



Monetary policy and forward bias for foreign exchange revisited: Empirical evidence from the US–UK exchange rate

Juan Angel Lafuente ^{a,*}, Jesus Ruiz ^b

^a *Departamento de Finanzas y Contabilidad, Facultad de Ciencias Jurídicas y Económicas, Universidad Jaume I, 12071 Castellón, Spain*

^b *Departamento de Economía Cuantitativa, Facultad de Ciencias Económicas y Empresariales, Universidad Complutense de Madrid, 28223 Somosaguas, Spain*

Accepted 7 October 2005

Abstract

Forward exchange rate unbiasedness is rejected for international exchange markets. The two-country monetary model is extended to include an additional forward contract and a numerical solution method is proposed. Simulation exercises suggest that high uncertainty in monetary policy produces greater bias in the estimated slope coefficient in the regression of the change in the logarithm of the spot exchange rate on the forward premium. The model also suggests that the nature of the transmission between monetary shocks might explain the forward bias. Empirical evidence for the US–UK exchange rate according to our theoretical results is provided.

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JEL classification: C22; F31; F47

Keywords: Forward bias; Simulations; Rational expectations

1. Introduction

One of the most important issues in international finance refers to the failure of forward exchange rates to forecast the future evolution of spot exchange rates. This is widely known as the *unbiasedness puzzle*: the estimated slope coefficients in the regression of the change in the

* Corresponding author.

E-mail addresses: lafuen@cofin.uji.es (J.A. Lafuente), jruizand@ccee.ucm.es (J. Ruiz).

logarithm of the spot rate on the forward premium significantly departs from one (see Zhu, 2002; Tauchen, 2001; Baillie and Bollerslev, 2000; Baillie and Ostenberg, 2000; McCallum, 1994, among many others). More surprisingly, even negative estimates are reported. Such discrepancy from the underlying value in the uncovered interest rate parity implies not only that the forward rate is a biased predictor of the future spot rate, but also that forward rate predicts with the wrong sign. Potential economic explanations of this excess return puzzle are generally divided into three categories: (a) the most popular is that such pattern arises as a consequence of a time-varying risk premia (see Fama (1984)); (b) a second explanation relies on the nature of expectations. When agents have no rational expectations, they do not efficiently use the available information set, and incur systematic forecasting errors over a significant number of time periods ahead (see Froot and Frankel (1989)); and (c) the peso problem, that is, by a rational learning process market participants anticipate a future discrete shift in policy that does not take place within the sample period analyzed (see Lewis (1995)).

Engel (1996) reminds us that, under rational expectations:

$$\text{plim}(\hat{\beta}) = 1 - \beta_{rp},$$

where $\beta_{rp} = \frac{\text{Cov}(E_t(s_{t+1}) - s_t, f_{t,t} - E_t(s_{t+1})) + \text{Var}(f_{t,t} - E_t(s_{t+1}))}{\text{Var}(f_{t,t} - s_t)}$, $\hat{\beta}$ denotes the OLS estimator of the slope and s and f refers to spot and forward rate, respectively. From the above probability limit it follows that low positive values of $\hat{\beta}$ can be explained if the variance of expected forward speculative profit is large enough. Numerous previous studies have considered general equilibrium models related to the Lucas (1982) (see, for example, Hodrick, 1989; Macklem, 1991; Canova and Marrinan, 1993; Bekaert, 1994), but they do not successfully explain the substantial variability that occurs in the magnitude of predictable excess returns. Standard models of international finance either require unreasonable risk aversion parameters or consumption processes more volatile than in reality. The recent contribution of Moore and Roche (2002) gives substantial additional insights in this respect. In particular, according to the Campbell and Cochrane (1999) framework, these authors consider a cash-in-advance model with habit persistence which account for (i) the low volatility of the forward discount, (ii) the higher *volatility* of expected forward and (iii) the even higher volatility of the spot return. These authors call this joint pattern as the volatility puzzle. However, their model fails to explain the forward bias because they make the volatility of expected spot returns too high, leading to slope coefficients that significantly exceeds unity.

From an econometric point of view, Baillie and Bollerslev (2000) show that the forward premium anomaly might be interpreted as a statistical phenomenon due to high persistency in the forward premium. This fact would explain that the estimated slope coefficient in the regression of the change in the logarithm of the spot rate on the forward premium be lower than unity. According to the UIP-FIGARCH model in Baillie and Bollerslev (2000), higher persistence in the spot rate produces not only higher persistence in the forward premium but also greater volatility of expected forward speculative profit. Hence, the higher persistence in the forward premium, the greater asymptotic bias of the slope estimator. Maynard and Phillips (2001) provide empirical evidence from several exchange markets (Aus\$/US\$, Can\$/US\$, FF/US\$, DM/US\$, Yen/US\$ and UK/US\$) on the non-stationarity long memory of the forward premium which causes a statistical imbalance in the regression itself. The inability to explain a short stationary variable, like the spot return, using a regressor with a stochastic trend, like the forward premium, leads to reject the null of unbiasedness. However, in a recent work, Maynard (2002) also notes that while the behaviour of both regression estimates and correlations

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