A Review of Literature on Monetary Neutrality - The case of India

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1.   Introduction

According to the classical theory of macroeconomics, in the long-run, real economic variables are not influenced by nominal variables. Monetary neutrality proposition is one of the propositions under this hypothesis. Based on monetary neutrality proposition, increment in money supply has no effect on real variables in the long-run. In another words, monetary injection into the economy by the government will not trigger or promote real economic growth as in real gross domestic product (GDP) in the long-run. This has caused strong dilemmas in the government regarding injection of money supply into the economy for effective monetary policy. Moreover, monetary neutrality proposition determines the suitable monetary aggregates used for effective boost of economy as all of the countries implement different types of monetary policies such as inflation targeting, price level targeting and others. Based on reports by International Monetary Fund (2014a, 2014b), high and persistent inflation is a key macroeconomic challenge facing India. High inflation in India is caused mainly by food, which has also coincided with economic slowdown, has posted challenges for Indian monetary management. With that, monetary neutrality proposition, also known as long-run neutrality (LRN) of money, is able to examine effectiveness of the current monetary policies in the economy of India.

2.0   Review of Literature

Over the past few decades, numerous studies have been conducted to examine the impact of money supply on real macroeconomic variables in the long-run (see Habibullah et al., 2002a; Leong et al., 2010; Liew et al., 2009; Mishra et al., 2010; Puah et al., 2008b; Puah & Hiew, 2010; Puah & Jayaraman, 2007; Tang et al., 2015; Singh et al., 2015). The hypothesis of long-run monetary neutrality proposition is one of the significant topics concerned by researchers. Testing LRN of money in a specific country would provide policymakers in that country with the path for implementing more effective monetary policy.

There has been an increasing amount of literature on LRN proposition using different methods of estimation and models on various definitions of monetary aggregates (see Ashra et al. 2004; Atesoglu & Emerson, 2009; Habibullah et al., 2002b; Leong & McAleer, 2000; Lee, 2012; Malliaropulos 1995; Wallace, 2005; Sulku, 2011). Primary research on LRN of money in India was done by Ramachandra (1983, 1986) using annual data where he found that money had causal relationship with real income and price level in India.

Evans (1996) examined the LRN of money in 27 countries. The 27 countries consisted of Australia, Costa Rica, Denmark, El Salvador, Finland, France, Germany, Ghana, Greece, Guatemala, Honduras, India, Ireland, Italy, Japan, Korea, Mauritius, Mexico, Netherlands, Norway, Pakistan, Philippines, Spain, Sweden, United Kingdom, United States and Venezuela. The period under study was from 1960 to 1992. By applying the simple stochastic growth models and ordinary least squares, he found that in a wide class of models, money was not neutral in the long-run if it was not neutral in the short-run and the growth was endogenous. The same conclusion was applicable for the case of India.

Moreover, Moosa (1997) also conducted a research to test the LRN of money in India. The period of study was from 1972Q1 to 1990Q4. With the application of seasonal integration and cointegration approaches, he found that money and output were not cointegrated at zero frequency which represents the long-run while money and prices were found to be cointegrated at all frequencies. He concluded that money only influenced nominal, but not real, variables in the long-run, indicating that money was neutral in the long-run.

Bernanke and Mihov (1998) conducted a study on testing the liquidity effect and LRN in the U.S. Both of them utilized the sample period covering 1966 to 1996 with data of real GDP, M2, GDP deflator, commodity price index and real balance of the U.S. By using the VAR estimator, the empirical evidence showed that the two propositions of a liquidity effect and long-run monetary neutrality are mutually consistent in a robust sense. Besides that, the result did not imply important deviations from LRN. In other words, LRN did not bond to the parameter.

Later, Giordani (2001) commented on Bernanke and Mihov's research on LRN in the U.S. The author used the quarterly time series sample period that covered 1966 to 1998 and applied the data of real GDP, CPI and M2 of the U.S. for that sample period. The author argued that the omission of a measure of output gap from the VAR estimated by Bernanke and Mihov VAR lied at the heart of the excessive persistence of the output response to MP shocks. From the empirical finding, it showed that the inclusion of proxy for the output gap in the VAR was shown to drastically increase the evidence for LRN on US data.

Ramachandran (2004) had investigated the stability of relationship among broad money, output and prices in India. The period under study was done for 1951-1952 to 2000-2001 using conventional stability tests, cointegration, error correction models and a test for structural break. The empirical evidence suggested that proportionality relationship between money and real income did exist and money was endogenous. He concluded that evidence from this study was in favour of a stable long-run relationship between broad money, output and prices in India.

Puah et al. (2006a) conducted a research to test the LRN of money in Malaysia using the FS bivariate ARIMA framework. The period of study was from 1978:1 to 1999:12. They found that the LRN proposition was supported in Malaysian stock market except for M3 on Finance Index. They also added that the permanent stochastic changes in money supply did not affect real stock returns in Malaysia.

Apart from examining Malaysian stock market, Puah et al. (2006b) also tested the long-run monetary neutrality on real output in Malaysia. The period of study was from 1981Q1 to 2004Q4. They applied FS non-structural reduced form bivariate ARIMA model. They found that in Malaysia, evidence against LRN indicated the permanent shocks to the level of Divisia money had important effect on real economic performance.

Chen (2007) conducted a research to test the LRN of money in South Korea and Taiwan. The period of the study was from 1970Q1 to 2004Q4 for South Korea and from 1965Q1 to 2004Q4 for Taiwan. He applied the King and Watson's (1997) eclectic approach. He found that the long-run neutrality of money was fully supported in the case of South Korea, but not in the case of Taiwan. Moreover, the hypothesis of short-run neutrality of money was rejected for South Korea and Taiwan.

Puah et al. (2008a) conducted a research to examine the long-run monetary neutrality in South East Asian Central Banks (SEACEN) countries. The period of study was from 1965 to 2002 for Indonesia, 1950 to 2002 for Malaysia, Myanmar, the Philippines, and Sri Lanka, 1964 to 2002 for Nepal, 1963 to 2002 for Singapore, 1953 to 2002 for South Korea and Thailand, and 1951 to 2002 for Taiwan. Using the FS approach, they found that money did not matter for the economies of Malaysia, Myanmar, Nepal, the Philippines, and South Korea, but it was long-run non-neutral with respect to real output in Indonesia, Taiwan, and Thailand. Meanwhile, evidence against long-run superneutrality in Singapore data was found, indicating the permanent shock to the rate of monetary growth had important effect on real economic performance.

In addition, Westerlund and Costantini (2009) conducted a research study on proposition of LRN on certain countries. The study argued on the statement that LRN rely on the assumption that money and real GDP do not cointegrate which is supported by the data can be attributed in part to the low power of univariate tests. They also stated that a violation of the non-cointegration assumption is likely to result in a non-rejection of the neutrality proposition. They implemented the sample period covering 1870 to 1986 which was extracted from the Central Bank. The countries that they examined are Australia, Canada, Denmark, Germany, Italy, Japan, Norway, Sweden, United Kingdom and United States. They employed various methodologies such as Phillips and Sul test, Moon and Perron panel unit root test and BN panel unit root test. The empirical finding suggested that the null hypothesis of no cointegration between money and real GDP could be rejected. This indicated that the neutrality of money could also be rejected. They also stated that the permanent changes in the stock of money had real effects that could persist for appreciable periods of time which was good news for the central banks.

Puah et al. (2010) used stock indexes to estimate the LRN of money in Malaysia where the period of study was from 1978Q1 to 2009Q4. They applied the Fisher and Seater's (1993) methodology and found that Malaysia data did not support LRN of money where permanent changes in M1 and M2 had impact on real macroeconomic variables in the long-run. This finding was in line with Mishra et al. (2010). Mishra et al. (2010) investigated the dynamics of the relationship between money, price and output for India. They utilised the data covering 1950-1951 to 2008-2009 by estimating vector error correction model based on VAR. Empirical evidence from their research showed that long-run bidirectional causality between money supply and real output exists, indicating money is non-neutral in India. They also added that inflation is a monetary phenomenon in the short-run only.

For the period of study from 1970-2008, Arintoko (2011) examined the long-run money neutrality in Indonesia. He applied the FS methodology and found that the LRN of money was not prevailed in Indonesian case. Empirical evidence also suggested the presence of positive correlation between money and price only when using the narrow definition of money (M1) and not for the case of M2.

Chuku (2011) conducted a research to test the LRN propositions in Nigeria. The period of study was from 1960Q1 to 2008Q4. By applying King and Watson's (1997) eclectic methodology, he found that there was the existence of long-run money neutrality in Nigeria as the evidence was held under the assumptions of contemporaneous money exogeniety and contemporaneous money neutrality. Similar results were obtained by Chinaemerem and Akujuobi (2012) when they employed data from 1962:1 to 2010:4. They also found that the

long-run Fisher relation was rejected for Nigeria because of the existence of cointegrating relationship between inflation and real interest rate.

Lee (2012) employed a nonparametric testing on LRN in U.S. using spectral approach. The sample period covering 1959 to 2009 was obtained from the division site at Federal Reserve Bank at St. Louis, USA. The author employed real GDP and M2 as the variables in his study. The author used a different approach in testing LRN by employing kernel-based nonparametric cross spectral density estimator in his research study. This estimator provided some information about correlations between money and real GDP in different forms. In other words, it was designed to detect unknown forms of cross correlations in the time series data applied. Through the empirical findings, he found out that there was a strong rejection in the case of M2 regardless of bandwidths and of kernels which also showed that nearly insensitive to the choice of bandwidths.

Tang et al. (2013) examined the long-run monetary neutrality in the Singapore from 1980Q1 to 2009Q4. They applied FS neutrality test for this study and found that monetary neutrality did not hold in Singapore when both the simple-sum money and Divisia money were employed. This indicated that monetary aggregate had long lasting impact on real economic where expansionary monetary policy, in fact, could be used to stimulate economic growth.

Singh et al. (2015) examined the relationship between money supply, output and prices in the short and long-term in India. The period under study for this research was from 1991-1992 to 2015-2016 on Johansen test for cointegration and Granger causality test for causality. To understand the relationship between money, output and prices, empirical evidence showed that variable choice was relevant in such cases. They found that there was no long-run relationship between money supply and output for data of quarterly and monthly frequency where money was said to be neutral in India.

Puah et al. (2015) examined the assumption of monetary neutrality for the case of a developing economy, Indonesia during the period of 1981Q1 to 2011Q4. With the application of the FS ARIMA framework, they found that the LRN hypothesis was rejected in Indonesia under all of the alternative monetary aggregates, simple sum and Divisia money. This indicated that money was non-neutral in the context of Indonesia economy where money did have impact on real variables in long-run. Puah et al. (2015) further suggested that both simple sum and Divisia money could be used as policy variables in influencing the Indonesian economy in the long-run.

From the review of literature on monetary neutrality in India, the findings on monetary neutrality in India are mixed with the employment of different definitions of monetary aggregates and period under study. Evidently, empirical findings by Ramachandra (1983, 1986), Evans (1996), Ashra et al. (2004), Ramachandran (2004), and Mishra et al. (2010) concluded that money was non-neutral in India but not Moosa (1997) and Singh et al. (2015). Through their empirical study, issues on monetary neutrality in India turn out to be inconclusive yet interesting. Further studies on these issues in India are encouraging for researchers to explore more on monetary neutrality in India.

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