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# Journal of International Money and Finance

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## Real financial market exchange rates and capital flows<sup>☆</sup>



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### ARTICLE INFO

#### Article history:

Available online 25 February 2015

#### JEL:

F31

G15

E58

#### Keywords:

Real effective exchange rate

Capital flows

Financial markets

### ABSTRACT

Foreign exchange rates, asset prices and capital movements are expected to be closely related to each other as international capital markets become more and more integrated. This paper provides new empirical evidence from an index of exchange-rate adjusted cross-country asset price ratios, which may be interpreted as a real effective financial exchange rate. The integrated stock-flow approach reveals that a country's real effective financial exchange rate is cointegrated with international investors' net foreign holdings of its assets. The associated error correction equations have useful interpretations against the backdrop of uncovered return parity and investor portfolio rebalancing behavior.

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<sup>☆</sup> We are deeply indebted to an anonymous referee providing important advice. We also thank Matei Demetrescu for helpful comments on an earlier draft of the paper.

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## 1. Introduction

The real effective exchange rate (REER) is a pivotal variable in open economy macroeconomics. With the expansion in trade in goods and services, the REER has emerged as a prime indicator of price competitiveness of economies in the economic policy arena. With its roots in the law of one price among integrated international goods markets, the theoretical concept of the REER as well as its practical impact on countries' output and wealth have been extensively studied in the literature (Aghion et al., 2009; Bleaney and Greenaway, 2001). With ongoing globalisation and financial integration, however, capital flows now account for a major share of cross-border transactions (Hau and Rey, 2004). Given that expected future cash flows determine current asset prices it may be assumed that their cross-country ratios, computed in the same currency, provide a measure of price competitiveness of a country's assets relative to its foreign competitors, just as the REER provides a measure of the price competitiveness of a country's goods and services. While permanent shocks to this 'real effective financial exchange rate' (REFER) signal a fundamental reappraisal of future returns and indicate changing shares of a country's assets in the portfolio of international investors, temporary variations may be interpreted as overvaluation or undervaluation of domestic asset prices relative to foreign assets. In general, moreover, it seems reasonable to assume that the REFER should reflect foreign investors' willingness to hold a country's assets. Further, given that capital movements will generate a price impact on assets and/or nominal exchange rates, we may derive an equilibrium relationship between the REFER and foreign investors' holdings of a country's assets, net of domestic holdings of foreign assets (NFH).

By doing so, we explicitly consider Lane and Shambaugh (2010) observation that the trade-weighted exchange rate indices are insufficient to provide a full understanding of the financial impact of currency movements. These authors create a financially weighted exchange rate index based on the composition of foreign assets and liabilities in order to investigate the impact of currency movements on the capital gains and losses of foreign assets and liabilities. In contrast, the proposition of a real effective exchange rate that is not only financially weighted but also deflated on the basis of financial market prices should fully reveal the causes and consequences of exchange rate movements in international capital market transactions.

In this paper, a panel of 15 leading national stock markets is used to construct and empirically investigate the index of real effective financial market exchange rates. While, at the first stage, nominal bilateral exchange rates are deflated by MSCI stock market indices to obtain real bilateral financial market exchange rates, weights based on bilateral cross-holdings of equity securities as reported in the IMF's Coordinated Portfolio Investment Survey (CPIS) data set are used to calculate the REFER as a geometric average of bilateral values at the second stage. This indicator therefore reflects the relative attractiveness of a country's financial assets as compared to those of its capital market competitors. The empirical results are encouraging at least in two important ways. First, we find that a country's net foreign asset position in equity securities is cointegrated with its REFER. Second, the resulting dynamic error correction analysis provides empirical support for uncovered return parity developed by Cappiello and De Santis (2007) and De Santis and Sarno (2008) as well as investors' portfolio rebalancing behaviour as discussed in Bohn and Tesar (1996) and Hau and Rey (2009).

The remainder of the paper is organised as follows. In Section 2 we briefly review the literature on the relationship between exchange rates and capital flows. In Section 3 we offer a theoretical framework for the linkages between the REFER and net foreign assets. In Section 4 we describe the data, while in Section 5 we provide a description of the econometric framework and report the empirical results, before offering some concluding remarks in a final section.

## 2. Exchange rate dynamics, capital flows and asset prices

Numerous studies such as Portes and Rey (2005), Bekaert et al. (2002), and Brooks et al. (2004) have analysed the linkage between exchange rate dynamics, capital flows and asset prices. Based on the now widely accepted microstructure proposition that foreign exchange order flow drives exchange rates (at least contemporaneously; e.g. Lyons, 2006), the theoretical approach of Hau and Rey (2004, 2006)

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