



Forward premium anomaly of the British pound and the euro



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ABSTRACT

Using pooled data, we study the forward discount bias (FDB) of 24 British pound and 24 euro exchange rates. The results show a FDB during “non-crisis” periods, which is more pronounced for advanced than emerging economies. This finding is especially striking during the period of the European sovereign debt crisis (2010 to 2013), for which we find a FDB for the currencies of advanced economies versus the pound, but not versus the euro. The differences between the results for advanced and emerging country currencies are mainly related to whether the period under investigation is classified as a crisis period or not. Our findings support the literature that relates carry trade activities to the FDB; as such activities are assumed to decrease during times of uncertainty. Further, our study shows evidence for asymmetric behavior with respect to the forward premium, as well as, to the overvaluation and undervaluation of the currency. We find negative slope coefficients for advanced country currencies during crisis periods when the pound and the euro are overvalued and sell at a premium. This suggests that even during crisis periods carry trade activities are present, which may be related to investors' assumptions of higher returns when an overvalued pound or euro is expected to move back to equilibrium.

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1. Introduction

Pippenger (2011)³ states: “The forward-bias puzzle is probably the most important of several puzzles in international finance and open economy macroeconomics because it suggests that there are serious informational inefficiencies in foreign exchange markets” (p. 296). According to international financial theory, the forward rate should be able to predict the future spot exchange rate. However, several studies show that the spot exchange rate moves, on average, in the direction opposite that suggested by theory (e.g., Bansal, 1997; Bekaert & Hodrick, 1993; Bilson, 1981; Fama, 1984; Frankel & Poonawala, 2010; Froot & Thaler, 1990; Wu & Zhang, 1997).

The literature offers a variety of explanations for this puzzle, known as the forward discount bias (hereafter, FDB). Among the most popular explanations are that the finding is a result of a risk premium (Domowitz & Hakkio, 1985; Frankel, 1982; Korajczyk, 1985; Tai,

2003), an expectational error (Froot & Frankel, 1989), a combination of a risk premium and the failure of rational expectations (Cavaglia, Verschoor, & Wolff, 1994), a result of learning on the part of market participants and/or a “peso problem” (Bilson, 1981; Kaminsky, 1993; Lewis, 1989; Rogoff, 1979), nonlinear adjustments (Baillie & Kilic, 2006), a statistical problem of small sample size (Baillie & Bollerslev, 2000), and persistent autocorrelation of the forward discount (Baillie & Bollerslev, 2000; Tauchen, 2001). Further, Baillie and Bollerslev (2000) as well as Loring and Lucey (2013) show that the choice of the sample period impacts the outcomes of tests of the FDB. More recent literature connects the forward premium puzzle to carry trade activities (e.g., Bacchetta & van Wincoop, 2010; Breedon, Rime, & Vitale, 2010; Spronk, Verschoor, & Zwinkels, 2013). Breedon et al. (2010) find that order flow, which is partially driven by expectations of carry trade profits, creates a time-varying risk premium that is correlated to the FDB. Given that only a very small amount of foreign exchange positions are actively managed, Bacchetta and van Wincoop (2010) show that infrequent portfolio decisions, in combination with demand of a high yielding currency, cause a continuous appreciation, and, therefore can explain the forward prediction puzzle. Further, Spronk et al. (2013) find that the interaction between technical analysis and the carry trade helps to explain the forward discount puzzle. Finally, Clarida, Davis, and Pedersen (2009) and Coudert and Mignon (2013) show that the slope coefficients from testing the FDB become positive during times of crisis and during high exchange rate volatility regimes. This

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³ Pippenger (2011) claims that the forward discount bias is due to an omitted variable bias and that the bias disappears once we account for the future change in the forward exchange rate and future interest rate differentials. However, Baillie (2011), Chang (2011), King (2011) and Mueller (2011) show that Pippenger (2011) does not solve the forward discount bias, but rather provides another test of covered interest rate parity.

implies larger carry trade returns during times of low volatility regimes and negative carry trade returns during times of high volatility regimes. Moreover, [Menkhoff, Sarno, Schmeling, and Schrimpf \(2012\)](#) find that higher exchange rate volatility prevents carry trade activities.

Although the forward discount anomaly has been comprehensively studied for bilateral United States (U.S.) dollar exchange rates, less is known about exchange rates for which the numeraire currency is not the U.S. dollar, such as the euro and the British pound. Particularly, in the case of the euro there may be reason to believe that it behaves differently than other major currencies, especially in more recent years.

First, the Eurozone is a monetary system that is different from others in the world, as the euro comprises the economies of 18 nations. While the European Central Bank (ECB) sets the interest rates for the entire Eurozone, member countries are independent with respect to their fiscal as well as structural policies. Moreover, member countries determine the interest rates on their own government bonds independently. The latter fact may open up different carry trade strategies for the euro versus most other currencies (e.g., dollar and pound).⁴

Second, based on the literature that relates the FDB only to low volatility and non-crisis periods (e.g., [Clarida et al., 2009](#); [Coudert & Mignon, 2013](#)), one may conclude that the contribution of carry trade strategies to the failure of the forward rate unbiased hypothesis fades after the bankruptcy of Lehman Brothers in 2008. This is confirmed by [Loring and Lucey \(2013\)](#), who find positive slope coefficients for the U.S. dollar for the period that includes the global financial crisis. However, this may not necessarily hold for the euro given that carry trade strategies may impact the euro differently (as previously discussed). On the other hand, following the global financial crisis, the euro also went through the European sovereign debt crisis, which may have further enhanced the tendency of positive slope coefficients for the euro in more recent years.

To investigate whether the euro behaves differently than other currencies, we include the British pound in our analysis. The British pound, like the euro, has received negligible attention in the forward discount anomaly literature, despite the fact that it is one of the world's major currencies. Moreover, while the United Kingdom (U.K.) is part of the European Union, they have not joined the Eurozone. Therefore, while the U.K., which houses one of the largest trading centers in the world, was impacted by the global financial crisis, the European sovereign debt crisis may have had a smaller impact on the British pound than on the euro.

Third, for several decades the U.S. dollar has been the primary reserve currency due to its safe haven properties; however, there was an expectation that the world would be moving towards a regime of multiple reserve currencies ([Gianluca, 2011](#)), with the euro, being a likely candidate, but not necessarily the British pound.⁵

Yet, despite the turmoil in the U.S. financial system during the global financial crisis, the dollar strengthened in value and reinforced its position as a safe haven currency. Further, the European sovereign debt crisis may have weakened the euro's path to becoming a reserve currency. Hence it is important to study how the euro and its exchange rates and spot rates behave fundamentally—to determine whether the forward bias exists, and in what form, for the euro.

The above discussion suggests that the British pound and the euro may behave differently, especially during the later period of the global financial crisis and the European sovereign debt crisis. This in turn may have impacted the relationship between future exchange rate changes and the forward rate differently and motivates our investigation of the forward rate unbiasedness hypothesis of the two currencies.

⁴ For example, one can borrow U.S. dollars, buy euros (euro appreciates) and invest in government bonds of higher interest paying countries within the Eurozone. Combined with the infrequent portfolio argument made by [Bacchetta and van Wincoop \(2010\)](#), this would lead to a continuous appreciation of the euro, even though Eurozone interest rates set by the ECB are low.

⁵ For example, [Rinaldo and Söderlind \(2010\)](#) find safe haven properties for the Swiss franc, the Japanese yen, but not for the British pound.

While investigating the forward rate unbiasedness hypothesis for the euro and the British pound, we also investigate if the FDB is asymmetric with respect to an undervalued or overvalued currency, which to our knowledge has not been examined in the literature. Investigating if an asymmetry exists between an overvalued and undervalued currency is motivated by two arguments provided in the literature. First, [Leon and Najarian \(2005\)](#) suggest that policymakers may defend an undervalued currency more vigorously, which may influence any potential risk premium differently depending on whether a currency is under- or overvalued. Second, the literature relates increased carry trade activities with the finding of a FDB. The expectations of any carry trade profit, however, may also depend on the state of the currency; that is to say, if it is overvalued or undervalued. For example, the expectation of an appreciating currency should further increase the expected profits from carry trade activities. Hence, it may be that the state of a currency and its future expected movements may trigger an increase in carry trade activities, thereby contributing to the failure of the forward rate unbiasedness hypothesis.

Based on the above observations, the main purpose of this paper is fourfold. First, we investigate whether a FDB exists with respect to several bilateral exchange rates of the British pound and the euro, and how this anomaly has evolved over time. For this purpose, we investigate the entire period from 1999 to 2013 and split our sample in three sub-periods: (1) the pre-crisis period from 1999 to 2007, (2) the global financial crisis period from 2008 to 2013, and (3) the European sovereign debt crisis period from 2010 to 2013.

Second, the literature provides inconclusive evidence as to whether the FDB of the U.S. dollar depends on the sign of the forward premium. While [Wu and Zhang \(1996\)](#) and [Bansal \(1997\)](#) find evidence for such an asymmetry, [Zhou and Kutan \(2005\)](#) do not. Hence, an interesting empirical question is if such an asymmetry exists for the euro and the British pound and if it changes over time.

Third, and as discussed above, this study is the first to investigate if an asymmetry exists for the euro and the British pound with respect to the sign of possible deviations from an implied purchasing power parity (PPP) equilibrium. To accomplish this, we employ a time-varying equilibrium exchange rate based on the approach of [Hakkio \(1992\)](#) to test whether the anomaly persists when the sample is separated into periods where the bilateral exchange rates are overvalued and undervalued.

Fourth, we ascertain whether the forward anomaly still exists when the sample of bilateral exchange rates is divided into currencies from advanced and emerging economies. The literature investigating such differences, between developed and developing countries for U.S. dollar exchange rates, again finds inconclusive results. For example, [Bansal and Dahlquist \(2000\)](#) and [Frankel and Poonawala \(2010\)](#) find that the forward premium puzzle is mainly a phenomenon of currencies of advanced economies. However, [Loring and Lucey \(2013\)](#), using a more current sample, show that the FDB is less severe for currencies from developed countries rather than developing countries. This suggests that the time period under investigation matters and introduces doubt as to whether the findings hold for other currencies.

Finally, [Snaith, Coakley, and Kellard \(2013\)](#) investigate the forward premium puzzle for five bilateral U.S. dollar exchange rates using interest rate differentials. They find robust evidence for the existence of the forward rate bias for horizons up to two years, but demonstrate that the puzzle disappears at horizons longer than 3 years. Hence, we also check if our results for the euro and British pound are robust with respect to the 1-month, 3-month, 6-month, and the 12-month forward rates, respectively.

This study presents the following interesting results: First, the empirical findings provide evidence that a statistically significant FDB exists over the entire period from 1999 to 2013 for advanced and emerging country currencies alike. Additionally, the results indicate that a statistically significant FDB exists for advanced and emerging countries during the pre-crisis period from 1999 to 2007, though it is less pronounced for the emerging countries. This may be related to

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