Summary and Conclusions

The present study begins from the failures of macro models in exchange rate determination like purchasing power parity, monetary approach, portfolio approach, asset market hypothesis, etc. The survey of literature on the exchange rate determination models reaches the conclusion that macro variables like prices, money supply, interest rates, trade balance, and fiscal deficit are not of much use in explaining and predicting the short-run behaviour of the market. But it is well known that the fluctuations in the foreign exchange market are of short-run phenomena and explaining them will be of much help for the participants and the policy makers in predicting and analyzing for the improved functioning of the market. For that purpose, it is necessary to study the impact of new variables on the market behaviour like bid-ask spreads, transaction costs, volume of trade, order flows, etc., which are micro in nature.

Towards that end, we try to explain the anomalies in the market with the help of a theory called market microstructure theory that will consider and examine the micro behavior in the financial markets. In the existing literature, it is found that microstructure theory is basically applied in the studying the behaviour of the stock market and the bond market. But with the availability of
high-frequency data in the foreign exchange market since the early 90's, the application of microstructure theory to the study of the foreign exchange market's behaviour became possible. Some studies have tried to explain micro behaviour in the three major foreign exchange rates, namely, Deutsche mark/US dollar, Japanese Yen/US dollar and pound sterling/US dollar.

Market microstructure theory, which is defined in the literature as 'the process and outcomes of exchanging assets under explicit trading rules', was first formulated by Garman and was subsequently developed by many researchers with their applications to financial markets. It consists of two models (see O'Hara 1995). They are (1) Information models and (2) Inventory models. Information models explain the behaviour of market participants and market outcomes when there exist both public information and private (or asymmetric) information among the market participants. In the foreign exchange market, which is very different from the other financial markets, the role of asymmetric information is very important. Tracking of this type of information is of much importance in reducing speculation in the market.

In the inventory models, the main aspect is that of studying the optimising problem of the dealers as their objective is to maximise expected profit per unit of time. This model emphasises control of the inventory fluctuations through price...
adjustments to avoid bankruptcy and failure at the end of the dealing process. Failure arises in this model whenever the dealer runs out of either inventory or cash. These models also explain the relationship between the transactions cost and the price fluctuations in the market.

Given this background about the microstructure theory, the present study tries to apply this theory to the foreign exchange market after identifying the gaps in research through a survey of the existing literature. From the literature survey, the study finds that this theory was basically applied to three major currencies that were specified earlier. There are no studies dealing with the Indian rupee/US dollar and the US dollar/Euro. The present study attempts to examine the micro issues in these markets with the help of high-frequency data that were arranged by Olsen & Associates (Switzerland). The data covers 22 working days in August 1999.

The micro issues covered in the study are the impact of public information, namely 'news', on the exchange rate, and the impact of asymmetric information on the exchange rate. The study also tries to examine the relative superiority of micro variables on macro variables in explaining and predicting changes in the exchange rate. In this regard the study follows the methodology of Evans & Lyons (1999). To test the impact of information on the exchange rates, the study uses
both Ordinary Least Square (OLS) model and Generalised Autoregressive Conditional Heteroscedasticity (GARCH) models. The study also examined the volatility of exchange rates by using P-GARCH model. Analysis was carried out with the help of RATS package and the results obtained could be of help to academicians and market participants in better understanding and predicting changes in the exchange rates.

To examine the objectives, the study utilises the data for: Indian rupee/US dollar (INR/USD) for the period of one month (22 working days) i.e., August 1999, and the observations are 4,981; US dollar/Euro (USD/EURO) for one day, i.e., on August 2, 1999 and the observations are 13,318; and Japanese Yen/US dollar (YEN/USD) for two days, i.e., August 5-6, 1999, and the observations are 8,158. A limitation of the study is that only one day was taken in the case of USD/EURO and two days in the case of YEN/USD as the transactions in these markets are very high and the existing statistical softwares (with us) were unable to perform tests on it.

It was found from the summary statistics of all the three exchange rates that the average bid-ask spread, which is a proxy for the transaction cost, in USD/EURO is very small (0.0005) compared to the other two exchange rates. It shows that the USD/EURO market is very active and that the volumes are very
high in these markets. The coefficient of kurtosis is very high in INR/USD market compared with the other two markets, indicating that INR/USD market's spreads are not in tune with the effective market forces. The participants in this market may be 'defensive players'.

It was found from the volatility results that all the three exchange rates show the presence of P-GARCH effect, i.e., allowing for richer dynamic periodic structure in the models of three exchange rates will lead to better prediction of the exchange rate changes. Further, the study examines the effect of 'news' on the exchange rate behaviour. For this purpose, the study considers the news of employment report on every Friday at 8:30 a.m. released by the US Government (i.e. on August 6, 1999) and examines its impact on the short-term dealings in the YEN/USD market. It also considers the impact of federal banks' macroeconomic report, which is released every Monday at 8:30 a.m. (EST), on the USD/EURO dealings. The study finds that irrespective of the nature of the news, the outcomes in the market will react to these reports and will continue to depend on this news for a minimum of one hour in both the markets.

Finally, the study tries to examine the superiority of micro variables on macro variables with the help of daily order flows in the market. Order flows, which are synonymous with the concept of effective demand in micro economic
literature, are defined as the net of buyer-initiated trades and seller-initiated trades in a day. Since the information on buyer-initiated trades and seller-initiated trades are not publicised, the present study considers the daily turnover of INR/USD in the Indian foreign exchange market that are available in the Reserve Bank of India Monthly Bulletin. For macro variables, the study considers the Indian daily call money rates and the US federal fund rates. In the case of YEN/USD, the study considers the total number of transactions in a day through the electronic broking system as a proxy for the order flow.

The study concludes that order flows have a significant negative impact on the INR/USD exchange rate. It is also found, interestingly, that both Indian and US interest rates are not found significant in explaining the INR/USD exchange rate. This result supports the disclaimers of macro theories on exchange rate determination models. Further, it was found that comparing to US federal fund rate, total number of transactions has a positive and significant impact on the YEN/USD exchange rate. In the case of USD/EURO exchange rate, it is found that the US federal fund rate plays a significant role in explaining the short-run changes in its rate.

Given these conclusions, it can be inferred that the studies on exchange rate forecasting models should concentrate on the short-term forecasting with the
help of micro variables like bid-ask spreads, volume of transaction, order flows, and public and private news. This type of study may be of much help to the true participants in the market. As a policy measure it is suggested that all the foreign exchange dealing rooms must and should be equipped with research wings to help the dealers in predicting short-term changes, in reducing the transaction costs, to 'escape' from inventory problems, and to make the dealers to have 'smart deals' by trading at thin spreads.