Chapter 2
Review of Literature

There is a vast body of literature on determinants of real exchange rate (RER) and its impact on trade balance (TB), capital flows and monetary policy response function. Apart from at theoretical level, the issues related to RER have been dealt with extensively in empirical studies related to a large number of countries. This chapter covers main findings of these studies; however, some of studies have been referred in the relevant chapters. The chapter has been divided into four sections. Each section gives due attention to the specific aspect covered in the present study. Section 2.1 presents the review of studies on determinants of RER, while studies dealing with impact of RER on trade have been discussed in Section 2.2. The studies examining impact of RER on capital flows have been given in Section 2.3. Section 2.4 contains the findings of the studies on role of RER in the monetary policy response function.

2.1. Determinants of RER

In theory, various external and internal fundamentals have been discussed as determinants of real exchange rate. The former fundamentals are terms of trade, capital flows, net foreign assets etc., while later fundamentals are productivity differential, government expenditure, trade policy etc. A large number of studies have investigated the determinants of RER across the countries using different econometric techniques.

Mkenda, Beatrice Kalinda (2001) examines the main long-run determinants of the real exchange rate in Zambia employing Cointegration analysis. He finds that terms of trade, investment share, and government Consumption are determinants of RER for imports, while terms of trade, central bank reserves, and trade taxes are the long determinants of the real exchange rate for exports. For the internal real exchange rate, terms of trade, investment share, and the rate of growth of real GDP have been found
as determinants. Mtonga Elvis (2006) establishes that, in the long run, the Rand’s real exchange rate appreciates in response to changes in the differences in real interest rates and labour productivities relative to those prevailing in the major trading partner countries. Accumulation of foreign reserves, increased fiscal expenditures, improvement in the terms of trade, and inflows of capital also appreciate the real exchange rate. On the other hand, changes in the size of the fiscal deficit, increased openness of the trade regime, and accumulation of foreign debt cause the rand’s real exchange rate to depreciate in the long run.

Venezuela’s real exchange rate has a time-varying equilibrium real exchange rate and specifically, increases in oil prices are associated with the emergence of appreciation pressures (Juan Zalduendo, 2006). There is also, however, a trend decline in the equilibrium rate that appears to be explained by depreciating pressures arising from the sharp decline in productivity differentials recorded by the Venezuelan economy, against the backdrop of a marked increase in economic volatility. This decline represents a sort of reverse Balassa-Samuelson effect, and is not consistent with the hoped-for catch-up effects underlying neoclassical growth theory. He further finds that a VEC model applied to official REER rates indicates the equilibrium real exchange rate is more appreciated than the official rate and the speed of adjustment of this VEC model is too slow, however, suggesting that the government’s comprehensive set of foreign exchange restrictions enable sharp and persistent departures from the equilibrium rate.

In a study on “Cyclical Fluctuations in Brazil’s Real Exchange Rate: the Role of Domestic and External Factors (1988-95)”, Agenor, P.R., et al. (2002) examines the links between capital inflows, domestic and foreign interest rates, expected changes in the nominal rate of depreciation, the government spending-output ratio, and changes in the real exchange rate in Brazil estimating a near-vector auto regression model. Their findings suggest that fluctuations in the real exchange rate are also associated mostly with the historical innovations in the real exchange rate itself at short forecasting
horizons, and, to some limited extent, with world interest rate shocks at longer horizons. The short and long-run determinants of the real exchange rate in Mexico are investigated by Villavicencio A.L., et al. (2006). First, they find that the purchasing power parity cannot be taken as a long-run equilibrium relationship in Mexico and the real exchange rate, far from converging to a constant mean overtime, is subject to several structural breaks which correspond to the main economic crisis in Mexico. They further establish that the real exchange rate in Mexico is connected to macroeconomic variables such as the relative productivity, the real interest rate and the stock of debt of a country as these set of economic fundamentals explaining reasonably the real exchange rate appreciation. Nowadays, more crucial for the exchange rates movements in Mexico and in other developing economies are the effects of the interest rates and the size of the net foreign assets, especially in a period driven by the twin forces of globalization and liberalization of markets and trade. They find evidence that first, a higher interest rate generates an inflow of capitals which, in turns, appreciates the real exchange rate and second, the size of net foreign assets is associated with a more appreciated exchange rate. That is, reaching a higher level of net foreign assets can afford to finance a worse current account balance.

Jorge Carrera & Romain Restout, (2008) attempt in their study to determinate what factors influence real exchange rates in nineteen Latin American countries over the 1970-2006 period using panel cointegration techniques. They include six traditional fundamentals in the estimation as determinants of RER. They confirm the links between the real exchange rate and its determinants. That is, a higher government spending to GDP ratio, an increase in productivity differential, a positive terms of trade shock, a surge in foreign capital flows and an higher net foreign assets position affect positively the real exchange rate in Latin America. Whereas increase in trade openness leads to depreciation of the real exchange rate. The de facto exchange regime has also a strong influence on real exchange rates in Latin America: rigid regimes (peg or crawling peg) exercise an upward pressure on
the real exchange rate. Bjornland H C and Havard H (2002), while examining the fundamental determinants of the long run real exchange rate in Norway, conclude that PPP holds against a basket of Norway’s trading partners only when the interest rate differential is incorporated, however, pure PPP is rejected. This implies that although PPP is not by itself a stationary process, it becomes stationary when it is combined with the interest rate differential. Hence, the long-run interactions between the goods and capital markets are too important to be ignored by simply investigating PPP in a three dimensional system consisting of the exchange rate, domestic prices and foreign prices.

Wang Tao (2004) studies the sources of real exchange rate fluctuations in China since 1980 using a structural vector autoregression model. Three types of macroeconomic shocks - supply, real demand, and nominal shocks - and their impact on output, the real exchange rate, and relative price are identified. The estimation results show that real relative demand shocks have been the most important sources of fluctuations in the real exchange rate over the period 1980–2002; while supply shocks have been the main factors accounting for variations in relative output and relative prices. It also shows that supply shocks have been at least as important as nominal shocks in contributing to real exchange rate variations in China. These findings are consistent with the empirical results of similar techniques applied by other authors to other developing countries, but differ from most studies on real exchange rate movements of industrial countries where real demand and nominal shocks are typically found to be important.

Kiptoo Christopher K (2009) analyse the real exchange rate (RER) misalignment in COMESA countries using cointegration. He finds that in the long run, the equilibrium RER for each of the countries studied is only affected by real variables, which may be categorized as either external or internal ‘fundamentals’. The external fundamentals are terms of trade, and net capital and financial flows, while internal fundamentals are productivity growth and trade policy proxied by the degree of openness. The coefficients
of terms of trade, net capital and financial inflows (proxied by interest rate
differential in some countries) and government expenditure have been found
in accordance with a priori expectations. The conclusion drawn from the
results of this study is that despite the adoption and implementation of a
liberalized exchange regime in many COMESA countries, success has not
been achieved as expected in restoring equilibrium in the RER. The results
indicate that most countries experienced more pronounced episodes of RER
overvaluation, implying deterioration in the country’s international
competitiveness compared to those of RER undervaluation, implying
improvement in the country’s international competitiveness. Caporale G M,
et al (2009) studies the determinants of the long-run equilibrium RER in
emerging countries and assesses possible misalignments, focusing in
particular on the long-run effects of international financial integration. They
confirm the existence of a long-run relationship between the RER and
various factors (including international financial integration) for all four
panels considered (all countries, Latin America, Asia, the MENA), in contrast
to what is concluded when relying on asymptotic critical values (which are
not reliable for statistical inference here). Further, their econometric
analysis indicates that several factors affect the long-run RER, the signs of
the estimated coefficients being consistent with theory. It has been found
that, in addition to other determinants normally considered in exchange rate
models, international financial integration plays a key role, and has resulted
in long-run RER depreciation and undervaluation.

Sfia, Mohamed Daly (2006) studies the sources of real exchange rate
fluctuations in Tunisia employing a long run structural VAR approach.
Three types of macroeconomic shocks (supply, demand and nominal) have
been identified. The empirical results indicate that real shocks play a large a
role in explaining the fluctuations of real exchange rate in Tunisia. Real
disturbances account for more than 80 per cent of the forecast error
variance of the real exchange rate in Tunisia. The fact that real exchange
rate fluctuations in Tunisia are dominated by real shocks presents several
implications for the decision making and the exchange rate modelling. In a
study, Drine Imed and Christophe Rault (2003) attempt to identify the determinants of the equilibrium real exchange rate, others than the Balassa-Samuelson effect, in Africa, Latin America and Asia. Their investigations show that an improvement of the terms of trade, an increase of per capita GDP and of capital flows entail a long-run appreciation of the real exchange rate. On the other hand, an increase of the domestic investment and of the openness degree of the economy entails a real exchange rate depreciation; the effect of public spending increase being ambiguous. The real exchange rate is effectively at the centre of an economic spiral and its value depends on the economic specifications of each country.

Mkenda B. K. (2001) attempted to estimate long-run and short-run determinants of the real exchange rate in Zambia to find out the degree of misalignment in the real exchange rate. Cointegration analysis was employed in identifying and estimating the long-run determinants (the fundamentals) of the three real exchange rates in Zambia, namely the real exchange rates for imports and exports, and the internal real exchange rate. The study finds that in the long-run, following fundamentals influencing the real exchange rate for imports; terms of trade, investment share, and government consumption, while terms of trade, central bank reserves, and trade taxes are the long-run determinants of the real exchange rate for exports. For the internal real exchange rate, long-run determinants are terms of trade, investment share, and the rate of growth of real GDP. Further, error-correction model shows that apart from the difference of the fundamentals mentioned above, the flow of aid and real money supply effect the internal real exchange rate. The nominal exchange rate and openness have been found to have short-run effects on the real exchange rates for exports and imports, respectively. The study also demonstrates that real exchange rates have been overvalued in several periods. Lastly, the findings concur with the view that the equilibrium real exchange rate is not constant over time, but responds to changes in a range of fundamentals and shocks to the economy (Aron et al, 1997).
Drine I. and Rault C. (2007) re-examine empirically the real exchange rate determinants for 16 MENA countries using new panel unit root tests proposed by Inn, Pesaran and Shin (1997) and panel cointegration tests recently developed in the econometric literature by Pedroni’s (1995a, 1997a and 1999), which permit to get round the problem of insufficiency of available data. Their main finding is that time series tests appear to be unable to put in evidence the existence of a long-run relationship between real exchange rate and per capita GDP for more than two third of MENA countries implying the empirical rejection of the Balassa-Samuelson hypothesis, whereas the recourse to new panel data unit-root tests and cointegration techniques permit to rescue this hypothesis for all MENA countries. Moreover, most of the estimated coefficients have the expected sign and confirm that economic development is accompanied by a real exchange rate appreciation. Furthermore, other variables than GDP per capita such as real interest rate differential, government consumption, the degree of openness of the economy have also a significant effect on the equilibrium real exchange rate for 7 countries (Bahrain, Egypt, Jordan, Kuwait, Morocco, Syria, and Tunisia). Besides, the analysis of real exchange rate misalignment shows three different periods in real exchange rate fluctuations. They conclude that real exchange rate is highly affected by exogenous shocks. Kildegaard Arne (2005) find that “fundamental” determinants of real exchange rates as identified by the theoretical literature, are in fact cointegrated with nominal exchange rates and relative prices, for the bilateral case of Mexico and the U.S., while tests of PPP alone fail to reject a unit root in the real exchange rate.

2.2. Impact of RER on Trade

A large number of studies have been undertaken to find out the impact of RER on trade balance. Theory provides that RER appreciation/depreciation would make exports costly/cheaper and imports cheaper/costly and lead to deterioration/improvement in trade balance. The Marshal-Lerner (ML) condition, however, provides that depreciation in RER will result in improvement in trade balance if exchange rate elasticity of
exports and imports if more than unit. Therefore, studying the impact of RER on trade balance would tantamount to testing ML condition.

Takaendesa P, et al. (2005) examines the impact of real exchange rate volatility on trade flows in South Africa using EGARCH for estimation of RER volatility and cointegration for estimation of long-run relationship. The empirical results based on the cointegration analysis show that real exports are cointegrated with foreign income, real exchange rate and exchange rate volatility in a single way. By normalisation on exports, all the other estimated long-run elasticities are consistent with predictions of economic theory except for foreign income. Foreign income is found to have a significant negative effect on exports, which is rather surprising since an increase in the income of trading partners is expected to positively affect export. The real exchange rate (as a proxy for improvements in external competitiveness) carries an expected positive sign, while exchange rate volatility has a strong adverse impact on South Africa’s exports to the US. The short-run dynamics show that about 66 per cent of variation in exports is corrected within a quarter.

David, Alvarez-Ude and Guadalupe (2006) examine the long and short run effects of real exchange rate on the Argentinean trade balance (TB). By using VAR-based cointegration tests and impulse response functions, their study demonstrates that ML condition is fulfilled in the periods including fix exchange rate regime policy but not in those periods when exchange rate has shown more flexible policies. This result holds even though there have been episodes of RER overvaluation with relatively flexible exchange rate periods in the Argentina economy as have shown by Richaud et al. (2003). In the short run, Argentina’s TB has not usually followed the J-curve pattern of adjustment. Only before the Convertibility Plan launching in 1991, the impact of RER is negative on the long-term and short-run TB showing that though the ML condition does not hold a J-curve-type phenomenon is observed. Further, their study suggests that, likely, currency devaluation in 2002 (and, therefore, the abandon of the currency board implemented in the Convertibility Plan) was necessary for improving TB and recovering a more
sustainable economic growth path. In this sense, flexible exchange rate policies seems to be necessary to induce a balance of payments long run sustainability and, therefore, for Argentina’s economic development.

In a recent study, Duasa, Jarita (2009) assess the relationship between real exchange rate and trade balance, imports and exports demand in Malaysia by cointegration tests assuming asymmetric adjustment. The study finds existence of asymmetric cointegration between balance of trade and real exchange rate and also asymmetric cointegration between export volume and real exchange rate. The estimation of error-correction trade balance model concludes that there exists a long-run cointegrating relationship between real exchange rate and trade balance with the underlying adjustment process being highly asymmetric. In specific, the value of the adjustment parameters indicate that when real exchange rate and trade balance temporarily depart from their underlying equilibrium relationship, adjustment back to equilibrium is more rapid following relative increase in trade balance (above long-run value) compared to relative decrease in trade balance (below long-run value). As for error-correction import demand model, the model suggests quick adjustment of import demand once it is below long-run value. The empirical results provide no evidence for import demand adjustment when it is above long-run value. The empirical results reflect the evidence of persistence of trade balance deficit in the case of Malaysia as the trade balance adjustment to its long-run value is slower when it faces deficit than when it faces surplus. Moreover, the shock of exchange rate on import demand is likely to be temporary in nature, in which, increase in real exchange rate only reduces imports temporarily and therefore non-persistence while the impact of depreciation is found to be insignificant.

Mtonga (2006) studies the impact of the misalignment in real exchange rate of the rand and on the competitiveness of South Africa’s trade. First, the study establishes that, in the long run, the rand’s real exchange rate appreciates in response to changes in the differences in real
interest rates and labour productivities relative to those prevailing in the major trading partner countries. Accumulation of foreign reserves, increased fiscal expenditures, improvement in the terms of trade, and inflows of capital also appreciate the real exchange rate. On the other hand, changes in the size of the fiscal deficit, increased openness of the trade regime, and accumulation of foreign debt cause the rand’s real exchange rate to depreciate in the long run. On the basis of these findings, equilibrium value for the rand’s real exchange rate is calculated to use as a point of reference to distinguish and assess the degree of real exchange rate misalignment and the implication of this for export competitiveness. This reveals that, from 1993 to 1996, and also in 1998, the rand’s real exchange rate has overshot its equilibrium value by an average 10%, while the 2001 rand crisis has brought about a 20% undervaluation of the rand at the start of 2002. Conversely, the strong appreciation of the rand, which began in early 2002, has, by the last quarter of 2003, culminated into an average 15% overvaluation of the rand real exchange rate. In consequence, South Africa’s exports have remained at a competitive disadvantage during 2003.

*Arize, Augustine C. (1994)* investigates the long-run effects of devaluation on the trade balance applying cointegration tests developed by *Engle and Yoo (1989)* and *Johansen (1988)*. The most significant observation appears to be the positive relation between the trade balance and the real effective exchange rate in most of the Asian economies. Despite some obvious exceptions, his results indicate that the two variables are cointegrated. This implies that in the long-run devaluation improves the trade balance. Put differently, an increase in real effective exchange rate (defined as the number of units of domestic currency per unit of foreign currency) implies a devaluation of domestic currency.

*Asfaha and Huda (2002)* attempt to estimate the degree of real exchange rate misalignment and its impact on the international trade competitiveness of the South African economy for the period 1985:1-2000:4,
based on Edwards' (1989) intertemporal general equilibrium model of a small open economy,. For this purpose, they employ a one-step Engle-Granger approach and five years moving average technique to estimate the exchange rate misalignment, while impulse response analysis and variance decomposition techniques of cointegrated VAR (vector auto regression) have been established to assess the impact of the misalignment on trade competitiveness. The study reveals that the real exchange rate had been consistently overvalued during the period 1988:3-1998:2 but undervalued during periods 1998:3-2000:4. For most of the periods during 1985:1-1988:2 the rand had been undervalued. Moreover, the study discloses that the exchange rate misalignment debilitates South Africa's international trade competitiveness accounting for 20 percent of the variation in competitiveness.

Hsing, Yu (2008) examines the J-curve of the bilateral trade between the U.S. and her seven South American trading partners including Argentina, Brazil, Chile, Colombia, Ecuador, Peru, and Uruguay. He finds that the trade balance for Argentina has a positive relationship with real depreciation and real income in the U.S. and a negative relationship with own real income in the long run indicating lack of support for a J curve. The balance of trade for Brazil is positively associated with real depreciation and own real income and negatively influenced by real income in the U.S. in the long run lacking support for a J curve. For Chile, real depreciation is negatively affected by real depreciation and own real income and positive influenced by real income in the U.S. in the long run displaying evidence of a J curve. The trade balance for Colombia is not affected by real depreciation, has a negative relationship with own real income, and has a positive relationship with real income in the U.S. in the long run rejecting evidence of a J curve because the trade balance improves initially and deteriorates later. For Ecuador, real depreciation and higher own real income would improve the trade balance whereas higher real income in the U.S. would deteriorate the trade balance in the long run. Like Chile, there is support for a J curve. The trade balance for Peru is negatively affected by
real depreciation and own real income and positively associated with real income in the U.S. in the long run. There is no evidence of a J curve because real depreciation leads to a trade deficit. Like Argentina, the trade balance for Uruguay is positively affected by real depreciation and real income in the U.S. and negatively associated with own real income in the long run. Like Chile and Ecuador, there is support for a J curve for Uruguay.

2.3. Impact of RER on Capital Flows

Lahreche-Revil A. (2001) in a study on “The Impact of Exchange Rate Strategies on Trade and Foreign Direct investment in China” concludes that the real exchange rate is likely to be an increasing concern for both trade and foreign direct investment in China as exchange-rate volatility play a role for attracting FDI in China. He finds no evidence of an influence of exchange-rate uncertainty on trade. Further, the empirical results show that diversifying the peg of the yuan would likely stabilize inward FDI in China, especially if the yen was to acquire a significant role. Conversely, the risk from moving to a free floating regime would be more that of lasting fluctuations of the yuan than that of short-run volatility. In a study, Serven Luis (2002) explores empirically the impact of real exchange rate uncertainty on private investment in a large developing-country panel data set. On theoretical grounds, its sign is ambiguous, and the analytical literature suggests that it may be highly nonlinear and /or depend on economic features such as the output share of variable inputs, the degree of financial market development and trade openness. The study finds a negative and highly significant impact of real exchange rate uncertainty on private investment in the overall sample, after controlling for standard investment determinants. Moreover, the investment effect of real exchange rate uncertainty is shaped by the degree of trade openness and financial development: higher openness and weaker financial systems are associated with a significantly negative uncertainty- investment link. Conversely, under
conditions of high financial development and low openness, real exchange rate uncertainty may actually have a positive impact on private investment.

Kosteletou, Nikolina (2000) examine the interlinkages between foreign direct investment and the real exchange rate. Theoretically, there is no clear-cut distinction concerning the direction of such a relationship. He distinguishes between the trade integrated Models, where the volatility of FDI is the driving force of RER movements and Models of financial behavior where the fluctuation of RER is the driving force of FDI movements. Models of financial behavior can explain the effect of RER on FDI. An accelerated appreciation of the real exchange rate induces greater accumulation of FDI inflows in the European countries of our sample—with the exception of Denmark, France and the UK—and also in the US and Japan. This positive influence can be explained by the monetary approach to the balance of payments or by the strategic behavior of international firms, according to which firms invest in markets with appreciating RER for fear of protectionism. In Denmark, France and the UK the RER depreciation could have been used as an instrument to attract FDI inflows. The imperfect capital markets theory, as well as the relative labour cost theory can explain this negative influence. In the EU countries of our sample, whose currencies are connected with the Euro, an increase in the growth of FDI inflows has induced an increase in RER appreciation (decrease in RER depreciation). The effect is larger in the three countries of the South: Portugal, Greece and Spain. The opposite effect is true for the case of France and Denmark. The portfolio or the trade integrated Model can be used to explain these relationships. Hence, he infers that capital inflows, in the Southern European countries were used to finance domestic consumption that raised spending power, causing a real exchange rate appreciation and a trade account deficit. Unlike the South, the North of Europe was able to direct FDI inflows to finance capital accumulation in the tradable goods sector. In the case of France and Denmark the inverse relation can be explained with the same Model according to which FDI inflows were used to finance capital
accumulation in the non-tradable sector. In conclusion, a weaker Euro will not have uniform effects on FDI across the unified Europe.

**2.4. Role of RER in Monetary Policy Response Function**

*Taylor, John B. (2001)* suggests that for a country that chooses not to “permanently” fix its exchange rate through a currency board, or a common currency, or some kind of dollarization, the only alternative monetary policy that can work well in the long run is one based on the trinity of (1) a flexible exchange rate, (2) an inflation target, and (3) a monetary policy rule. In this study, he mentions that some of the studies indicates that monetary policy rules that react directly to the exchange rate—as well as to inflation and output—do not work much better in stabilizing inflation and real output, and sometimes work worse, than policy rules that do not react directly to the exchange rate. He explains this finding by positing an indirect effect of exchange rates on interest rates. The indirect effect exists even if the central bank follows a policy rule without a direct exchange rate effect. Inertia combined with rational expectations causes this indirect effect. The indirect effect may have advantages compared with the direct effect because it results in fewer and less erratic fluctuations in the interest rate. More research is needed to establish this advantage and to see if the findings hold up to more general measures of people’s preferences including perhaps the composition of output or the exchange rate itself. In a study, *Taylor (1999)* simulates the monetary policy rule augmented with RER for the European Central Bank. Compared with the rule that did not react to the exchange rate, he finds that the exchange rate reaction lead to better performance for some countries in Europe (France and Italy), but has poorer performance in Germany.

*Leitemo Kai and Ulf Soderstrom (2001)* analyze the performance and robustness of some common simple rules for monetary policy in a new-Keynesian open economy model under different assumptions about the determination of the exchange rate. They find that adding the exchange rate to an optimized Taylor rule gives only slight improvements in terms of the
volatility of important variables in the economy. Furthermore, although the rules including the exchange rate (and in particular the real exchange rate) perform slightly better than the Taylor rule on average, they sometimes lead to very poor outcomes. Thus, the Taylor rule seems to be more robust to model uncertainty in the open economy.

_Frenkel and Taylor (2006)_ in a study on “Real Exchange Rate, Monetary Policy, and Employment mentions that in a developmental policy regime, monetary policy must be designed in view of its likely effects on the RER, inflation control, and the level of economic activity. There is nothing very surprising here – in practice central banks always have multiple objectives. RER targeting can help the central bank steer away from this problem. A stable competitive RER in coordination with sensible industrial and commercial policies can substantially improve prospects for economic development, which is the over-riding goal of the monetary and all other economic authorities in any developing or transition economy.

_Malikaney, Christopher and Willi Semmlerz (2008)_ use a practical Keynesian macro-model for a small open economy to investigate the role of the exchange rate in an interest rate policy rule. The model is practical in the sense of Blinder (1997), in that it contains separate Phillips curves for nominal wages and prices, has an IS-type adjustment relationship in which output is demand-determined in the short run, there is Okun’s law that links the goods market and the labour market, and aggregate demand directly responds to the interest rate, and is therefore sensitive to monetary policy. The findings of the study motivate for an explicit consideration of the real exchange rate in monetary policy rules. A central bank that does not respond to real exchange rate fluctuations tends to generate persistence of macro shocks. By responding slightly to the real exchange rate, the central bank improves the performance of the economy in the face of these shocks. Further, macro variables return faster to their steady state values when the real exchange rate appears explicitly in the policy rule of the central bank.
In a study, *Osawa Naoto (2006)* estimates the response of monetary policy reaction functions to exchange rate movements under the inflation-targeting regimes in use in Korea, Thailand and the Philippines. The empirical results of his study indicate that all three countries do not react to exchange rate movements, contrary to the findings in existing work. It is argued that differences in the sample period contribute to the differences in the monetary policy response, as the inclusion of the Asian financial crisis period results in a stronger correlation between interest rates and the exchange rate. The empirical results contrast with the conventional wisdom reinforced by *Calvo and Reinhart (2002)* of a rigid exchange rate policy in emerging market economies. This paper argues that these countries have changed their rigid exchange rate policies to more flexible ones after the Asian financial crisis. Since they respond less to the exchange rate, while using foreign exchange reserves and the interest rate less frequently to control exchange rate fluctuations, they have far less “fear of floating” in the post-crisis period. One can argue that no monetary policy response to the exchange rate arises from the fact that central banks use foreign exchange reserves to control exchange rate movements instead of the interest rate.

*Chen S.S., Y.H. Chou and J.L. Wu (2009)* investigate the significance of the expectation formation effect in explaining real exchange rate fluctuations based on a simple New Keynesian small open economy model incorporating a Markov-switching monetary policy rule. They find that the expectation formation effect stabilizes the real exchange rate in the hawkish regime, but amplifies the real exchange rate in the dovish regime conditional on a productivity or cost-push shock. Moreover, the influence of the expectation formation effect on real exchange rates is larger in the dovish regime than in the hawkish regime. The expectation formation process (transition probabilities) can also affect the magnitude of the expectation formation. *Kumhof M, D. Laxton and K. Naknoi (2007)* also examine whether exchange rate belong in monetary policy rules and find that the exchange rate optimally do not enter the monetary rule under producer currency pricing. However, in the monetary DSGE model with endogenous tradability and
trade frictions, they find real exchange rate optimally entering the monetary policy rule.

Edwards Sebastian (2006) suggests that exchange rate is one of the most important macroeconomic variables in the emerging and transition countries. It affects inflation, exports, imports and economic activity. He addresses three issues: (a) the relationship between the pass-through and the effectiveness of nominal exchange rates in inflation targeting (IT) regimes; (b) the effects of IT on exchange rate volatility, and (c) the role (or potential role) of exchange rate changes on the monetary rule in IT countries. His main findings from this analysis are as follows: (1) countries that have adopted IT have experienced a decline in the pass-through from exchange rate changes to inflation; (2) the adoption of IT monetary policy procedures has not resulted in an increase in (nominal or real) exchange rate volatility, and (3) there is some evidence that IT countries with a history of high an unstable inflation tend to take into account explicitly developments in the nominal exchange rate when conducting monetary policy. Leitemo Kai and O. Roisland (2005) show that the proposed monetary policy rules, including nominal income targeting, perform well in traditional open-economy backward-looking models, as long as the exchange rate is forward looking, which is a less controversial assumption. The policy rule proposals in the New Keynesian literature may thus be more robust than previously believed. A conservative central bank seems to be a robust solution in the sense that it brings the economy close to the commitment solution irrespective of the relative magnitude of demand versus cost-push shocks. Interest rate smoothing improves the discretionary solution in our model also, but only to the extent that cost-push shocks occur. If such shocks tend to dominate, nominal income targeting comes close to the optimal rule under commitment. Dong Wei (2008) develops and estimates a structural model with limited exchange rate pass-through for Australia, Canada, New Zealand and the United Kingdom, to study whether and how exchange rate movements were incorporated in the formulation of monetary policy. His main finding is that the Reserve Bank of Australia, the Bank of
Canada and the Bank of England directly responded to real exchange rate movements in the past, while the Reserve Bank of New Zealand did not seem to incorporate exchange rate movements explicitly into their monetary policy rule. This, however, does not imply that the Reserve Bank of New Zealand paid no attention to the exchange rate. Instead, the central bank of New Zealand responded to exchange rate movements indirectly, because in the model, the exchange rate, inflation and output are all endogenously determined. Hsieh, Wen-jen (2006) examines output determination based on an extended IS-MP-AS model, which replaces the conventional LM function with the monetary policy reaction function. Real depreciation of the pound, more government deficit spending, a lower federal funds rate, more world output, and a lower expected inflation rate are expected to raise the Egyptian real output. There are several policy implications. To stimulate the economy, the authorities may consider real depreciation of the pound, expansionary fiscal policy, and the lowering of inflation expectation. The monetary policy in the U.S. plays an important role in determining the interest rate level and real output in Egypt. A stronger world economy is expected to help the Egyptian economy.