Chapter 23
Money Supply: Predictive Analytics in India

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ABSTRACT
Money supply is nowadays expected to contain precise, comprehensive, and real-time information about the macroeconomic system to facilitate decision making of the Central Bank. Because money supply, as driver or driven, is linked from time to time to several other variables like inflation, it touches every lair of civil society and politics. An important aspect of understanding such information is to identify other variables and their interrelations with money supply and the models to quantify and predict the same. This chapter covers various facets and issues of modeling and forecasting money supply in India in a comparative tone between pre- and post-crisis periods.

1. INTRODUCTION
Money supply is a matter of interest to Central Bankers as also economists. There are economists both inside and outside the Central Banks. Sometimes they agree, sometimes there is discord. But nevertheless, from both the viewpoints of academics and administration, the literatures of monetary economics and monetary policy cannot dispense one with another in the process of

1. Defining and measuring money supply,
2. Examining the existing literature on money supply against Indian backdrop,
3. Ascertaining the mode of determination of money supply,
4. Examining the econometric tools in understanding the relationship between money, output and prices,
5. Detecting the endogeneity of money supply, and
6. Dealing with the emerging issues in forecasting money supply in the post crisis period.

2. BACKGROUND
Evolution of models involving money supply as macroeconomic variable in the forms of policy variable as well as target variable in India since early 1970s till today is by and large linked to the development of econometric literature in the

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West. The issues dealt with by those models vary between pre-crisis period and post crisis period. The post crisis period witnessed the emerging issues of liquidity management and deviation from mainstream literature on money supply. Using chronologically classical regression models and time series analysis consisting of co-integration and Granger causality, the above models try to discern measurement and components of money supply and the feedback between money supply, price and output from both sides following orthodox literature except for a few, which expressed interest towards structuralism.

3. MAIN FOCUS OF THE CHAPTER

This chapter would focus on application of econometric methodologies of measuring money supply and relationship between money, price and output in line with the diverse issues cropping up from time to time.

4. DEFINITION AND MEASURES OF MONEY SUPPLY

Indian economists use the terms ‘money’, ‘money supply’ and ‘money stock’ synonymously. The literature on definition of money supply reflects intellectual discourses and dialogues among economists, which need concrete shapes in the form of measures of money supply, because concrete measures of money supply are more useful than abstract concepts for the purposes of modelling and forecasting.

The Reserve Bank of India (RBI) is following the simple sum procedure of measuring money supply in its compilation of monetary aggregates. The RBI publishes data on $M_1$, $M_2$, $M_3$ and $M_4$ and not on the Divisia index. Here

\[ M_1 = \text{currency with public} + \text{demand deposits with the banking system} + \text{other deposits with RBI}; \]

\[ M_2 = M_1 + \text{saving deposits with post office savings banks}; \]

\[ M_3 = M_1 + \text{time deposits with the banking system}; \]

\[ M_4 = M_1 + \text{all deposits with post office savings banks excluding National Saving Certificates}. \]

For forecasting purpose one has to work with whatever information is available. The evolution of the components of the monetary aggregates from time to time reflects that the classical regression technique will not be able to serve the purpose of long run forecasting, because explanatory variables are changing over time. In this context the ARIMA model having the quality of temporal stability can be more useful. A careful perusal of the literature on money supply would reveal that the number of factors affecting money supply is increasing side by side with progress of research in the field. So there may be other factors also, which are so far not discovered or yet to be discovered like simply seasonal cycles in the demand for credit on part of the business community.

Existing basic and advanced literatures on time series econometrics like Enders (1995), Patterson (2000), Pindyck and Rubinfeld (1998) and Gujarati (2003) suggest that if requisite data are not available for the variables affecting money supply or all the variables affecting money supply are not known then it is difficult or impossible to explain the movement of money supply using a structural model. Estimation of such a model for money supply may result in so large a standard error as to make most estimated coefficients insignificant and the standard error of forecast unacceptably large. A statistically significant regression equation for money supply may not work out for forecasting.
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