

# Exchange Rate Disconnect Puzzle: A Review of Literature

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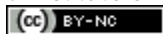
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**ABSTRACT**

*The exchange rate disconnect puzzle has been haunting economists for over four decades now. That the volatility in the movement of both real and nominal exchange rates has no linkage with macroeconomic fundamentals is a mystery. This paper selectively reviews the literature on attempts to resolve this puzzle.*

**Keywords:** Macroeconomics, exchange rate, finance

**1. Introduction**

Forecasting exchange rate movements continues to be a challenging task for financial economists. Literature on this topic over the last four decades or so has delineated three puzzles pertaining to exchange rate movements. The first puzzle is the forward bias puzzle. The fact forward markets are not only inaccurate indicators on exchange rate movements, but surprisingly they indicate a wrong direction of movement. Thus higher the premium on foreign currency in forward market, less chances that the home currency will depreciate.

The second puzzle is the Purchasing Power Parity (PPP) Puzzle. In a non-autarky environment, the PPP hypothesis says that in the long run national price levels should be equal when expressed in common currency terms. Real exchange rate can be expressed in logarithmic terms  $q_t$  as,

$$q_t = s_t - p_t + p_t^* \tag{1}$$

where  $s_t$  is the nominal exchange rate and  $p_t$  and  $p_t^*$  are domestic and foreign price levels respectively (all variables in logarithmic terms). Expressed in this form, the  $q_t$  may be interpreted as a deviation from PPP [10]. If the PPP hypothesis has to hold, then the real exchange rate should have a tendency to revert back to a stable equilibrium. This is not supported by empirical data and thus continues to remain a puzzle for economists.

The present paper proposes to concentrate on the third puzzle which in some sense encompasses the above two puzzles. This is the exchange rate disconnect puzzle. Put in simple terms it states that the exchange rate of currencies, both, real and nominal, seem to behave independently of all major macroeconomic variables. Both in terms of volatility in the movements as well as the actual value of the exchange rates are difficult to explain using any fundamental macroeconomic variables. Not only that, there seems to be little evidence of a causality in the other direction i.e. movements in currency do not seem to significantly impact any macroeconomic fundamentals.

The present paper proposes to review select papers in the literature on the exchange rate disconnect puzzle.

**2. Review of Literature**

**2.1 Empirical basis**

One of the seminal papers to point out the inefficiency of our exchange rate determination models was by Meese and Rogoff [7]. They examined out-of-sample performance of the then prevailing exchange rate estimation models. They checked three models - (1) Frenkel-Bilson Flexible monetary model (2) Dornbusch-Frankel sticky price monetary model and (3) Hooper- Morton sticky price asset model. They estimated the quasi-reduced form of all three models under a general for -

$$s = \alpha_0 + \alpha_1(m - m^*) + \alpha_2(y - y^*) + \alpha_3(r_s - r_s^*) + \alpha_4(\pi_e - \pi_e^*) + \alpha_5(TB - TB^*) + u \tag{2}$$

where  $s$  is the logarithm of dollar price of foreign currency,  $m - m^*$  the logarithm of the ratio of US money supply to foreign money supply,  $y - y^*$  is logarithm of ratio of US to foreign real income,  $r_s - r_s^*$  is the short term interest rate differential and  $\pi_e - \pi_e^*$  is the expected long run interest rate differential.  $TB - TB^*$  represent the cumulated US and foreign trade balances respectively. Estimating this model for performance of US dollar exchange rates between March 1973 and June 1981 against British Pound, Japanese Yen and the German Deutschmark, they found that the simple Random walk (without drift) performed as well in predicting the movement in the exchange rates as the model. In addition to these structural models the paper also tries estimates exchange rate using a host of other univariate and multivariate time series. The poor performance of these models persist even after accounting for several known flaws in statistical techniques such as simultaneous equation bias, sampling errors, etc. The paper considers several issues related to misspecification or omitted variable bias. It discusses some possible candidates for omitted variables and misspecification such as uncovered interest rates, inflation expectations, goods market specification and money demand specification. While the paper does not test for these variables, its *prima facie* analysis is that it the performance is unlikely to improve after correcting for these issues.

Theories on international transmission of real and monetary shock assign a critical role to exchange rates in the transmission process. It then follows that macroeconomic aggregates should show a systematic relationship with any change in the exchange rate regimes. In 1971- 73 a major chunk of countries in the world shifted from

the Bretton Woods system of fixed exchange rates to a more flexible system. Baxter and Stockman [2] investigate the impact of this change in exchange rate regime on macroeconomic variables for 49 countries (23 OECD and 21 Non-OECD countries). They study impact on fluctuations in aggregate variables such as output, consumption, government consumption and trade volatility. However, the paper finds that these variables do not show any systematic dependence on exchange rate system. The paper also considers the possibility that during the period 1971-73 countries had to face a series of exogenous global shocks and hence it may not be possible to separate out the impact of a change in exchange rate regimes. It, therefore, investigates few more episodes of change in exchange rate regimes - (1) Abandonment of the peg between Irish Pound and the British Pound in 1979 and (2) Canadian Float against the US Dollar in 1950s and 1970s. However, these results reconfirm the earlier conclusions. The paper also notes the following puzzles from data post 1971-73 - (a) Correlation of output fluctuations between countries generally decreased (b) Correlation between national consumption and national output generally increased (c) Correlation between government-purchases between countries increased.

A policy implication from this debate is whether governments should actively interfere in stabilizing exchange rates. If the volatility in exchange rates neither result from nor has impact on fundamental macroeconomic variables, then there is no case for either of the policy option. Then the only rational would be that a fixed or less volatile exchange rate promotes stable business climate and is thus generally good for all. However, if the basis for exchange rate volatility is indeed some underlying volatility in some macroeconomic variable, then exchange rate management would lead to a scenario where the volatility in the system would manifest itself in some other form. It was, therefore advocated that a flexible exchange rate would help in a clear and manageable manifestation of that volatility. Flood and Rose [6] argue that the volatility vanishes in case the exchange rate is managed. The paper finds no correlation between volatility in exchange rates and volatility in other macroeconomic variables such as interest rates, relative prices, money, reserves and stock returns. The paper thus makes a case for practising an exchange rate management policy without being concerned about the suppressed volatility in exchange rates manifesting itself in any other form. According to the paper, volatility either vanishes or one needs to look at micro-foundations to provide a credible explanation of volatility.

## **2.2 New Keynesian Framework**

Obstfeld and Rogoff [9] tried to model exchange rate determination in the New Keynesian framework. They build their model on three foundations - (1) inter-temporal optimizing decisions of individual agents (2) Monopolistic competition in the goods market and (3) sticky prices. [11] Having tried to explain the volatility in the exchange rates from micro-foundations, they concluded that there is a disconnect between the exchange rate movement and the rest of the economy. However, they felt that price rigidities along-with trade costs have the potential to explain the apparent disconnect between the exchange rates and the real economy [8].

### **2.2.1 Exchange Rate Pass Through**

Subsequent researchers have made extensive use of the framework provided by Obstfeld and Rogoff and have tried to incorporate various factors within the New Keynesian to better explain the disconnect. Devereux and Engels [4] and Chari, Kehoe and McGrattan [3] try to explain the disconnect on the basis of nominal rigidities. In particular, Devereux and Engel [4] tried to explain the volatility in terms of the pass-through. This paper explores the possibility that exchange rate volatility may be disconnected from the real economy on account of the fact that pricing in local currency eliminates, or at least reduces, the possibility of changes in exchange rates to pass-through to consumer prices, thereby shielding the real economy from exchange rate volatility. The authors construct a model wherein it is possible to explain the volatility in exchange rates and the disconnect under three prerequisites.

Firstly, as mentioned above, pricing in local currency may prevent exchange rate changes from passing through to domestic consumer prices.

Secondly, the structure adopted to sell goods in the international commodity markets has an impact. According to their model a producer may choose to sell in foreign market either directly or through a distributor. Thus forms in a given economy are divided between producers (who have export earnings) and distributors (who import goods from foreign producers to sell in domestic market in local currency). It is assumed that a producer selling the good directly to the foreign consumer completely passes on any exchange rate change to the consumer. On the other hand a distributor absorbs the exchange rate risk. In this setting, a depreciation of home country currency is likely to have two impacts. It has positive wealth effect on producers' profits while at the same time has negative wealth effect on distributors. In case the two wealth effects are equal the underlying economy remains unaffected by a currency depreciation. There is no expenditure switching as prices are set in

consumers' currencies. This according to the authors explains the disconnect between exchange rate volatility and the underlying economy.

While this may be true in a static setting, this does not explain the disconnect in a dynamic setting. An exchange rate depreciation, in a dynamic world, lead to a reduction in the real interest rate differential between countries. This would alter the households' consumption path in favour of current consumption relative to future consumption. This would have a dampening effect on the volatility of exchange rates. The real interest rate linkage relies on the working or the Uncovered Interest Rate Parity (UIRP) hypothesis, wherein exchange rates movements are expected to cover the interest rate differential between the two countries. However, there is ample empirical evidence to suggest that future exchange rate movements show substantial deviations from the UIRP model. One of the major reasons for this deviations is the "noise- traders" (foreign exchange dealers who exhibit bias in their forecast of future exchange rates conditional on the volatility of the exchange rate itself). Presence of noise-traders prevent the impact of a depreciation being transmitted through the real interest rate channel, thereby creating a further disconnect between exchange rate volatility and the real economy.

### **2.2.2 Home Bias**

Wang [12] explain the exchange rate disconnect using the home bias in consumption and try to arrive at an optimal exchange rate policy. According to this paper, a higher proportion of domestically produced goods in the consumption basket would reduce the impact of an exchange rate change on macroeconomic variable. While considering the policy implications, therefore, the paper suggests that in case of a home bias in consumption it would be better to adopt a policy of least interference in exchange rates. This is because while exchange rates are disconnected from the real economy, a policy response to tackle exchange rate fluctuations, such as a change in interest rates, may have a real impact. Under their home bias model, if the central bank puts a weight on interest rate stabilization of 0.1% or less, a shock to UIRP leads to a 25% standard deviation in GDP but leads to a 12 times increase in volatility of exchange rates.

### **2.2.3 Exchange Rate as Asset Prices**

In an interesting comment to the seminal paper by Obstfeld and Rogoff [8] Olivier Jeanne has made some interesting comments on the exchange rate disconnect puzzle. Jeanne asks if one views exchange rates "primarily as asset prices" or "primarily as determinants of relative prices in goods market". Jeanne goes on to show using the New Keynesian framework that if trade costs are low, exchange rates have a direct impact on the goods prices and thus exchange rate is primarily determined in the goods market. On the other hand in case of high trade costs, exchange rates determination is primarily an asset market phenomenon and thus has no direct connection with domestic output or price level. Further, high trade costs increase exchange rate volatility if the inter-temporal substitutability of consumption is low, "as this would make the interest rate - and hence the exchange rate when it is determined as an asset price - more volatile." An infinitely high trade cost is thus likely to cause a complete indeterminacy of nominal exchange rate, thus increasing the volatility. Once viewed as primarily as an asset price, the factors determining the exchange rate would be radically different, with more prominent role to information asymmetry and expectation formations.

### **2.3 Market Micro-Structures**

Another strand of literature that seeks to explain the disconnect relies on market micro- structure. According to Evans and Lyons [5] order flows are a better predictors of exchange rate movements compared to any other macroeconomic variables. According to this line of thought the order flow aggregates disperse and diverse information that currency markets need. As such factors such as heterogeneity of agents and information flow become critical [1]. This does not imply that the order flow are drivers of exchange rates. It may well be that macroeconomic fundamentals continue to play a role in determining exchange rates. However, when it comes to factoring in expectations formed on the basis of these fundamentals is concerned, an immediate proxy such as order flows performs better role. [10]

### **3. Conclusion**

As seen above, attempts to solve the exchange rate disconnect puzzle have been made by economists subscribing to various schools of thought. From structural equation modelling to DSGE models and finally a market micro-structure based explanation have been tried. Several modifications have been tried within the DSGE approach to establish the disconnect between the exchange rate and macroeconomic fundamentals, more important of them being incorporation of sticky prices, home bias, habit persistence, incomplete pass-throughs,

trade costs, etc. While they do explain the disconnect to some extent, some of them remain to be empirically validated. The market micro-structure models may be better predictors of exchange rate movements. However, they lack explanatory power in terms of connecting the exchange rate movements to other macroeconomic fundamentals and hence may have limited use in policy formation.

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