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Abstract

Meese and Rogoff (1983) and subsequent studies find that economic fundamentals are apparently not able to explain exchange rate movements, but we argue that this so-called "Exchange Rate Disconnect Puzzle" arose because researchers such as Meese and Rogoff (1983) did not use the right fundamentals and because they did not allow for the forward-looking nature of exchange rate determination. Further, because they apparently were not aware that financial markets by themselves could not equalise interest rates across countries, they did not properly appreciate that the exchange rate is strongly influenced by agents' expectations of aggregated differences in local returns. Thus, we believe that the same underlying explanation provided by Ford (2015) and Ford and Horioka (2016a and 2016b) for the Feldstein-Horioka (1980) Puzzle and the PPP Puzzle--namely that financial markets alone cannot achieve net transfers of financial capital and cannot equalise real interest rates across countries--also helps explain why previous attempts to connect changes in the exchange rate to economic fundamentals have not been successful, and so can also be said to contribute to solving the Exchange Rate Disconnect Puzzle.

JEL classification codes: F21, F31, F32, F36, G15

Key words: Exchange Rate Disconnect Puzzle, exchange rate determination, exchange rate volatility, Feldstein-Horioka puzzle or paradox, financial market integration, goods market integration, international capital flows, international capital mobility, net transfers of capital, PPP puzzle, purchasing power parity puzzle, real interest rate equalisation, real interest rate parity

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1. Introduction

In the early 1970s, the Bretton Woods fixed exchange rate system broke down. Most major currencies were allowed to freely float, and exchange controls were lifted in many countries. As banks and other institutions began trading foreign assets, the volume of foreign exchange transactions for the purchase of such assets increased many fold, far exceeding that for the purposes of trade. The volatility of nominal and real exchange rates increased significantly, and some countries developed either persistent trade deficits or trade surpluses.

Researchers were pushed to the conclusion that, in the new circumstances involving floating exchange rates and agents being free to purchase foreign assets, the exchange rate was determined by agents' relative valuations of domestic and foreign assets, rather than being determined by the terms of trade and comparative advantage. Various 'asset market macro-models' were put forward to try to capture these effects, such as those of Dornbusch (1976) and Branson (1980).

At their time of publication, there was optimism that such models could explain actual exchange rate movements and exchange rate volatility. However, econometric testing could not connect changes in the explanatory variables of these models (such as stocks of money and differences in short-term interest rates) to actual exchange rate movements (see, for example, Meese and Rogoff, 1983). This lack of apparent connection of the exchange rate to 'economic fundamentals' was labelled by some the 'Exchange Rate Disconnect Puzzle' and was included by Obstfeld and Rogoff (2000) in their 'Six Major Puzzles in Macroeconomics' (see, amongst others, Flood and Rose, 1995 and 1999, and MacDonald, 1999). Although some progress has been made in understanding some aspects of exchange rate movements, this Exchange Rate Disconnect Puzzle cannot be said to have been fully resolved.

Ford (2015) and Ford and Horioka (2016a and 2016b) put forward what they believe to be the solutions to two of Obstfeld and Rogoff's (2000) "Six Major Puzzles"--the Feldstein-Horioka (1980) Puzzle and the Purchasing Power Parity (PPP) Puzzle--using a number of hypothetical scenarios to help clarify both the separate and combined effects of international goods markets and international financial markets. In this paper, it is suggested that a similar approach might help resolve the Exchange Rate Disconnect Puzzle.

2. Four Scenarios

Taylor and Taylor (2004) suggest that Rogoff's 'PPP Puzzle' can usefully be regarded as two puzzles. One concerns why 'equilibrium' exchange rates should deviate from PPP, and the second concerns why actual real exchange rates also appear to deviate from these 'equilibrium' rates but eventually revert back to them. We attempt to build on this thinking by considering different markets' effects on the exchange rate.

We consider 4 hypothetical scenarios in which there are only 2 countries in the world, Japan and the U.S. We assume that the return on real capital and the risk-free interest rate are initially higher in the U.S. than in Japan. In Scenarios 2, 3 and 4, the exchange rate is allowed to freely float.

Scenario 1. In the first scenario, both international goods markets and asset markets are closed, and the two countries are in an autarky condition. There is no market for foreign exchange so the exchange rate is indeterminate, and there are no forces causing interest rates in the two countries to converge. Needless to say, if we ran Meese and Rogoff (1983)-type regressions, none of the explanatory variables would be significant as the exchange rate is indeterminate.

Scenario 2. In the second scenario, the purchase of foreign goods and services is permitted, but the acquisition of foreign assets is prohibited. Under these circumstances, trade must be balanced. Let us suppose that both countries are able to produce manufactured goods, services, and natural resource-type commodities such as oil, coal and metal ores, but that the US has a very significant comparative advantage in producing natural resource-type commodities. We would expect that the result of trade would be for Japan to be a net exporter of manufactured goods and to be a net importer of natural resource-type commodities. However, there can be no net transfer of capital between the two countries, and thus no reason for interest rates in the two countries to converge.

The exchange rate would not necessarily be PPP for reasons that have been extensively researched. We suggest that the currently accepted explanations for divergence from PPP in this scenario might conveniently be grouped into two categories:

Firstly, if the Law of One Price held at all times for traded goods, the Balassa-Samuelson effect (concerning relative productivities in tradeables and non-tradeables) might result in the exchange rate deviating from PPP.

Secondly, the exchange rate may deviate from PPP because the Law of One Price does not necessarily hold (see, for example, Podkaminer (2013) and Taylor and Taylor (2004) for a survey of the relevant literature). Obstfeld and Rogoff (2000) suggest that many of these explanations might ultimately be summarised as 'trade costs' or 'frictions' (which include, for example, the costs of transport, marketing and distribution costs, technical standards, certification procedures, tariffs, and non-tariff barriers) (see also Lee and Shin, 2010). They argue that the division of goods into 'tradeables' and 'non-tradeables' is in certain circumstances unhelpful and that it is better to consider that there is a continuum of different goods that have progressively higher trade costs. Such an interpretation implies, in this scenario, that the exchange rate must deviate from PPP until it renders a sufficient quantity of Japanese manufactured goods cheap enough when exported to compensate for the costs of transporting them to, and selling them in, US markets, and so provide the quantity of foreign exchange required to import natural resource-type commodities. If the price of such commodities relative to manufactured goods changes, then Japan would have to export a different quantity of manufactured goods to pay for its imported commodities, and we would expect the real exchange rate to change to ensure that trade remained balanced.

Let us refer to the hypothetical exchange rate in this scenario as the 'balanced current account exchange rate' (BCAER). We suggest that the deviation of the BCAER from PPP in this scenario is loosely equivalent to Taylor and Taylor's (2004) 'first PPP Puzzle.' This BCAER clearly must be related to 'fundamentals,' these being commodity prices, 'transport costs' and relative productivities. As these change, the BCAER will change. If we ran Meese and Rogoff (1983)-type regressions on this

exchange rate in these hypothetical circumstances, it would register no correlation with their 'fundamentals' because the explanatory variables in that regression calculation (such as stocks of money, short-term interest rates, etc.) are obviously not significant determinants of the exchange rate in this scenario.

Scenario 3. In this scenario, the purchase of foreign goods and services is not allowed, but the purchase of foreign financial assets is allowed for just 5 years, at the end of which foreign assets must be sold back to the authorities at an exchange rate known to agents in advance and estimated by the authorities to be PPP. As discussed in Ford (2015) and Ford and Horioka (2016a and 2016b), in such circumstances, purely financial transactions in international markets cannot result in a net transfer of capital (real or financial) between the countries. This is because a transfer of financial capital between countries by any party is cancelled out by the transfer of financial capital in the reverse direction by the counter party to the transaction. Further, such transactions cannot result in any change in the return on real assets. Let us suppose there is no foreign country risk premium. Agents in Japan would prefer to own higher yielding US assets than Japanese assets, and so will bid up the value of the US dollar above PPP by an amount influenced by their expectations of the *aggregated yield difference on assets* over the remainder of the period. Further, if we suppose that both the returns on risky and risk-free assets may change over the 5-year period in both countries, we would expect the current exchange rate to also change when expectations of aggregated future returns on assets change. We suggest that the resultant deviations from PPP in this scenario correspond loosely to the explanation of Taylor and Taylor's (2004) second PPP puzzle.

In this scenario, if we ran regressions similar to Meese and Rogoff (1983) but in real terms, we might again expect to find little correlation with variables such as output and money stocks as these do not much affect aggregated real yield differences, but we might expect to find a correlation with short-term real interest rates. However, even this is not clear cut. Because agents are forward-looking, it is changes in expectations of aggregated future interest rate differentials, not actual changes in current interest rate differentials, that should be correlated with exchange rate movements. However, if how far in advance agents anticipate changes in short-term rates varies from episode to episode, this may well confound conventional econometrics and deny a connection between exchange rates and interest rates even though one actually exists. Obstfeld and Rogoff (2000) suggest that the apparent disconnect between the exchange rate and economic fundamentals may be analogous to the apparent lack of connection between stock prices and fundamentals. We concur with this in that stock prices are affected by expectations of aggregated future company earnings, and changes in such expectations affect stock prices. If how far in advance agents anticipate changes in company earnings varies from episode to episode, it may appear superficially that stock price movements are not closely connected to earnings.

Scenario 4. In this scenario, both the purchase of foreign goods and services and foreign assets are allowed without limit. Now we would expect the exchange rate to be influenced simultaneously by the factors present in Scenarios 2 and 3. However, the situation is even more complicated. When agents bid up the value of the dollar above the BCAER, the US will incur a current account deficit and Japan a surplus. This imbalance represents a net transfer of real and financial capital from Japan to the US, which has consequences. As discussed in Ford (2015) and Ford and Horioka (2016a and 2016b),

over the long term, this trade deficit will affect stocks of real capital and tend to cause real interest rates to converge. Further, the earnings of the accumulation of Japanese owned assets situated in the US will affect the long-run current account. Moreover, the effect on capital stocks is not the only mechanism by which a trade imbalance can affect local interest rates. Rapid changes in net trade positions will also have a transitory impact on aggregate demand, which in turn may have a transitory effect on local short-term interest rates.

For example, suppose markets receive news of improved prospects for economic growth in the US. This increases the prospects for future interest rate rises, and so changes agents' expectations of aggregated future yield differences. This in turn causes forward-looking agents to bid up the value of the dollar. However, this rise in the dollar has a contractionary effect on the US economy which itself may push back the timing of the interest rate rise. As a consequence, conventional econometrics à la Meese and Rogoff (1983) may have even more difficulty in correlating exchange rate movements with actual interest rate movements in Scenario 4 than in Scenario 3.

3. Summary and Conclusion

Meese and Rogoff (1983) and subsequent studies find that the economic fundamentals they consider (such as output, stocks of money, stocks of bonds, and differences in short-term interest rates) cannot explain actual exchange rate movements. However, we show using our four scenarios approach that economic fundamentals do explain deviations of the BCAER from PPP but that the relevant fundamentals are the terms of trade (exemplified by commodity prices), transport costs, and the Balassa-Samuelson effect, not the ones considered by Meese and Rogoff (1983). It is these fundamentals as well as the accumulation of foreign-owned assets that drive the underlying BCAER, and it is changes in expectations of aggregated future differences in the returns on real and financial assets (driven by news or fresh analysis) that drive deviations of the actual exchange rate from this BCAER. We maintain that the exchange rate appears to be disconnected from economic fundamentals to researchers such as Meese and Rogoff (1983) because they did not use the right fundamentals and because they did not allow for the forward-looking nature of exchange rate determination. Further, because they were apparently not aware that financial markets by themselves could not equalise real interest rates across countries, they did not properly appreciate that the exchange rate is strongly influenced by agents' expectations of aggregated differences in local real returns; this also applies to Obstfeld and Rogoff (2000).

Thus, we believe that the same underlying explanation provided by Ford (2015) and Ford and Horioka (2016a and 2016b) for the Feldstein-Horioka (1980) Puzzle and the PPP Puzzle--namely that financial markets alone cannot achieve net transfers of financial capital and cannot equalise real interest rates across countries--also helps explain why previous attempts to connect changes in the exchange rate to economic fundamentals have not been successful, and so can also be said to contribute to solving the Exchange Rate Disconnect Puzzle.

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