Available online at www.sciencedirect.com
ScienceDirect
Journal of International Money and Finance 25 (2006) 1168–1186
Journal of International Money and Finance
www.elsevier.com/locate/jimf

Testing the uncovered interest parity using traded volatility, a time-varying risk premium and heterogeneous expectations

Nicholas Sarantis*

London Metropolitan University, UK

Abstract

This paper carries out an empirical investigation of an extended version of Flood and Marion's (2000, Self-fulfilling risk predictions: an application to speculative attacks. Journal of International Economics 50, 245–268) UIP model, which incorporates a nonlinear time-varying risk premium that depends on both the expected variance of the future exchange rate and the relative worldwide private holdings of domestic and foreign government bonds. A novel contribution of our paper is the use of traded currency volatility, which is directly observable in the market place, to measure expectations about the future volatility of the exchange rate. Another contribution is the explicit modelling of heterogeneous exchange rate expectations formed by forward-looking fundamentalists and backward-looking chartists. Our overall empirical evidence provides strong support for the extended nonlinear UIP model. We also investigate for the first time the role of traded volatility in the dynamic behaviour of exchange rates, and find that high currency volatility is likely to produce oscillatory and unstable exchange rate paths.

JEL classification: E43; F31; F41

Keywords: Uncovered interest parity; Traded currency volatility; Time-varying risk premium; Fundamentalists and chartists; Government bonds

* Corresponding author. Department of Economics, Finance and International Business, Centre for International Capital Markets, London Metropolitan University, 84 Moorgate, London EC2M 6SQ, UK. Tel.: +44 20 7320 1464; fax: +44 20 7320 1414.

E-mail address: n.sarantis@londonmet.ac.uk

0261-5606/$ - see front matter © 2006 Elsevier Ltd. All rights reserved.
doi:10.1016/j.jimonfin.2006.08.002

1. Introduction

> ''Few propositions are more widely accepted in international economics than that uncovered interest parity (UIP) is at best useless – or at worst perverse – as a predictor of future exchange rate movements'' (Meredith and Chinn, 1998, p. 1)

Meredith and Chinn's (1998) damning conclusion on the failure of the uncovered interest rate parity is based on a large number of empirical studies over the last 20 years. The extensive surveys of the relevant literature by Froot (1990), Taylor (1995) and Marston (1995) reveal that all studies, using a variety of estimation techniques, currencies and time periods, find a coefficient on interest rate differentials which is not only smaller than the theoretical value of unity, but also displays the wrong (negative) sign. The finding that this coefficient is closer to -1 than $+1$ has become an industry paradigm.[1] Meredith and Chinn (1998) and Flood and Rose (2001) have also confirmed the failure of UIP for the 1990s.

An important explanation for the failure of UIP often cited in the literature is the existence of a time-varying foreign exchange risk premium (see Lewis, 1995; MacDonald, 2000). But risk premia are unobserved and this has led to a great deal of research on how to model these currency risk premia. Most studies employ pure 'statistical' methods to model the risk premium.[2] The problem with these approaches is that they fail to provide any insight into the economic determinants of the risk premium. This problem can be avoided by deriving the risk premium from a theoretical model that relates the risk premium to underlying economic variables and, hence, its foundation is based upon economic theory.

Such an approach was adopted in a very interesting paper by Flood and Marion (2000). Using a portfolio balance optimisation model for a representative international investor, the authors obtain a nonlinear time-varying risk premium which depends on the variance of the future exchange rate, the degree of risk aversion and the worldwide relative private holdings of domestic and foreign government bonds. Flood and Marion (2000) and Flood and Rose (1999) show that this nonlinear UIP model can generate multiple equilibria and has important implications for exchange rate behaviour, speculative attacks and economic policy. But as Flood and Rose (1999, p. F668, footnote 12) point out, no one has tested this version of the UIP model empirically.[3]

The main aim of this paper, therefore, is to carry out an empirical investigation of Flood and Marion's (2000) UIP model, which incorporates a structural nonlinear time-varying foreign exchange risk premium. We apply the model to five exchange rates using monthly data and interest rates with varying maturities from the 1990s. In addition, we derive Flood and Marion's nonlinear UIP relation using a simpler optimisation model.

[1] Similar results are obtained by studies which replace the interest rate differential by the forward discount in regressions of the exchange rate change. For an extensive survey of this literature, see Engel (1996).

[2] One of the most popular statistical methods employed is the GARCH framework (see Baillie and Bollerslev, 1990; Berk and Knot, 2001). An alternative approach is to use signalling extraction methods (see Wolff, 2000; Bhar et al., 2000).

[3] Alternative forms of the portfolio balance model, under different assumptions and with varying objectives, have of course been investigated empirically by various authors. See, for example, Frankel (1982), Lewis (1988), Kim and Salemi (2000), and references cited in Engel (1996). It should be noted, however, that the emphasis of these studies is on searching for a risk premium, so the models are estimated by imposing rational expectations and a unit slope coefficient (i.e. on the interest rate differential or on the forward premium). In contrast, our model relaxes both these constraints.