CHAPTER – VI

FINDINGS AND CONCLUSION

6.1 Introduction

There are different econometric techniques in time series estimation. They are the traditional Ordinary Least Squares (OLS), Engle and Granger two step and Engle-Yoo three step. The OLS does not take stationary of the variables into account and if the variables in the estimation are non stationary, the results will be spurious. The Engle –Granger two step and Engle-Yoo three step procedure take stationary and co-integration into account, but assume that there is only one cointegrating vector. That is a main weakness of these two techniques and they are not sufficient in multivariate system. Johansen’s full information maximum likelihood and Vector Auto-regression (VAR) do not assume that there is one cointegrating vector. They are essential and appropriate for time series analysis in multivariate systems.

The study period has covered 1975-2006 and 1981-2006 for India and Pakistan respectively. Annual data have been used to estimate the determinants of the real exchange rate. It was not possible to use quarterly data for the post Brettonwood period as statistics for real exchange rate are not available for both the countries. This caused a restriction of study to the above period. The first step of the Johansen methodology is to determine the integration order of the series. In this study one informal test and three formal tests are used. None of the variables
are stationary for both countries and stationary at different levels. Thus variables are not integrated in the same order and they could be integrated in the long run.

6.2 Determinants of Real Exchange Rate in India and Pakistan

One per cent increase in the nominal exchange rate is associated with an appreciation of the real exchange rate by 0.80 per cent and 0.48 per cent in India and Pakistan respectively. This is consistent with the results obtained by Joyce and Kamas (2003) for Argentina, Colombia and Mexico. A one per cent increase in government expenditure causes the real exchange rate to appreciate by 0.55 per cent in India and the same causes the depreciation about 0.49 in Pakistan. This is comparable to the results obtained by Elbadawi (1994) for Chile and India, and by Edwards (1988) for developing countries. A one per cent increase in the domestic credit causes the real exchange rate to depreciate to 0.64 per cent in India. A one per cent increase in degree of openness is associated with an appreciation of real exchange rate by 0.45 per cent in Pakistan. This coefficient can also be favorably compared to Asfaha and Huda (2000) for South Africa and Zhang (2001) for China.

6.3 Cointegration Analysis for India and Pakistan

The maximum eigenvalue from the Johansen test rejects the null hypothesis of no cointegration, but fails to reject that of utmost one cointegrating vectors, since the test statistics of about 31.65 is less than the 5 per cent critical value of about 33.87. The maximum eigenvalue therefore suggest that there is one cointegrating relationship in the India’s real exchange rate model.
The trace statistic shows that there are 6 cointegrating vectors, while the maximum eigenvalue indicates one cointegrating vectors.

The maximum eigenvalue from the Johansen test rejects the null hypothesis of no co-integration, but fails to reject that of utmost two cointegrating vectors, since the test statistics of about 13.88 is less than the 5 per cent critical value of about 21.13. The maximum eigenvalue therefore suggests that there are two cointegrating relationship in the Pakistan model. The trace statistic shows that there are six cointegrating vectors, while the maximum eigenvalue indicates two cointegrating vectors. This study uses atleast one statistic to assume a verdict of co-integration.

6.4 Impulse Response Analysis for India and Pakistan

This analysis shows the dynamic response of the real exchange rate to a one-period standard deviation shock to the innovations of the system and indicates the deviations and persistence of the response functions have expected pattern confirm the results from the analysis. One-period standard shock to openness in India depreciates the real exchange rate by a very meager amount, but also gradually depreciates the real exchange rate from 4 to 8 periods. A one-period standard deviation shock to the nominal exchange rate and terms of trade depreciates the real exchange rate more than one per cent, but also gradually levels off in about 4 to 6 period. The response of the real exchange rate to a one-period shock to domestic credit initially appreciates the real exchange rate up to 4 periods and thereafter depreciates. This result implies that expansion of monetary
policy appreciates the real exchange rate in the long run. Government consumption has a positive impact on the real exchange rate. A one-period shock to the government consumption appreciates the real exchange rate by less than one per cent up to 5 periods.

One-period standard deviation shock to domestic credit in Pakistan appreciates the real exchange rate by more than 2 per cent up to 7 periods and openness; initially there is no response and after two periods it appreciates real exchange rate around 2 per cent up to 7 periods. A one-period standard deviation shock to the nominal exchange rate and terms of trade depreciates the real exchange rate an average of less than one per cent respectively. The response of the real exchange rate to a one-period shock to government consumption appreciates an average of less than 1 per cent.

6.5 Variance Decomposition Analysis for India and Pakistan

In the first period, all the variance in the real exchange rate is explained by its own innovations. Initially, India’s real exchange rate itself explains about 75 per cent of variations while all other determinants explain only 25 per cent. Of this 25 per cent domestic credit explain about 16 per cent, terms of trade explain 5.5 per cent and the nominal exchange rate 3 per cent, while the remaining variables do not significantly contribute to the variation in the real exchange rate. However after 4 year period the real exchange rate explains only 71 per cent of its own variation, while its determinants explain the remaining 29 per cent. The influence of the domestic credit decreases about less than one per cent, followed
by the second largest component terms of trade about 8.7 per cent and nominal exchange rate explains about 4.5 per cent variations in the real exchange rate. This result in line with Joyce and Kamas (2003) found in their study of the determinants of the real exchange rate in Argentina, Colombia and Mexico. Domestic credit accounts for about 14 per cent and terms of trade about 8.7 per cent and nominal exchange rate about 4.5 per cent.

The real exchange rate of Pakistan itself explains about 90 per cent of variations while all other determinants explain only 10 per cent. Of this 10 per cent nominal exchange rate accounts 5.29 per cent followed by domestic credit about 3.8 per cent, while the remaining variables do not significantly contribute to the variation in the real exchange rate. However after three periods, the real exchange rates own variation reduces and the other variables variations in the movement of the real exchange rate increases. After five periods the real exchange rate variations account only 50 per cent of its own, while the remaining variables explaining about 50 per cent where domestic credit alone explains 20 per cent.

The variables that have a long run relationship with the real exchange rate in both the countries are the nominal exchange rate, government expenditure, domestic credit and degree of openness. One per cent increase in the nominal exchange rate is associated with an appreciation of the real exchange rate by 0.80 per cent and 0.48 per cent in India and Pakistan respectively. A one per cent increase in government expenditure causes the real exchange rate to appreciate by
0.55 per cent in India and the same causes the depreciation about 0.49 in Pakistan. A one per cent increase in the domestic credit causes the real exchange rate to depreciate to 0.64 per cent in India. A one per cent increase in degree of openness is associated with an appreciation of real exchange rate by 0.45 per cent in Pakistan. These results therefore, for the most part corroborate the findings from previous research. From the variance decomposition analysis domestic credit, nominal exchange rate and terms of trade explains the variations in the real exchange rate in both countries.

6.6 Policy Implications and Recommendations

The results of this study have a number of policy implications. First, the presence of long run co-movements (cointegration) between the real exchange rate and its determinants found in this study implies the effectiveness of targeting one of the variables influencing the long run behaviour of the other variables. If this interpretation holds and given the significant long run relationship between the real exchange rate and the monetary policy variable, the monetary authorities in India as well as Pakistan have to manage tight monetary policy. The second observation is that both India and Pakistan are developing countries, government expenditure falls heavily on non tradable goods and defense purpose. If the governments spend towards the tradable goods, then both can manage the real exchange rate. During the study period the Rupee was continuously appreciated in both countries. Instead of leaving the determination to the invisible hands, both can fix conformingly to any currency according to their reasonable wish.
6.7 Limitations of the Study and Areas for Further Research

One of the reasons for investigating the determinants of the real exchange rate is to estimate the equilibrium real exchange rate and ultimately measure the degree of misalignment in the actual real exchange rate. Having not gone to this extent, the study has obviously left some gaps, although it has successfully achieved its broader objectives.

The other issue, which has also confronted previous researchers, concerns the inadequacy of data, particularly in developing countries, on the actual variables suggested by the theoretical models on the determination of the real exchange rate. This means that some of the variables either have to be excluded in the empirical model, albeit with the risk of an omitted variables bias, or proxies have to be found for those variables. The risk involved in finding proxies is that they may not correctly represent the impact of the actual variables, resulting in inconsistent results. Striking this balance poses a serious challenge to empirical studies on the determinants of the real exchange rate. However, these problems seem not to have significantly affected the findings presented in this study, since they corroborate both the theoretical and empirical knowledge on the determinants of the real exchange rate.

The areas for further research that emerge from this study include covering the gap that has been left by this study of measuring the degree of misalignment in the both countries real exchange rates. The other issues concern the proxies, measurement of the actual real exchange rate and the speed of adjustment.
parameter. Research into what proxies represent the actual real exchange rate determinants efficiently may improve the performance of the empirical real exchange rate models. The other area that remains widely debated is the measurement of the actual real exchange rate. Research into what measure constitutes the best real exchange rate policy variable is still lacking. Finally, it has been found in this and other studies that the speed of adjustment parameter varies both between countries and within the same country during different periods. It may also be important for policy purposes to research into the causes of this high variability in the speeds of adjustment.