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Generating currency trading rules from the term structure of forward foreign exchange premia

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A B S T R A C T

The quality of an exchange rate forecasting model has typically been judged relative to a random-walk in terms of out-of-sample forecast errors. The difficulty of outperforming this benchmark is well documented, although Clarida and Taylor have demonstrated how the random walk can be beaten in this metric by exploiting information embedded within the term structure of forward exchange rate premia. But this achievement does not guarantee success within an investment context. We therefore assess whether the Clarida-Taylor framework can be used to generate significant trading profits in combination with an acceptable degree of risk in a realistic investment portfolio context.

1. Introduction

This paper has a simple aim: to assess whether a fundamentals-based exchange rate forecasting model can be used to generate significant trading profits in combination with an acceptable degree of risk in a realistic investment portfolio context. Since the seminal work of Meese and Rogoff (1983a,b), the quality of exchange rate forecasting models has typically been judged by their ability to generate significantly smaller out-of-sample forecast errors than those produced by a naïve random walk forecast. Engel et al. (2008) question the validity of this performance metric, arguing that as standard fundamentals-based models in fact imply near random walk behavior in exchange rates, so the power of these models to beat a random walk in forecasting exercises is limited. And indeed, the difficulty of outperforming the random walk in out-of-sample forecasting exercises is well documented, although a

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few exceptions have appeared in recent years.[1] These include Gourinchas and Rey (2007), who report significant improvements over a random walk, based on mean square error criteria and from one to sixteen quarters ahead, using a forecasting model based on the deviation from trend of the ratio of net exports to net foreign assets.

Notwithstanding the academic evidence, investors have demonstrated a persistent ability to add value to portfolios through active currency trading (Baldridge et al., 2000; Hersey and Minnick, 2000). For instance, using data from an independent auditor of currency manager performance, Baldridge et al. report that the median currency overlay manager generated an average excess return, net of costs and interest-rate carry, of 55 basis points per unit of active currency risk over the period 1989–2000, to give an information ratio (IR) of 0.55.[2,3]

In this paper, we bring together strands of the academic and investor literature using the exchange rate forecasting framework originally proposed by Clarida and Taylor (1997). This framework arguably represents the first robust challenge to the conclusions of Meese and Rogoff (1983a,b) to emerge from academic exchange rate research. It is predicated on the proposition that although the forward rate is not an optimal predictor of the future spot exchange rate, important information for the future path of the spot rate is nevertheless embedded within the forward premium term structure (FPTS). Exploiting this information within a linear vector equilibrium correction mechanism (VECM) estimated by full information maximum likelihood (FIML), Clarida and Taylor use the FPTS framework to achieve a statistically significant reduction in out-of-sample forecast errors of the order of 50–70% relative to a random walk for four major exchange rates and over forecast horizons that range from one to fifty-two weeks.[4] These results are particularly impressive in the context of the Engel et al. (2008) study. Moreover, they have been confirmed for different data sets and time periods by Clarida et al. (2003).

In the present study, employing the Clarida-Taylor framework and weekly data for the period 1979 to 2011, we generate n-step ahead out-of-sample exchange rate forecasts for the euro, yen and sterling, all versus the US dollar.[5] These forecasts are then used to implement trading positions within a simulated investment portfolio that incorporates realistic assumptions on transaction costs and position limits. We assess the investment performance of associated trading rules in terms of their ability to generate returns in excess of a strategic benchmark return, rather than in terms of the average size of associated forecast errors. Risk-adjusted returns are examined by exchange rate but also within an equally-weighted portfolio of currency bets for evidence of diversification benefits. We then consider the merits of stop-loss limits designed to truncate the extent of negative returns from any trading strategy, as well as drawdown parameters that are central to the investment strategy of many risk-averse investors within the foreign exchange market. Finally, as a point of comparison, we examine the performance of an alternative, simple but widely used trading rule based on forward-rate bias.

2. Exploiting the failure of the risk-neutral efficient markets hypothesis

2.1. Trading rules based on forward-rate bias

Under risk neutrality and rational expectations – that is, under the risk-neutral efficient markets hypothesis (RNEMH) – the k-period forward exchange rate at time t, f_t^k, is equal to the true

[1] See, for example, the 2003 symposium in the *Journal of International Economics*, celebrating the enduring importance of the Meese–Rogoff papers after two decades.

[2] Baldridge et al. (2000) base their findings on data provided by the Frank Russell consultancy firm. This firm represents one of the two independent and comprehensive sources of active currency manager performance data, the other being the Mercer Consulting Group.

[3] The information ratio or IR is defined as the ratio of annualized excess returns to the standard deviation of those annualized returns, where excess returns are calculated relative to a benchmark return. The underlying rationale for the IR is that it attempts measure excess return per unit of risk, with risk measured as the standard deviation of excess returns. It is a standard performance metric in the investment industry (see, e.g., Grinold and Kahn, 1999).

[4] The four exchange rates considered by Clarida and Taylor are German mark-dollar, Japanese yen-dollar, UK sterling-dollar and French franc-dollar.

[5] Euro-dollar is proxied by the mark-dollar exchange rate before January 1, 1999, with appropriate splicing. Our portfolio includes the three most liquid exchange rates, by some distance (Bank for International Settlements, 2010).