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Forward premiums and market efficiency: Panel unit-root evidence from the term structure of forward premiums

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Abstract

A plausible explanation for cointegration among spot currency rates determined in efficient markets is the existence of a stationary, time-varying currency risk premium. Such an interpretation is contingent upon stationarity of the forward premium. However, empirical evidence on the stochastic properties of the forward premium series has been inconclusive. We apply a panel unit-root test – the Johansen likelihood ratio (JLR) test – to forward exchange premiums by utilizing cross-sectional information from their term structure. In contrast to earlier studies, the JLR test provides decisive and temporally stable evidence in support of stationary forward premiums, and therefore foreign exchange market efficiency, for six major currencies.

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1. Introduction

The weak-form efficiency hypothesis of foreign exchange markets presents testable implications for the time series behavior of systems of spot currency rates.¹ Researchers' empirical findings of cointegration in systems of spot exchange rates (Alexander and Johnson, 1992; Lopez, 1996; Baillie and Bollerslev, 1989, 1994a, *inter alia*) would seem to contradict the market efficiency hypothesis, since a cointegrated system necessarily implies the presence of predictability of returns in at least one currency.^{2,3}

Does the existence of cointegration among spot rates imply a rejection of the market efficiency hypothesis?⁴ Crowder (1994) argues that the cointegrating relationship may merely reflect a common feature: a time-varying currency risk premium evident in several currencies' returns.⁵ Under conditions of risk aversion, foreign exchange market efficiency implies that a time-varying risk premium must share the same stochastic properties with the error-correction term from the cointegrated system, that is, it must be covariance stationary. Since the risk premium is unobservable, its stochastic properties cannot be directly ascertained, but it can be shown that they depend on the order of integration of the forward premium. Therefore, the finding of a stationary forward premium would directly imply stationarity of the currency risk premium, which would be compatible with the temporal behavior of the error correction term from a cointegrated system of spot exchange rates. Our investigation of the foreign exchange market efficiency hypothesis thus proceeds from a study of the stochastic properties of forward premiums.

The empirical evidence on the stochastic properties of forward premiums is decidedly mixed. Using daily data for four currencies, Crowder (1992) finds that forward premium series are nonstationary processes. Crowder (1994) confirms such unit-root evidence for monthly forward premium series for three currencies, and concludes that the data do not support the market efficiency hypothesis. Luintel and Paudyal (1998) find daily forward premium series for five currencies to be realizations of unit-

¹ The weak form of asset market efficiency states that no asset price should be forecastable from the prices of other assets.

² According to the Granger representation theorem (Engle and Granger, 1987), cointegration implies the existence of Granger-causal orderings among cointegrated time series. While deviations from equilibrium dissipate, they impact the short-run dynamics of the set of asset prices, implying predictability of an asset price on the basis of the others. Such predictability suggests the existence of arbitrage opportunities across markets.

³ Sephton and Larsen (1991) caution that evidence of cointegration among spot exchange rates exhibits instability as it is sensitive to model specification and choice of sample period.

⁴ Bossaerts (1988) and Dwyer and Wallace (1992) challenge the theoretical basis for the presumed relationship between market efficiency and cointegration. Engel (1996b) and Crowder (1996) further debate the issue. Cerchi and Havenner (1988) provide evidence of increased predictability for stock prices of five department stores based on their cointegrating relationship with one dominant common trend.

⁵ The presence of a time-varying foreign exchange risk premium is one possible explanation for the cointegration of spot exchange rates. As Crowder (1994) points out, peso problems, learning, regime shifts, or other unobserved factors consistent with rational behavior in an efficient foreign exchange market could provide alternative plausible explanations.

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