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Exchange rate volatility and its impact on the transaction costs of covered interest rate parity

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Abstract

This paper provides empirical evidence on the linkage between foreign exchange market volatility and daily 90-day covered interest rate parity (CIP) conditions of the three major exchange rates against the US dollar (US$). Markov regime shifting models were utilized to generate time series of volatility regime probabilities and these were used to explain the first and second moments of the daily deviations from and the transaction cost bands around the covered parity conditions. We find a significant positive relationship between the deviations and the regime probabilities, indicating an increasing probability of higher volatility state being associated with rising deviations (both first and second moments) from the parity condition. Similar positive relationship is found for the transaction bands. Rising (falling) probabilities of high (low) volatility regimes increased the first and second moments of the bands. Furthermore, we find a higher volatility state combined with a US$ depreciation is associated with significantly higher volatility in the daily deviations than an appreciation. Also, US$ depreciation is associated with widening transaction bands. This suggests that the level of market uncertainty was higher when the US$ was depreciating.
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1. Introduction

Short-term interest rate differentials between two countries, in theory, convey informa-tion regarding markets' expectations concerning future exchange rate movements. This linkage between foreign exchange and money markets, via arbitrage, has been shown not to hold in its uncovered form (uncovered interest rate parity, UIP) but is often assumed to be a

valid empirical regularity in its covered form (covered interest rate parity, CIP) once various market imperfections are taken into account.[1] An enormous extant literature on forward premium (FP) (inter alia Hansen and Hodrick, 1980; Mark, 1988; Hodrick, 1989; Backus et al., 1993; Levich and Thomas, 1993; Stulz, 1994; Bansal et al., 1995; Bekaert, 1996) suggests that persistent deviations from the theoretical condition of UIP are deemed to be attributed to the failure of either or both of the two conditions underlying UIP, namely risk neutrality and rationality of expectations of market participants. However, despite some limited success in resolving the forward premium puzzle, on balance a general conclusion is that it remains a serious challenge and an anomaly in the literature of currency exchange. In parallel with the research on the forward risk premium briefly touched on above there exists a different strand of research that focuses on the empirical validity of the equilibrium conditions implied by CIP. Despite the empirical support in the Eurocurrency markets (Taylor, 1987; Clinton, 1988), violations of CIP between national markets (significant deviations of forward exchange rates from the CIP conditions) are observed which are attributed to transactions costs (Frenkel and Levich, 1975, 1977; Frenkel, 1981), political risks (Aliber, 1973), tax differentials (Levi, 1977), and capital market imperfections (Blenman, 1991). In addition, Balke and Wohar (1998) show non-linear dynamics of persistence of CIP deviations where deviations outside of the transaction cost bands were less persistent compared to those within the bands. While most of the arbitrage profits are small there are also large deviations from CIP from their sample. Peel and Taylor (2002) investigate covered interest arbitrage in the interwar foreign exchange market, using weekly US dollar (US$)–UKP rates during the 1920s. Specifically their analysis supports the Keynes–Einzig conjecture that the neutral band is of the order of one percent point on an annual basis and the deviations are moderately persistent even outside this band. Overall deviations from the exact CIP conditions are often attributed to transactions costs in line with much of the published work (see, inter alia, Demsetz, 1968; Frenkel and Levich, 1977; Taylor, 1987, 1989). In particular, in the Eurocurrency markets, where most of the market imperfections that hinder the covered interest arbitrage between national money/foreign exchange markets identified above are absent, deviations from the exact CIP are mostly attributable to transaction costs. In other words, no arbitrage bands around the exact CIP conditions are determined by transaction costs of covered arbitrage. The transaction costs, measured as bid–ask spreads, can also be influenced by risk considerations in the foreign exchange market. For example, an expected rise in the level of foreign exchange volatility would induce wider spreads to compensate the liquidity providers for the information (adverse selection) costs. Assuming that in the highly competitive Eurocurrency markets (in major currencies) a significant part of the transaction costs of covered arbitrage (and thus deviations from the exact CIP conditions) may then be attributable to this compensation for the information costs.

   In this paper, we aim to establish a time varying relationship between the foreign exchange market volatility and the transaction cost considerations in the covered interest rate parity conditions. We measure transaction costs in two ways, (i) deviations from the exact CIP conditions and (ii) vertical distance between the upper and lower bounds around

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[1] These include differential tax rates between nations, transactions costs, risk premium, etc. and they create a band around the exact CIP line within which no profitable arbitrage is possible.