates), BR (Banking rates) and WLR (loan rates with securities) variables were stationary in the 1st difference. According to the bound test results, there is a joint long-run cointegration relationship among the variables of money demand and deposits interest rates in Sri Lanka. There is a negative relationship among the saving deposit rates, fixed deposit rates and real money demand, while there are positive relationships among the real GDP, treasury bill rates and real money demand in long run. The results of this analysis satisfy the implication of Baumol-Tobin model. This model states that an increase in income leads to increase transaction money demand and a decrease in interest rates leads to increase in money demand. For the brevity of this paper, results tables are not included here.

This paper concludes that there are joint long-run cointegration relationship among the variables of money demand and lending rates in Sri Lanka. The estimated coefficient of the long run relationship shows that real GDP has a positive relationship and significant impact on real money demand. According to Baumol-Tobin hypothesis the value of estimated coefficient of equation 2 should be 0.5 (negative for interest rate and positive for GDP). However the estimated coefficient in this study was 0.64 which did not agree with Baumol-Tobin hypothesis.

The lending rates variables are negative and significant at the 1% level. A 1% increase in lending rates leads to approximately 0.599 decrease in real money demand, all other things being equal. The lending interest rates variable is support this hypothesis.

The results of the short-run dynamic coefficients associated with the long-run relationships obtained from the ECM shows that the speed of adjustment coefficient is statistically significant. The coefficient suggests that about 70% of the disequilibria of the previous year's shock is adjusted back to equilibrium.

Conclusion and Policy Recommendations

There are negative relationships between money demand and interest rates while there is a positive relationship between money demand and real GDP in the long-run in Sri Lanka. This analysis also concludes that the behavior of money demand and interest rates satisfies the Baumol-Tobin model. Increase in the GDP will increase the income level of people and due to their transaction and precautionary motives they will uplift the demand for money.

This study finds that the coefficient between money demand and income deposit interest rates is 0.34 which is lower than the theoretical prediction 0.5. In the lending interest rate analysis GDP coefficient is 0.64. The value of estimated coefficient of saving rate is 0.26. Both 6 month and 12 month fixed deposit rates are 0.22. On the other hand the value of estimated coefficient of lending rate is 0.59. Lending interest rate tallies with the inventory theoretic model. It is clear that in addition to the interest rate, there were other factors which affected the money demand structure in Sri Lanka. Hence it is difficult to obtain the values of coefficient and income and interest elasticity value proceeding to the Baumol-Tobin Model.

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