

## DETERMINANTS OF EXCHANGE RATE: A REVIEW BASED STUDY

Divya Nandrajog

Research Scholar, Department of Commerce, Delhi  
School of Economics, University of Delhi, Delhi,  
India

### ABSTRACT

DOI URL: <https://doi.org/10.36713/epra2995>

*Purpose: The study aims to find out the suitable model for exchange rate determination and economic variables which affect movement of exchange rates by reviewing available studies.*

*Design/methodology/approach: The study is descriptive and is entirely based on secondary data.*

*Findings: There is no one perfect model which can determine exchange rate movements. Inflation, interest rates, money supply, current account balance, oil prices are among the macroeconomic variables and currency order flow is microeconomic variable which affect exchange rates.*

*KEY WORDS: Exchange rate, monetary model, portfolio balance model, IRPT model, PPP model, macroeconomic factors, macroeconomic & microstructure factors.*

### INTRODUCTION

Globalisation has boosted the level of international dealings all across the world. The interaction between the countries is facilitated either through trade and/or investment. An international transaction essentially involves foreign currencies and these currencies are bought and sold in foreign exchange markets at some price. The price at which one currency is exchanged with other foreign currency is called an exchange rate (Krueger, 1983).

There are several types of exchange rate regimes which helps in determining exchange rate. Every country is distinctive in terms of their choice of exchange rate regime. Under fixed exchange rate, value of one currency is fixed against some units of other currency or basket of currencies and government intervenes through control on capital, current account transactions or internal measures such as fiscal and monetary policy in order to maintain the rate (Krueger, 1983). Similar to fixed exchange rate system is the pegged exchange rate system. In addition to fixation of one currency in some units of other currency, pegged exchange rate system allows movement of exchange rate within a narrow bracket. However, these types of exchange rates regimes are rarely adopted by any country in today's scenario. The system which is widely adopted by countries is the floating exchange rate. Under this system, the demand for and supply of a country's currency

determines its exchange rate and the imbalance between demand and supply is adjusted by changes in the relative prices of the currencies (Stockman, 1988). While in dirty float, exchange rate is determined through market forces of demand and supply, but government intervenes from time to time to maintain stability in exchange rates.

Various exchange rate determination models have been propounded by economists which helps in forecasting exchange rates and fluctuations in exchange rate. Every model explains movement in exchange rate using macroeconomic variables. Purchasing power parity model uses price levels of two countries to forecast foreign exchange rate between them. Under Absolute PPP, exchange rates are determined by difference between actual and foreign prices. While in relative PPP, the ratio of domestic and foreign prices helps in forecasting exchange rates. Relative PPP is more appropriate and preferred over absolute PPP (Krueger, 1983). On the other hand, Portfolio balance model determines the relative levels of current and future exchange rate as a function of demand and supply of all domestic and foreign assets (Dooley & Isard, 1983). There is another model called Interest rate parity model (IRPT) in which the difference between borrowing and lending interest rates across countries explain changes in exchange rates, provided the assets have same risk (Throop, 1993). IRPT further is of types, uncovered interest rate parity and

covered interest rate parity. In the former case, there exist an opportunity to make profit by using arbitrage and expecting a forward exchange rate while in latter, the forward exchange rate is known with certainty and arbitragers can make risk free profit.

Forecasting exchange rate using interest rate is further extended by Mundell-Fleming model which is based on IS-LM framework. It takes into account the effect of foreign interest rates. It assumes that capital can move freely across borders and investment will flow into a country where returns are high, and the rest of the world is considered as a single country. Hence, exchange rates are determined between one country and rest of the world. Interest rate parity between domestic interest rate and foreign interest rate is one of the most important assumptions of this model (Huh, 1999). Furthermore, Monetary model states that demand for and supply of a currency in relation with another currency explains its exchange rate (Bilson, 1978). Demand for and supply of a currency is in turn affected by numerous factors which eventually affects exchange rate. Thus, exchange rates are indirectly influenced by various variables. On the contrary, International Fisher effect model suggests that exchange rate between two nations should change by an amount similar to the differences in their nominal interest rates and inflation rates. It combines both interest rate and inflation (Puci & Mansaku, 2016). Lastly, Balance of Payments model explains that equilibrium exchange rates are determined by the current account balance of two countries. If a country is experiencing large current account surplus or deficit it means that it is in the state of disequilibrium. In such cases, exchange rates will adjust themselves in order to bring current account back to equilibrium (Rubaszek, 2004).

The paper aims to examine the factors proposed by these models and analyse their impact on forecasting exchange rate. Additionally, it aims to explore other economic variables which could reasonably explain the volatility of exchange rate.

### OBJECTIVES OF THE STUDY

- To understand the concept of exchange rate.
- To find out which exchange rate determination model is able to forecast exchange rate accurately.
- To review the literature available on the subject of exchange rate in order to determine economic variables which influence the movement of exchange rate

### METHODOLOGY

The research design of the study is descriptive in nature. The paper is entirely based on secondary data. Secondary sources of data include books, research papers and articles from internationally recognized journals.

### LITERATURE REVIEW

There are different exchange rate determinant models which facilitate forecasting of exchange rates. Several studies are available with respect to exchange rate determination models (Meese & Singleton, 1983; Gros, 1989; Kikumoto & Tcha, 1996). A study conducted by Meese & Singleton (1983) examines the volatility of exchange rates in a stationary world and non-stationary world with both sticky and flexible price model. Analysis reveals that variations in exchange rate is due to fluctuations in fundamental economic conditions. Speculations are also responsible for exchange rate fluctuations. Findings indicate that in a stationary world, exchange rate elasticity in relation to its determinants is greater than unity. Magnification effect is observed, and real income

and money stock are the important determinants which influence the value of exchange rates. On the other hand, in case of non-stationary world, variations in exchange rates could not be clearly explained by variations in its determinants. The volatility of exchange rates is also investigated with sticky and flexible price model under two good model. Results suggest that in two goods sticky price model, magnification is higher than flexible price model and any innovation or new information in money stock or real income with sticky prices shows larger magnification than flexible price model. Hence, it is concluded that when world is stationary and prices are sticky exchange rates show more volatility while on the other hand, flexible prices adjusts themselves quickly and reduces significant variations in exchange rates. Also, when there are innovations in money stock or real income, it is observable that value of exchange rate will overshoot and induce larger variations in exchange rates. Gros (1989) also tries to find out which exchange rate model among the monetary model and portfolio balance model could best explain the exchange rate volatility. Monetary model with flexible prices is taken on both annual basis and quarterly basis but this model gets rejected on the ground that monetary factors alone are not sufficient to explain the variations of the exchange rates. Even fixed prices could not improve the performance of monetary model in forecasting the actual level and degree of volatility of exchange rates. Later, portfolio balance model with both sticky and flexible price model is tested but even this could not explain the observed degree of volatility. Therefore, it is generalized that there is no specific model which can explain the exchange rate volatility and freely floating exchange rates are generally more volatile than their fundamentals.

Kikumoto & Tcha (1996) focuses on the range and factors affecting the range of an exchange rate. The study aims to find out the ideal range of an exchange rate which is dealing with target zone. Range refers to the upper limit and lower limit which is determined by the profitability condition of firms. It is observed that when exchange rate is at disequilibrium state then firms will either start losing profits or earning more profits. Exchange rate will take some time to adjust and resort itself to the equilibrium level. Various other factors such as demand from both countries for goods, technical conditions are also identified which could have significant impact on the width of exchange rates. Thus, these factors should also be given due consideration while deciding range of exchange rates.

Numerous studies have been undertaken across the world to investigate the impact of macroeconomic variables on the movement of exchange rate. The review of literature covers studies on exchange rates related to countries falling under Asia, Africa, Europe and America which are summarized below.

Lee and Boon (2007) examines different macroeconomic factors which could possibly affect exchange rates of four Asian countries namely Malaysia, Thailand, Indonesia and Singapore. The study employs ARDL model to discover the long-term relationship between relative income, relative money supply, relative stock index, relative trade balance, relative interest rate, relative inflation and exchange rate. The output indicates that relative money supply and relative stock indices affect Malaysian Ringgit, Indonesian Rupiah and Thai baht in the short term. In addition, E-GARCH is applied to calculate the volatility of exchange rates and it concludes that there exists co-integration between long term macroeconomic variables and exchange rate volatility in all cases except Thailand. Among all four currencies, Singapore dollar has

remained stable and its volatility is least as compared to other countries and its own innovations are responsible for its volatility. On the other hand, Indonesian Rupiah is discovered to be largely affected by macroeconomic variables and its volatility is least defined by its own innovations. Similar research is undertaken by AbuDalu & Ahmed (2014) which examines the short run and long run forcing variables of purchasing power parity on ASEAN-5 real effective exchange rates namely Malaysia, Indonesia, Thailand, Philippines and Singapore. Data related to exchange rate and forcing variables is analysed for the period of 16 years i.e. 1991-2006 using ARDL. Together with ARDL, Error correction model and CUSUM model are also applied to test the stability of long run parameters. The study concludes that domestic money supply and foreign interest rates are the strongest forcing variables of PPP for the selected countries. In context of Malaysia, domestic money supply is the forcing factor in the short run. On the other hand, Domestic interest rate, foreign interest rate and GDP strongly affect exchange rate of Indonesia. Terms of trade and domestic money supply are the forcing variable for Philippines. While foreign interest rate is found to be the major forcing variable in case of Thailand. Overall, it is concluded that the impact of every factor is different on different countries because of the uniqueness of their economic environment and market conditions.

Another research study by Bouraoui & Phisuthiwatcharavong (2015) deals with the determinants of TBH/USD exchange rate. The study employs multiple liner regression to investigate the relationship among variables and exchange rate. Analysis points toward a significant impact of international reserves and terms of trade on exchange rate where the former variable has a positive and latter has negative impact on exchange rate. It is further observed that government debt, monetary base, interest rate differential and the manufacturing production index have insignificant impact on TBH/USD exchange rate. However, these factors may influence different exchange rates differently depending upon each country's market conditions. Chaudhary et al. (2016) explore the association between foreign trade and exchange rates of selected south and south-Asian economies. Pakistan, Bangladesh, India and Sri Lanka are selected from south Asian region and Singapore, Malaysia, Indonesia and Thailand are classified under south east Asia. ARDL test shows that the relationship between imports and exchange rate is found in only one country whereas association between exports and exchange rate is found in more than half of the sample countries. It is revealed that exchange rate is one of the significant factors which affect foreign trade, but it does not provide any evidence to show that the relationship is bi-directional.

A section of research investigates the inter-linkage between stock market and foreign exchange market (Noman et al., 2012; French & Vishwakarma, 2013; Caporale & Ali, 2015). Noman et al. (2012) analyses the relationship between stock market and foreign exchange market in case of Bangladesh. Granger causality test shows that stock prices do not have a significant effect on the movement of foreign exchange rate which could also mean that stock market is yet to be developed in Bangladesh. Even during stock market crash no granger causality is found among stock prices and exchange rates. Thus, there does not exist any strong relationship between stock prices and exchange rates. However, the relationship between equity flows and volatility of exchange rate is different in context of Philippines (French

& Vishwakarma, 2013). Results of GARCH model and Impulse response functions (IRF) indicates that net equity flows forecast both volatility of exchange rate returns and volatility of equity returns. SVAR model indicates there exist high statistically significant relationship between positive shocks to net flows and the volatility of exchange rate returns and stock exchange returns. An unexpected increase in foreign equity flow will increase the conditional volatility of equity trading and exchange rates over the next 2 to 3 weeks. The paper concludes that foreign equity investment increases the conditional variance of both the exchange rates and equity markets. The relationship is further explored by Caporale & Ali (2015) under which the impact of international bond and equity portfolios on exchange rate dynamics for the selected Asian countries (India, Indonesia, South Korea, Pakistan, Thailand, the Philippines, and Taiwan) is examined over the period 1993-2015. GARCH model provides evidence of direct impact of international flows on exchange rate volatility which means high inflows would push exchange rates to high volatility regimes. Impact of equity flows on exchange rates is much higher than bond flows. Markov regime switching model brings out that equity inflow increases the probability of remaining in, or switching to, the high exchange rate volatility. On the other hand, Bond inflow increases the probability of staying in, or switching to, the low volatility regime. In such circumstances, monetary policy alone is not sufficient, capital control is also required i.e. restricting the inflow would help in stabilizing the foreign exchange market.

There are studies related to determinant of exchange rate in the context of European countries (Apergis, 1998; Kar et al., 2016; Tursoy, 2017). Apergis (1998) investigate the impact of budget deficit on exchange rate for eight countries namely Switzerland, the UK, Canada, France, Belgium, Italy, the Netherlands and Germany over the time period 1980 - 1995. It is found that in short run, an increase in budget deficit causes appreciation of domestic currency in Germany, the UK, Switzerland, the Netherlands and Canada whereas in Italy, France and Belgium high budget deficit causes domestic currency to decline because these countries do not follow anti-inflationary policies. Thus, it is concluded that budget deficit causes and impacts exchange rates in both short run and long run, but the impact is different in every country because of different macroeconomic conditions. Kar et al. (2016) examines the impact of Credit default swaps premium as a risk financial indicator on the movements of the Turkish lira against the euro. Frequency domain causality test concludes that there exists bi-directional causality between exchange rate and CDS differential in long term. In short run, causality runs from nominal exchange rate to CDS differential. As per the Hatemi-J and Roka asymmetric causality test, a positive shock in CDS differential does not affect exchange rate neither positively nor negatively. But a negative shock in CDS differential would affect exchange rate negatively as well as positively. Furthermore, Tursoy (2017) analyses the relationship between stock prices and exchange rates for Turkey. Stock market changes in a country influence flow of funds which in turn affects demand and supply of domestic currency and hence affects exchange rates. Not only this, but stock price change in other countries might make domestic stock market relatively better off which eventually impacts exchange rates. Results of ARDL and Granger causality test indicates that there exists bi-directional relationship between stock prices and exchange rates. High stock prices would attract more investment which would lead to appreciation of

Turkish Lira. On the other hand, appreciated currency would affect international competitiveness of companies, which might result into falling exports and declining stock prices.

The association between oil prices and exchange rate volatility in Nigeria is explained by Ogundipe & Ojeaga (2014). As oil is an essential commodity and not available in every country, there is assumed to be a constant demand for oil even when oil price increases which results in domestic currency appreciation and finally trade surplus is achieved. However, there may be trade deficit in long run because importing countries may start importing from other countries and hence, domestic currency would depreciate. Johansen Co-Integration test shows that a proportionate change in oil price will lead to a more than proportionate change in exchange rate volatility. It is observed that Nigerian exchange rates are also affected by interest rates and external reserves. Thus, it can be concluded that exchange rate volatility is affected by oil prices. While Doukas & Lifland (1994) examines the relationship between trade balance announcements and exchange rate movements by using US trade data from the period August 1986 to April 1989. As per the asset market approach, the present value of an exchange rate is influenced not only by present economic conditions but also by the expectations of its future value. Outcome of regression test highlights that foreign exchange market is highly sensitive to bad news rather than positive trade balance improvement announcements. On an average, trade balance announcements are perceived as bad and exchange rate changes immediately in response to such announcements. Furthermore, the direction and quantity of exchange rate reaction may not correspond to trade balance deficit quantity. Foreign exchange market is comparatively more sensitive to trade deficit announcements rather than trade surplus announcements. The study conducted by Nagayasu (2015) takes into account the influence of global factors such as global financial crisis and country specific factors like real interest rate on real effective exchange rate of countries. Analysis indicate that exchange rates are more volatile in developing countries than developed countries and volatility is high during crisis period. The findings of regression and correlation test suggest that heterogeneity in real effective exchange rates results from country specific factors. External competitiveness of a country is mostly country specific and a country which is losing its competitiveness cannot solely blame external factors responsible for it.

The research undertaken by Rogalski & Vinso (1977) studies the inter-relationship between price level variations and flexible exchange rates. Granger causality test indicates a strong correlation among them. It is found that changes in relative price level determine exchange rates but there is no perfect correlation between changes in relative price level and currency exchange rates. They take time to adjust themselves to price level changes. Also, there is no information lag found at long lags which means foreign exchange markets are efficient that is every new information received by the market is incorporated into prices so rapidly that current prices reflect all current information available. It is further believed that intervention by government or central bank can create inefficiencies in foreign exchange markets and if a country is pursuing monetary or fiscal policy which causes inflation in their country then it should expect change in the value of its currency. Therefore, it can be concluded that fiscal and monetary policies have significant impact on currency prices.

There have been several studies which investigate factors affecting exchange rate of Indian currency (Mishra (2011), Rajhans, 2013; Singh & Tripathi, 2015; Singh & Tripathi, 2016; Sharma & Setia, 2015; Shastri & Shastri, 2016). According to Mishra (2011), India does not follow flexible exchange rate system. India has set some inflation targets and in order to maintain that level, central bank intervenes from time to time. Central bank cannot let rupee depreciate below a certain level because then imports would become costlier and it will raise inflation, so RBI intervenes in the foreign exchange market. He has further discovered that inflation, interest rates and current account deficit significantly contribute to the movements in exchange rates. Rajhans (2013), on the other hand, determines integration levels of various foreign exchange markets to study the spillover effects of price shocks from one market to another. As per the analysis, India is less integrated to foreign markets, but the US financial crisis and euro zone crisis have caused instability and excess volatility in the foreign exchange market. He has checked integration in Indian Rupees, Euro, Great Britain Pound against the US Dollar. Variance decomposition of returns of chosen currency markets suggests that USD/INR is 100% influenced by their own dynamics whereas other currency markets are well diversified and are less than 60% influenced by their own dynamics. Granger Causality test concludes that Indian currency market is less integrated to foreign markets. It implies volatility in Indian currency market is higher in comparison to other markets under consideration.

The impact of derivative trading on currency market volatility in India with respect to Euro is investigated by Singh & Tripathi (2015). The effect of recent news and old news on spot market volatility is tested using ARCH and GARCH model respectively. The outcome of test shows that volatility in spot currency market has declined after the introduction of derivatives. It indicates that the importance of recent news on spot market volatility has decreased and the persistence effect of old news has declined with the introduction of currency futures trading. Hence, the introduction of currency futures trading has helped in reducing the exchange rate volatility of the foreign exchange market in India and it has become more stabilised as well as efficient after the emergence of derivatives market. Singh & Tripathi (2016) attempts to re-explain the impact of introduction of currency derivatives on exchange volatility of INR/EURO. GARCH model highlights that the Indian currency market is non-normal and stationary and exchange rate volatility has increased after the introduction of currency derivatives. Daily volatility of exchange rates in post derivative period is observed to be high in comparison to pre-derivative period. Overall, currency derivatives have failed to reduce the exchange rate volatility.

Sharma & Setia (2015) investigates the macroeconomic factors which determine exchange rate and the theories which explain pattern of exchange rate movements in case of India. It is discovered that traditional purchasing power parity (PPP) model, with flexible price model and sticky price model, and Interest rate differential model is given due consideration. The output of unit-root test provides that data is not stationary and there are breaks during Asian financial crisis (1997), terrorist attacks (2001-2003) and stock market crash (2002) which means that a stable long run relationship among the variables does not exist. Results of FMOLS test indicate that Interest rate is one of the most important policy tools for

easing out the exchange rate volatility. There exists an inverse relationship between price levels and exchange rates. Variation in output level does not affect exchange rates much in duration of 10 months. Increase in money supply decreases exchange rates and trade balance impact on exchange rate is not clear. It is ambiguous. Shastri & Shastri (2016) examines the relationship between the exchange rates and interest rates in case of India by taking into account structural breaks in the data. Three different type of securities are taken i.e. 91 days T-bill, 364 T-bills and 10 year dated securities (1996-2014) to determine the sensitivity of exchange rates with respect to interest rates. It is found that capital flows are not influenced by the level of interest rates. There is no causal relationship between exchange rates and interest rates. Hence, it is concluded that stability of exchange rates cannot be achieved through interest rates in an open capital account country like India.

There have been strong evidences of the role of macroeconomic variables in causing movement in exchange rate. However, there are several microstructure factors as well which could result in variations in the exchange rate. Studies dealing with microstructure variables are relatively sparse (Zhang & MacDonald, 2016; Anifowose et al., 2017). Zhang & MacDonald (2016) examines how macro news announcements and order flow information impact exchange rate return volatility and whether there is any interaction between macro news and private information. This study is confined to a very short period of four months. The behavior of exchange rate return is tested, and it is discovered that exchange rate return cannot be predicted i.e. it follows a random walk. Additionally, the output of GARCH model implies that there is a strong impact of macro news as well as order flow on exchange rate return but in their individual capacity. The interaction between macro news and private information does not play any significant role in affecting exchange rate returns. Overall, the study concludes that microstructure order flow information can explain short run variations in exchange rate returns and macroeconomic news is responsible for medium and long run variations. Additionally, Anifowose et al. (2017) investigates the relationship between currency order flow and exchange rate movements between Thailand/ US dollar. They draw attention towards the unique characteristic of microstructure factors that even when same information is sent out to all market participants it is perceived and interpreted differently by every participant. Buying and selling orders of a currency will pass some information in the market and hence will fluctuate its price. However, microeconomic variables define currency returns in short run only. Causality test finds that currency order flow granger causes exchange rate fluctuations in the short term. Furthermore, it is discovered that there exists a negative relationship between country risk premium and exchange rate fluctuations. In comparison to the currency order flow and country risk premium, short run and long run interest rates are very less effective in causing exchange rate fluctuations.

In total, it can be summarized that microeconomic factors are as important as macroeconomic factors in deciding exchange rates. They are highly responsible for movements and fluctuations in exchange rate.

## CONCLUSION

On the basis of the studies reviewed in the previous section, it can be concluded that there is no one perfect model which can determine exchange rate precisely and accurately. Every model has its own fundamentals and characteristics.

Countries use different models for forecasting exchange rates based on the reliability and accuracy of the model. In monetary model, exchange rate is indirectly influenced by the factors which affect demand for and supply of a currency. Numerous macroeconomic variables have been identified which affect exchange rate in the long run. Inflation, interest rates, money supply, current account balance, equity and bond prices, foreign direct investment, oil prices and credit default swap premium, macro news announcements play a significant role in influencing exchange rate. It has been observed that macroeconomic variables are unable to explain exchange rate movements in short run rather short run exchange rate movements are well explained by microstructure variables such as currency order flow. The direction of impact is different on exchange rates involving different currencies. Every country is unique in terms of market environment and macro-economic conditions. If in one country, increase in FDI appreciates currency, then in some country it might be possible that increase in FDI depreciates currency. Hence, impact of these factors varies from country to country.

## POLICY RECOMMENDATION

This study is important for policy makers of a country. Fiscal and monetary policy play a crucial role in influencing exchange rates so policy makers should track the movements of identified variables on continuous basis and take their decisions accordingly in order to maintain stability in exchange rate. The factors determined in this study can help them in deciding best hedging policies because excess fluctuations in exchange rate can hamper trade and investment flow in a country. The study is helpful for researchers as well as it highlights various important areas in which research is possible and not undertaken in detail before.

## Scope for future research

The study has helped in identifying various other factors which might influence exchange rate but due to non-availability of data they are kept out of analysis. Factors like banking capital including NRI deposits, foreign exchange reserves, interbank rates, public debt, foreign institutional investors (FIIs), ADR/GDRs, gold reserves, commercial borrowings, short term credit and external assistance might influence exchange rate. Other than currency order flow, there are various microstructure factors like inventory management and information aggregation by foreign exchange dealers which are unexplored. These factors are yet to be studied in context of exchange rate. Furthermore, comparative analysis of the impact of given factors on the two different countries or their impact on one country's exchange rate over the years can be conducted. There are other non-economic variables like political risks, natural disasters, psychological factors, terrorism which might affect the value of a country's currency. They are kept outside the purview of analysis.

## REFERENCES

1. AbuDalu, A. & Musa Ahmed, E. (2014), "The determinants of ASEAN-5 real effective exchange rate vis-à-vis the UK pound," *World Journal of Entrepreneurship, Management and Sustainable Development*, 10(2), p.p: 98-118
2. Anifowose, A., Ismail, I. & Abd Sukor, M. (2017), "Dynamics of exchange rate determination and currency order flow in the Thailand foreign exchange market," *Journal of Chinese Economic and Foreign Trade Studies*, 10(2), p.p: 143-161

3. Apergis, N. (1998), "Budget deficits and exchange rates: further evidence from cointegration and causality tests," *Journal of Economic Studies*, 25(3), p.p: 161-178
4. Bilson, J. F. O. (1978), "The Monetary Approach to the Exchange Rate: Some Empirical Evidence (La theorie monetaire du taux de change: preuves empiriques) (El enfoque monetario del tipo de cambio: Algunas pruebas empiricas)," *Staff Papers - International Monetary Fund*, 25(1), 48. doi:10.2307/3866655
5. Bouraoui, T., & Phisuthiwatcharavong, A. (2015), "On the determinants of the THB/USD exchange rate," *Procedia Economics and Finance*, 30, p.p: 137-145 Retrieved from <https://www.sciencedirect.com/science/article/pii/S2212567115012770>
6. Caporale, G. M., Ali, F. M., Spagnolo, F., & Spagnolo, N. (2017), "International portfolio flows and exchange rate volatility in emerging Asian markets," *Journal of International Money and Finance*, 76, p.p: 1-15 Retrieved from <https://www.sciencedirect.com/science/article/pii/S0261560617300529>
7. Chaudhary, G. M., Hashmi, S. H., & Khan, M. A. (2016), "Exchange rate and foreign trade: A comparative study of major south Asian and south-east Asian countries," *Procedia-Social and Behavioral Sciences*, 230, p.p: 85-93 Retrieved from <http://www.sciencedirect.com/science/article/pii/S1877042816311120>
8. Dooley, M. P., & Isard, P. (1983), "The Portfolio-Balance Model of Exchange Rates and Some Structural Estimates of the Risk Premium (Modele d'equilibre de portefeuilles applique aux taux de change et certaines estimations (structurelles) de la prime de risque) (El modelo de equilibrio de cartera para los tipos de cambio y algunas estimaciones estructurales de la prima de riesgo)," *Staff Papers - International Monetary Fund*, 30(4), p.p: 683-702 doi:10.2307/3866782
9. Doukas, J. & Lifland, S. (1994), "Exchange rates and the role of the trade balance account," *Managerial Finance*, 20(5), p.p: 67-78
10. French, J. & Vishwakarma, V. (2013), "Volatility and foreign equity flows: evidence from the Philippines," *Studies in Economics and Finance*, 30(1), p.p: 4-21
11. Gros, D. (1989), "On the volatility of exchange rates: Tests of monetary and portfolio balance models of exchange rate determination," *Weltwirtschaftliches Archiv*, 125(2), p.p: 273-295
12. HUH, H.-S. (1999), "How well does the Mundell-Fleming model fit Australian data since the collapse of Bretton Woods?" *Applied Economics*, 31(3), p.p: 397-407 doi:10.1080/000368499324372
13. Kar, M., Bayat, T. & Kayhan, S. (2016), "Impacts of credit default swaps on volatility of the exchange rate in Turkey: The case of Euro," *International Journal of Financial Studies*, 4(3), p.p: 14 Retrieved from <http://www.mdpi.com/2227-7072/4/3/14>
14. Kikumoto, Y. & Tcha, M. (1996), "The range and determinants of the real exchange rates," *Journal of Economic Integration*, 11(4), p.p: 539-15
15. Krueger, A.O. (1983), "Exchange-Rate Determination," New York: Cambridge University Press, New York, U.S.A
16. Lee Lee, C. & Hui Boon, T. (2007), "Macroeconomic factors of exchange rate volatility," *Studies in Economics and Finance*, 24(4), p.p: 266-285
17. Meese, R. & Singleton, K. (1983), "Rational expectations and the volatility of floating exchange rates," *International Economic Review*, 24(3), p.p: 721-73
18. Nagayasu, J. (2015), "Global and country-specific factors in real effective exchange rates" Retrieved from [https://mpra.ub.uni-muenchen.de/64217/1/MPra\\_paper\\_64217.pdf](https://mpra.ub.uni-muenchen.de/64217/1/MPra_paper_64217.pdf)
19. Noman, A., Humayun Kabir, S. & Bashar, O. (2012), "Causality between stock and foreign exchange markets in Bangladesh," *Studies in Economics and Finance*, 29(3), p.p: 174-186
20. Ogundipe, O. M., Ojeaga, P., & Ogundipe, A. A. (2012), "Oil price and exchange rate volatility in Nigeria," *Journal of Economic and Finance*, 5(4), p.p: 01-09
21. Puci, J. & Mansaku, S. (2016), "An Empirical Evidence of the International Fisher Effect on the USD to CNY Exchange Rate," *Academic Journal of Interdisciplinary Studies*, 5(1), p.p: 249-256 doi:10.5901/ajis.2016.v5n1p249
22. Rajhans, R. K. (2013), "Integration of foreign exchange markets: A short term dynamics analysis," *Global Journal of Management and Business studies*, 3(4), p.p:383-388
23. Rogalski, R. & Vinso, J. (1977), "Price level variations as predictors of flexible exchange rates" *Journal of International Business Studies*, 8(1), p.p: 71-82
24. Rubaszek, M. (2004), "A Model of Balance of Payments Equilibrium Exchange Rate," *Eastern European Economics*, 42(3), p.p: 5-22 doi:10.1080/00128775.2004.11041077
25. Sharma, C. & Setia, R. (2015), "Macroeconomic fundamentals and dynamics of the Indian rupee-dollar exchange rate," *Journal of Financial Economic Policy*, 7(4), p.p: 301-326
26. Shastri, S. & Shastri, S. (2016), "Exchange rate interest rate linkages in India: an empirical investigation," *Journal of Financial Economic Policy*, 8(4), p.p: 443-457
27. Singh, S., & Tripathi, L. K. (2015), "Impact of derivative trading on currency market volatility in India," *Global Journal of Multidisciplinary studies*, 4(2), p.p: 226-238
28. Singh, S., & Tripathi, L. K. (2016), "A critical evaluation of volatility in Indian currency market," *Research Journal of Finance and Accounting*, 7(9), p.p: 26-34.
29. Stockman, A. C. (1988), "Real exchange-rate variability under pegged and floating nominal exchange-rate systems: An equilibrium theory," *Carnegie-Rochester Conference Series on Public Policy*, 29, p.p: 259-294 doi:10.1016/0167-2231(88)90016-4
30. Throop, A.W. (1993), "A generalized uncovered interest parity model of exchange rates" *Economic Review- Federal Reserve Bank of San Francisco*, 2(3).
31. Türsoy, T. (2017), "Causality between stock prices and exchange rates in Turkey: Empirical evidence from the ARDL bounds test and a combined co integration Approach," *International Journal of Financial Studies*, 5(1),p.p: 8 Retrieved from <http://www.mdpi.com/2227-7072/5/1/8>
32. Zhang, G., Marsh, I. & MacDonald, R. (2016), "A hybrid approach to exchange rates," *Studies in Economics and Finance*, 33(1), p.p: 50-68