The Influence of Money on Inflation and Real Income:

An Alternative Assessment

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Abstract

This paper examines the impact of a monetary shock on inflation and real income in Sri Lanka. By incorporating money demand function in generalized impulse response functions (GIRFs), the paper measures to what extant a monetary shock (i.e. Central Bank policy decision) could transmit its influence on inflation and real income over ten year periods. The study period is from 1971 to 2002 based on annual time series data. This study is basically based on the argument that movements of the estimated demand for money totally represent the directions of the growth of money supply. The results reveal that on average positive monetary influences originating from both narrow and broad money demand seem to have a negative net impact on real income in the long run. This finding is consistent with Friedman's view that in the long run changes in money affect primarily on prices while real variables such as real income (output) and employment are affected mainly by non-monetary factors such as technology, population, resource endowment, and education. The study finds evidence that inflation is more suitable than real income to keep it as a target variable in Sri Lankan monetary policy.

Key Words; Monetary Influences, Generalized Impulse Response Analysis, Monetary Policy, Sri Lanka

1. Introduction.

Empirical evidence for the close and regular relationship between money, income and prices throughout the world has a long history and dates back to Milton Friedman and his associates' works in the middle of nineteenth century (Gilbson and Kaufman 1971). These studies reveal that expansions and substantial contractions in the supply of money over short periods have been a major proximate source of the accompanying inflation in prices and a major factor for economic contractions respectively (Gilbson and Kaufman 1971). In this scenario, according to Milton Friedman (Gilbson and Kaufman 1971), monetary policy can make its major contribution to economic stabilization by providing for steady growth of the rate of money supply. Following this line of reasoning, the main objective of the current study is to measure the impact of monetary influence on inflation and real income in the Sri Lankan economy.

Although a number of studies have been done to investigate the impact of monetary influences on economic activities (i.e. Gilbson and Kaufman 1971: Grauwe and Polan 2005: Brüggemann 2003: Christiano, Eichenbaum and Evans 1998: Gunasinghe 2005), it is still hard to find a study incorporated a money demand function in GIRFs to measure the transmission mechanism of a monetary influence on inflation and real income. The remaining structure of the paper is organized as follows. Section 2 is a brief discussion about the data and their properties. Section 3 builds up the methodological framework. Section 4 discusses empirical results and finally section 5 presents concluding remarks.

2. Data and Their Properties

Following time series data are considered for the analysis: TB_t (90 day nominal Treasury Bill rate): FDR_t (One year nominal fixed deposit rate (average of higher and lower values)): y_t (Real disposable (National) income (logarithms, 1996=100)): m_{1t} (Real narrow money supply (logarithms, 1996=100): m_{2t} (Real broad money supply (logarithms, 1996=100)): inf_t (Inflation rate: $\ln(P_t - P_{t-1})$). Narrow and broad money supplies are defined as Currency + Demand deposits for m_1 and m_{1t} + Time and savings deposits for m_2. P_t indicates the deflator of gross domestic product. All the data are obtained from Sri Lankan Central Bank Reports. Augmented Dickey Fuller test conducted to test the non-stationarity of variables confirmed that all variables are integrated of order one or $\sim I(1)$ (Gunasinghe 2005).

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3. Methodological Framework

Having concerned the non-stationarity of variables, the paper estimates money demand function using Johensen maximum likelihood methodology (Johensen and Jusilius 1994). Cointegration test confirmed two long run relations for each money demand function (Gunasinghe 2005). GIRFs (Pesaran and Shin 1998) are then estimated by incorporating estimated money demand functions. Formula for generalized impulse response functions, $\psi_{Zj}^g(n)$, is constructed using exactly identified co-integrating relations ($Z_j = \beta_i' X_t$) for both models.

$$\psi_{Zj}^g(n) = \sigma^{-\frac{1}{2}} \beta' B_n \sum e_j \quad n = 0,1,2.....10 \ (in \ years)$$

Where β' is a vector of exactly identified co-integrated relationships in our analysis. $\sum$ is a 4x4 variance covariance matrix of equation residuals. B_n is a moving average matrix of n" time horizons and it will be calculated recursively using VAR coefficients. $\sigma^{-\frac{1}{2}}$ is a weighting index used to overcome an orthogonalized problem. And e_j is a 4x1 matrix in which number "1" is used for the relevant variable under consideration to give a one standard error shock and zero for others (Pesaran and Shin 1998). The function, $\psi_{Zj}^g(n)$ measures the time profile of the effect of a shock at a given point in time on the future values of variables in a dynamic system (Pesaran and Shin 1998). Furthermore, this study is basically based on the argument that movements of the estimated demand for money totally represent the directions of the growth of money supply as we found a cointegration vector $\beta = (1, -1)$ for the relationship between money supply and estimated money demand for both narrow and broad money.

4. Empirical Results

Figure 01 given below shows a unit shock to the m_{1t} money demand and its effects on itself (M1T) and on real income (YT) as well as on inflation (INFT). In this case the size of the shock is scaled so as to ensure that the relevant variable under consideration to the shock rises by one standard error (S.E) on impact. Giving one S.E shock to m_{1t} generates a 7.9% initial increase of m_{1t} and this effect continues to persist over the next year around a .9% level and then seems to continue to decline by –1.6% within the second year. In the long run (after five years), m_{1t} has a 6.8% value

above its baseline value. This implies that, as noted earlier, a similar behaviour of the movements of narrow money supply.
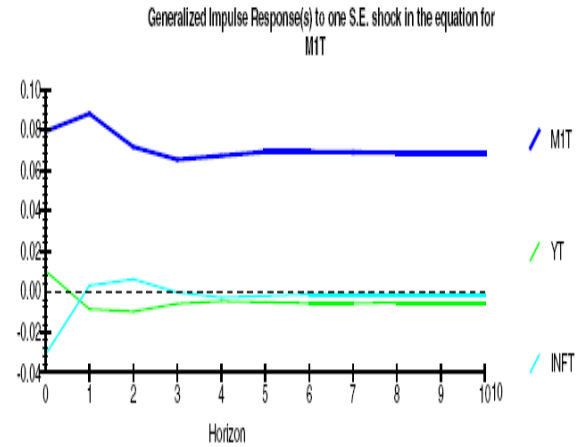

Generalized Impulse Response(s) to one S.E. shock in the equation for M1T

Figure 01: Generalized Impulse Response to one standard error shock in the equation for narrow money demand (m1t)

The initial increased of m_{1t} money demand (or equally say narrow money supply) causes a 3% initial decrease in inflation. Within the first year, however, inflation rises by **3.3%** and this growth of inflation seems to persist even in the second year by **.31%.** Then as a result of a **-.6%** decline of m_{1t} within the third year, inflation **also declines** by **-.27%** for the same period. In the long run inflation reports a .14% value above its baseline value.

Additionally, the effect of the shock on m_{1t} creates a 1% initial increase in real income. Within the first year, however, real income declines by –1.86% and this decrease of real income seems to persist even in the next year by –. 11%. As result of the decline in inflation by –2.7% (due to m_{1t} decreasing) within the third year, income generates by .38% in that period. In the long run, one standard error shock on m_{1t} has caused to decline income by –5.4% (negative effect) from its baseline value.

Figure 02 given below shows a unit shock to **m_{2t}** money demand (or equally say broad money supply) and its effects on itself (M2T) and on income (YT) as well as on inflation (INFT). This unit shock on **m_{2t}** causes a 6.5% initial increase in **m_{2t}**. Within the first year, **m_{2t}** increases by **1.0%.** Next second and third years, growth of **m_{2t}** decline by **–1.1%** and **-.6%** respectively. In the long run there is a –2.3% decrease per year in **m_{2t}** from its baseline value. This implies a similar behaviour of the movements of broad money supply. A unit S.E shock on **m_{2t}** creates a –3.3% initial impact on inflation. Within the next year, inflation

increases by **2.28%.** Although money demand represents a decreasing behaviour for the second and the third years, inflation still grows by **.37%** and **.17%** respectively for those periods. In the long run, it has a -.93% effect per year from it's baseline value.

A unit standard error shock on **m₂t** causes a **-.34%** initial decrease in **yt.** As a result of rising inflation for the second and third years, income also declines by –**1.36%** and by **–. 66%** for those periods respectively. In the long run, it has a **–2.3%** effect per year from its baseline value.
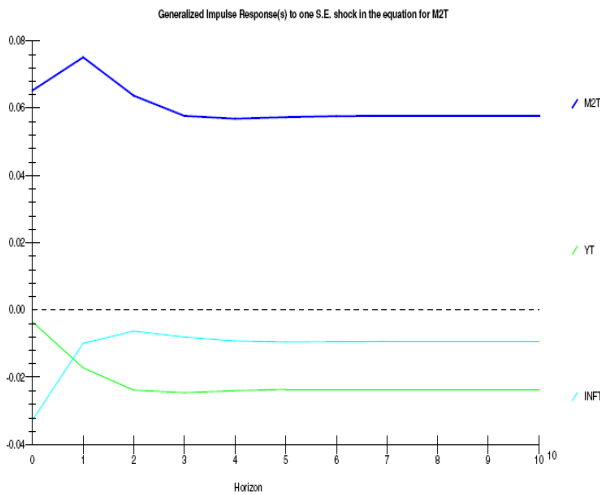

Figure 02: Generalized Impulse Response to one standard error shock in the equation for broad money demand (m2t)

Table 4.1 Summery of the Impact Assessment of One Standard Error Shock on Narrow Money Demand

Time Horizons	Nature of the impact			
	m_1 (1)	Inf (2)	y (3)	Net impact on y 4 = (3-2)
Very short term impact (within first year)	+	+	-	+
Short term impact (overall effects within 1-3 years)	-	+	-	-
Long term impact (after 5 years) compared to initial year; Nu (neutral), + or -	**Nu**	+	-	-

Shock on m₁t ⟶ **inflation** ⟶ **real income**
　　　　　　　　(+ effect)　　**(-effect)**

Table 4.2 Summery of the Impact Assessment of One Standard Error Shock on Broad Money Demand

Time Horizons	Nature of the impact			
	m_2 (1)	Inf (2)	y (3)	Net impact on y 4 = (3-2)
Very short term impact (within first year)	+	+	-	+
Short term impact (overall effects within 1-3 years)	-	+	-	-
Long term impact (after 5 years) compared to initial year; Nu (neutral), + or -	**Nu**	+	-	-

Shock on m₂t ⟶ **inflation** ⟶ **real income**
　　　　　　　　(+ effect)　　**(-effect)**

5. Concluding Remarks

In this study we examined the impact of a monetary shock on inflation and real income in Sri Lanka. By incorporating money demand function in generalized impulse response functions (GIRFs), we tested to what extant a monetary shock could transmit its influence on inflation and real income over ten year periods. The study period was from 1971 to 2002 based on annual time series data. Our study was basically based on the argument that movements of the estimated demand for money totally represent the directions of the growth of money supply. We found that, on average, positive monetary influences originating from both narrow and broad money demand seem to have a negative net impact on real income in the long run. As this finding is consistent with Friedman's view that in the long run changes in money affect primarily on prices, inflation is more suitable than real income to keep it as a target variable in Sri Lankan monetary policy.

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