CHAPTER - I

INTRODUCTION, OBJECTIVES AND SCOPE OF THE STUDY

".....the problems with tests of money in the economy in recent years may be more due to bad measurement theory rather than to an instability in the link between the true money and the economy. Rather than a problem associated with the Lucas critique, it could instead be a problem stemming from the "Barnett critique""

Chrystal K A and R MacDonald(1994) p 76

1.0. INTRODUCTION

The conventional simple sum procedure to monetary aggregates, practised by almost all the central banks today, assumes perfect substitutability among the component monetary assets. This assumption is unrealistic especially when there is ample evidence on imperfect substitution among component monetary assets. Simple sum monetary aggregates, therefore, fail to account for substitution effects whenever there is a fluctuation in the relative prices of different monetary assets. The microeconomic theory of monetary aggregation (Barnett(1980, 1982, 1987, 1992)) questions the very basis of simple sum scheme in terms of the latter's weak theoretical foundation. Integrating economic aggregation theory, statistical index number theory and monetary theory the microeconomic theory of monetary aggregation successfully circumvents the problems inherent in the simple sum scheme and suggests Divisia monetary services indices as powerful alternatives to simple sum monetary aggregates. One interesting feature of the Divisia monetary services indices lies in its ability to capture the entire liquidity services from the available spectrum of monetary assets by assigning weights (user cost evaluated expenditure shares) to different assets according to their degree of contribution to the
monetary service flow of the economy. The convincing theoretical basis of these indices which has an intuitive appeal, has invited the attention of many monetary economists all over the world.

1.1. WHY MONETARY AGGREGATION?

The debate on "What is money of standard macroeconomics?" started with the advocates of the theoretical approach school who emphasised on a particular function of money and accordingly identified the real world entities to be called "money." Prominent among the advocates include Fisher(1911), Yeager(1968), Johnson(1971), and Tobin(1980). Though the medium of exchange function of money was given universal importance, the disagreement still continued due to the different emphases put forth by different authors on functions of money. The ambiguities inherent in this school of thought coupled with emergence of additional money market instruments possessing money-like characteristics gave a different angle to the debate wherein monetary economists started looking for an empirically identifiable money. The idea was to evolve certain policy criteria on the basis of which one could quantify the total money stock in the economy. In this context, one may refer to the Friedman-Meiselman dual criteria(1963) and the stable money demand function criteria(Rose(1985), Gordon(1984)) etc. The Radcliffe committee in the United Kingdom and Gurley and Shaw in the United States pointed out the difficulties in drawing a line between money and other money-like assets considering them close substitutes of money. However, in a later period, studies by Chetty(1969), Boughton(1981) and Husted-Rush(1984) evidenced empirically low substitution between money and money-like substitutes. Thus no empirical criterion could provide a unique definition of money.
There was no controversy when monetary assets did not yield any interest *viz.*, the services rendered by them were purely transactions services. As a result they could be added together as simple sums. However, with the emergence of more and more interest bearing assets it became difficult to disentangle the transactions services from the investment services rendered by these assets. The investment characteristic of the assets featured as the main reason for compositional shifts in an individual's assets portfolio because with an increase in the rate of return on other assets opportunity cost of holding money also increased. This gave rise to an occasion for monetary aggregation Barnett's (1978) derivation of a formula for the price of money, the *user cost*, paved the way for applying index number theory to aggregate over different financial assets Barnett's (1980, 1982, 1987) aggregation theoretic results combined with advances in statistical index number theory (Diwet(1976), Hulten(1973)) provided a convincing basis for the now popular monetary services indices such as the Divisia monetary services indices and the Fisher Ideal monetary services indices. Following this *high road* of research in monetary economics (Barnett (1997)) researchers from many countries have focused on the relative empirical performance of these new monetary aggregates against the commonly adopted simple sum aggregates in explaining real activity in the economy. Though evidences in general have been mixed in nature, Divisia monetary aggregates have been found to have a clear edge against their sum counterparts. In fact, central banks such as the Bank of England and the Federal Reserve Bank of St Louis have started publishing Divisia money stock measures on a regular basis for monitoring their statistical behaviour along with the official simple sum aggregates.

In view of these index theoretic developments on monetary aggregation in monetary economics literature and in the wake of the ensuing financial innovations in Indian money market it must be rewarding attempt to make a case for the above mentioned aggregation theoretic monetary aggregates in the Indian context. Though few studies in the past (see Subrahmanyam and Swami (1991, 1994), Ramachandran (1993))
examined the relevance of these aggregates for India, the present study endeavours a reexamination of the whole issue in a renewed context. The present study differs from the earlier ones in three important respects viz., (i) in applying Varian's (1983) non-parametric test for testing weak separability, and (ii) in constructing Rotemberg's Currency equivalent monetary aggregates for the first time in the Indian context and finally discovering some new groupings with certificate of deposit as an additional asset. Accordingly, the objectives of the present study are formulated as follows.

1.2. OBJECTIVES

(i) To re-examine the performance of Divisia monetary aggregates, following Barnett's (1982) three stage procedure for selection of optimal monetary aggregates

(ii) To test the validity of currency equivalent monetary aggregate originally conceived by Hutt (1963) and later developed by Rotemberg et al (1995) as an alternative to the broadest Indian money supply measure viz., M4

(iii) To explore the feasibility of including some new assets like certificate of deposit in the existing monetary aggregates and study the properties of those aggregates

(iv) To make a comparison of the performance of Divisia monetary aggregates and their simple sum counterparts

(v) To analyse the implications of these aggregation theoretic results for the emerging money market in India
1.3. METHODOLOGY

The study spans over a period 1970 to 1996 for annual observations and from 1985 04 to 1996.09 for monthly observations. The rationale behind the choice of these time periods lies in the fact that the data set for these periods rationalised a well behaved utility function. Both for annual and monthly experiments four monetary assets namely currency with the public(CU), net demand deposits(DD) and net time deposits(TD) with all commercial and co-operative banks and saving deposits with post offices (PD) have been considered. For the period 1994 04 - 1996 07, a new asset called certificates of deposits has also been included in the analysis. The number of observations is constrained due to the availability of the data on this asset as it was introduced only in June 1989.

The first and foremost task of this study has been to identify some weakly separable groups. Assuming real goods and services and leisure to be separable from monetary assets, the study investigates for separable monetary groups. In this context Varian's (1983) nonparametric methodology has been employed for testing weak separability of a set of hypothesised monetary component groupings. The hypothesization follows Barnett's recursiveness condition and hence considers currency as a common component in all the utility structures.

In the second step, Divisia monetary aggregates are constructed along with their simple sum counterparts over the identified separable groups. A new class of monetary aggregates called Currency Equivalent Monetary Aggregates (CEMAs) proposed and analysed by Rotemberg et al are also constructed for the first time in the Indian context.

A simple information content test based on $R^2$ has been employed to test the information contained in these aggregates. The goal variables considered include GDP, Price(WPI), and Index of Industrial Production (IIP) as proxy for the monthly income
measure. The Davidson and Mackinnon (1981) J-test for non nested hypothesis is conducted to test Divisia versus sum aggregates in explaining a particular goal variable.

The superiority of a new monetary aggregate in relation to the conventional aggregates may be examined by testing for its stability in the demand for money framework. For this purpose simple money demand equations involving these monetary aggregates are formulated and their stability is examined by the CUSUM squares plot (Brown, Durbin and Evans (1975)). For monthly specifications the Johansen-Juselius (1990) multivariate cointegration framework is also employed to study the long run equilibrium relationships underlying the money demand relationships. Before going for cointegration as a prerequisite unit root tests have been conducted to check the stationarity properties of all relevant macroeconomic time series.

1.4. ORGANISATION OF THE STUDY

The rest of the study is organised into five chapters. Chapter II presents a critical survey of various issues in monetary aggregation. Sections 2.1 and 2.2 discuss the basic tenets of the theoretical and empirical approaches to money definition respectively. The approaches to weighted monetary aggregates are surveyed in section 2.3. A critical evaluation of all the approaches is attempted in section 2.4. Section 2.5 presents a review of some major evidences relating to the above approaches. Studies focusing on financial innovations and Divisia monetary aggregates are presented in section 2.6. Money definition in the Indian context is reviewed in the last section. Here, the official money stock measures as well as individual research efforts towards an appropriate measure of money for India are critically evaluated.
Chapter III searches for some theoretically admissible groups of monetary assets by way of testing their weak separability from the rest of the assets. Following a brief introduction, section 3.1 elaborates the concept of weak separability. Section 3.2 presents different methods of testing weak separability with a greater emphasis on Varian’s (1983) non-parametric approach to testing weak separability. This section also reviews some important previous studies which have employed this method for arriving at certain separable groupings. Section 3.3 introduces the nature of the present study followed by a description of data categories in section 3.4. Results of the non-parametric weak separability test are presented in section 3.5 and section 3.6 offers some concluding remarks.

The relative performance of Divisia versus simple sum monetary aggregates is examined in Chapter IV. Section 4.1 presents results from annual data spanning over the period 1970-1996 whereas monthly results from 1985 04 to 1996 09 are discussed in section 4.2. Section 4.3 summarises the results of some new aggregates (both Divisia and Sum) consisting of like Certificate of deposit (CD) as an additional asset for the very recent sample 1994 04-1996 07 for which data on CD are available. Some concluding remarks are offered in section 4.4.

A new monetary aggregate called the Currency equivalent monetary aggregate (CEMA) is exclusively dealt with in Chapter V. The theoretical foundation of CEMA is discussed in section 5.1. Section 5.2 reviews available empirical evidences on CEMA. Empirical findings of the tests conducted are presented in Section 5.3. The tests include information content test, Davidson-Mackinnon J-test and stability of demand for money functions. Concluding remarks are offered in section 5.4.
The last chapter (Chapter VI) summarises the findings of the present study. An analysis of the implications of the aggregation theoretic results (obtained in Chapters IV and V) for the emerging money market in India is also attempted in this chapter. The chapter concludes with some suggestions for the monetary authorities.