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THE 'REAL' EXPLANATION
OF THE PPP PUZZLE

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Abstract

This article shows that global financial markets cannot, by themselves, achieve net transfers of financial capital and real interest rate equalisation across countries and that the integration of both global financial markets and global goods markets is needed to achieve net transfers of capital and real interest rate equalisation across countries. Thus, frictions (barriers to mobility) in one or both of these markets can impede the net transfer of capital between countries, produce the Feldstein and Horioka (1980) finding of high saving-investment correlations, and prevent real interest rates from being equalised across countries. Moreover, frictions in global goods markets can explain why real exchange rates deviate from PPP (purchasing power parity) for extended periods of time and can therefore also explain the PPP puzzle. Thus, we are able to resolve 2 of Obstfeld and Rogoff's (2000) "6 major puzzles in macroeconomics" with essentially the same explanation.

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1. Introduction

In much of the academic literature on international economics, it is assumed that global financial markets can, by themselves, divert "financial capital" between countries and the tendency for saving to remain in the country of origin is cited as evidence of frictions (barriers to mobility) in global financial markets. However, Ford and Horioka (2016) show that global capital markets cannot, by themselves, achieve net transfers of financial capital between countries and that the integration of both global financial markets and global goods markets is needed to achieve net transfers of financial capital between countries. They further argue that frictions (barriers to mobility) in one or both of these markets can impede net transfers of financial capital between countries and produce the Feldstein and Horioka (1980) results (viz., high cross-country correlations between domestic saving and domestic investment) (see Apergis and Tsoumas, 2009, for a useful survey of this literature). Moreover, they cite evidence from Eaton, Kortum, and Nieman (2015) that barriers to the mobility of goods and services (e.g., transport, marketing, and distribution costs, technical standards, certification procedures, tariffs and non-tariff trade barriers, etc.) are an important obstacle to international capital mobility.

In our opinion, Ford and Horioka (2016) effectively resolve the so-called Feldstein-Horioka paradox or puzzle by showing that high saving-investment correlations can arise not only if there are frictions in global financial markets but also if there are frictions in global goods markets, which makes it far more likely for high saving-investment correlations to arise.

Many studies (such as Mishkin, 1984, and Chung and Crowder, 2004) have found that real interest rates are not equalised across countries. In this companion piece to Ford and Horioka (2016), we argue that because financial markets cannot, by themselves, achieve net transfers of financial capital between countries, the integration of both global financial markets and global goods markets is also needed to achieve real interest rate parity across countries. Indeed, the same frictions in global goods markets that inhibit the net transfers of financial capital between countries also inhibit real interest rates from being rapidly equalised. We therefore argue that expected returns are equalised across countries not via adjustments in real interest rates but via adjustments in real exchange rates, thereby causing them to deviate from PPP (purchasing power parity). It follows that by preventing real interest rate equalisation, frictions in global goods markets can explain the PPP puzzle pointed out by Rogoff (1996), MacDonald (1999), and Obstfeld and Rogoff (2000)—this being that real exchange rates are volatile and deviate from PPP for extended periods of time.

Obstfeld and Rogoff (2000) suggest that barriers to the mobility of good and services may be behind the PPP puzzle but fail to acknowledge that global financial markets cannot, by themselves, achieve net transfers of capital (real or financial) between countries and so cannot equalise real interest rates across countries. By contrast, Niehans (1986) is the first economist to have made the point that global financial markets cannot by themselves achieve net transfers of capital between countries, but he does not acknowledge that it is primarily frictions in the transfer of goods between countries that inhibit the transfer of real and financial capital between countries. To the best of our knowledge, Ford and Horioka (2016) is the first article to synthesize the views of Niehans (1986) and Obstfeld and Rogoff (2000) to explain the Feldstein-Horioka puzzle or paradox. In this article, we show how this synthesis also explains the PPP puzzle.

To summarize our main findings, this article shows that global financial markets cannot, by themselves, achieve net transfers of financial capital and real interest rate equalisation across countries and that the integration of both global financial markets and global goods markets is needed to achieve net transfers of capital and real interest rate equalisation across countries. Thus, frictions (barriers to mobility) in one or both of these markets can impede the net transfer of capital between countries, produce the Feldstein and Horioka (1980) finding of high saving-investment correlations, and prevent real interest rates from being equalised across countries. Moreover, frictions in global goods markets can explain why real exchange rates deviate from PPP for extended periods of time and can therefore also explain the PPP puzzle. Thus, we are able to resolve 2 of Obstfeld and Rogoff's (2000) "6 major puzzles in macroeconomics" with essentially the same explanation.

2. An Anecdotal Example

A more rigorous formulation of the line of argumentation presented in this article can be found in Ford (2015), but a simple anecdotal example will suffice to illustrate our points.

We will consider 4 scenarios, and in all of these scenarios, there are just 2 countries in the world--the US and Japan. We assume that the marginal productivity of real capital (MPK) is initially 10% in the US and 6% in Japan (i.e., that US firms earn higher returns on capital than firms in Japan), that there are no risk premiums, meaning that the real interest rate on loans of money is the same as the marginal productivity of capital in both countries, and that agents have perfect foresight.

Scenario 1: Let us assume, in Scenario 1, that both the purchase of foreign goods and services and the purchase of foreign assets (real and financial) are prohibited. In other words, both countries are in an autarky condition. In this scenario, even though the hypothetical Ms. Tanaka and other Japanese investors will be eager to purchase US corporate bonds to take advantage of the higher yields in the US, they will not be able to do so, and thus there will be no gross or net transfers of capital between the 2 countries. And given that the stock of capital remains unchanged in both countries, there is no reason to expect real interest rates to change in either country. Thus, the real interest rate gap between the 2 countries will persist and real interest rate parity will not be achieved. There is no market for foreign exchange, so the exchange rate is indeterminate.

Scenario 2: Let us assume, in Scenario 2, that the purchase of foreign goods and services is allowed but that the purchase of foreign assets and the ownership of assets in other countries are not allowed. In this scenario, the same argument as the one for Scenario 1 applies since the purchase of foreign assets is still not allowed. Thus, the real interest rate gap between the 2 countries will persist and real interest rate parity will not be achieved. However, because the purchase of foreign goods and services is allowed, our old friend Mr. Smith (an avid manga fan) will be able to purchase Japanese manga after buying Japanese yen (say from Ms. Tanaka), but Ms. Tanaka will not be able to purchase US corporate bonds using the US dollars she buys from Mr. Smith despite the higher yields in the US and will have to settle for purchasing, say, US comic books. Trade between the 2 countries must be perfectly balanced, and the real exchange rate will adjust until this is the case. Let us assume that this rate corresponds approximately to PPP.

Scenario 3: Let us assume, in Scenario 3, that the purchase of foreign goods and services is not allowed but that restrictions on the purchase of foreign assets are lifted for a period of 5 years. At the end of the 5 years, agents will be obliged to surrender foreign assets to the authorities at the PPP exchange rate. Ms. Tanaka and other Japanese investors will be eager to purchase US corporate bonds to take advantage of the higher yields in the US, but in order to do so, they must first convert their Japanese yen into US dollars, and this in turn requires them to find someone (say Mr. Smith) who is willing to convert his US dollars into Japanese yen. Suppose that Ms. Tanaka purchases 100,000 yen worth of US dollars from Mr. Smith and uses the US dollars to purchase 100,000 yen worth of US corporate bonds with a yield of 10%. Given the prohibition on the purchase of foreign goods and services, Mr. Smith has no choice but to use the Japanese yen he obtained from Ms. Tanaka to purchase Japanese assets. Let us assume that he purchases 100,000 yen worth of Japanese corporate bonds with a yield of 6%. Since Ms. Tanaka's purchases of US corporate bonds will be exactly offset by Mr. Smith's purchases of Japanese corporate bonds, there will be no net transfer of capital between the 2 countries. Given that the stock of capital remains unchanged in both countries, there is no reason to expect real interest rates to change in either country. Thus, the real interest rate gap between the 2 countries will persist and real interest rate parity will not be achieved.

However, because Mr. Smith will forego a 4% yield by purchasing Japanese corporate bonds rather than US corporate bonds, he will be prepared to sell his US dollars to Ms. Tanaka only if he were offered a sufficiently favourable exchange rate. Ms. Tanaka therefore finds that she has to offer Mr. Smith just over 20% (the 4% yield difference compounded for 5 years) more than the PPP exchange rate to induce him to sell his US dollars to her. It can thus be seen that frictions in global goods markets will cause the real exchange rate to deviate substantially from PPP, at least initially, although it will return to PPP over the subsequent 5-year period.

Scenario 4: Let us assume, in Scenario 4, that both the purchase of foreign goods and services and the purchase of foreign assets are allowed. Suppose further that Mr. Smith, the avid manga fan, converts 100,000 yen worth of US dollars into Japanese yen in order to purchase a stock of Japanese comics, which he imports from Japan to the US. He obtains his yen in the foreign exchange market from Ms. Tanaka, who wishes to purchase 100,000 yen worth of US dollars from Mr. Smith in order to purchase 100,000 yen worth of US corporate bonds to take advantage of the higher yields in the US. In this case, Ms. Tanaka's purchase of US corporate bonds will lead to a net transfer of capital from Japan to the US.

Of course, Ms. Tanaka and Mr. Smith are not alone in these markets. Many other Japanese investors would, like Ms. Tanaka, prefer to own higher yielding US assets so they too will seek to convert their Japanese yen into US dollars and purchase US corporate bonds, which will drive up the value of the US dollar above its PPP value.

There will be agents such as Mr. Sato who acquires Superman comics with dollars he buys off Ms. Jones, who in turn buys Japanese corporate bonds. Such a transaction would result in a transfer of capital from the US to Japan. However, because of the strong value of the dollar, there will be more Japanese goods exported to the US than there are US goods exported to Japan, and thus there will be a net transfer of real and financial capital from Japan to the US. This will result in a gradual decrease in real interest rates in the US, and a gradual increase in real interest rates in Japan until real interest rates in the 2 countries have been equalised. As

real interest rates in the 2 countries converge, the real exchange rate will move back towards the PPP value, and net transfers of capital from Japan to the US will dry up.

It can be seen from these 4 scenarios that real interest rate parity will be achieved only in the case of Scenario 4 and that real interest rate parity requires the integration of not only global financial markets but also of global goods markets and the net transfer of capital between countries. Moreover, the process is gradual because of frictions in both goods markets and financial markets.

We saw in Scenario 3 that expected returns are equalised across countries not via adjustments in real interest rates but via adjustments in real exchange rates when there are barriers to the mobility of goods, services, and real assets. Thus, frictions in global goods markets can explain why the real exchange rate deviates from PPP for extended periods of time and can therefore explain the PPP puzzle.

In Scenario 3, the real exchange rate followed a steady foreseeable path back to PPP because agents were assumed to have perfect foresight. However, if agents did not have perfect foresight and expectations of future interest rates kept changing, the current equilibrium exchange rate would also keep changing. We argue that it is these changes in expectations of future interest rates that explain much exchange rate volatility.

In a word, frictions in global goods markets can explain not only the Feldstein-Horioka paradox or puzzle but also the failure of real interest rate parity to hold and the PPP puzzle.

3. Conclusion

This article has shown that global financial markets cannot, by themselves, achieve net transfers of financial capital and real interest rate equalisation across countries and that the integration of both global financial markets and global goods markets is needed to achieve net transfers of capital and real interest rate equalisation across countries. Thus, frictions (barriers to mobility) in one or both of these markets can impede the net transfer of capital between countries, produce the Feldstein and Horioka (1980) finding of high saving-investment correlations, and prevent real interest rates from being equalised across countries. Moreover, frictions in global goods markets can explain why real exchange rates deviate from PPP for extended periods of time and can therefore also explain the PPP puzzle. Thus, we have been able to resolve 2 of Obstfeld and Rogoff's (2000) "6 major puzzles in macroeconomics" with essentially the same explanation.

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