Asset Market and Balance of Payments Characteristics: An Eclectic Exchange Rate Model for the Dollar, Mark and Yen

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Abstract

In this paper we use an exchange rate model, which combines asset market characteristics with balance of payments interactions, to examine the nominal effective exchange rates of the German mark, Japanese yen and US dollar for the recent experience with floating exchange rates. Our approach may be interpreted as one which attempts to flesh out the missing links that arise in conditioning an exchange rate solely on relative prices, as occurs in a standard PPP analysis. Amongst the results reported in this paper are: significant, and sensible, long-run relationships for the currencies studied; complex short-run dynamics; a variance decomposition analysis which apportions nominal exchange rate error variances into real and nominal elements.

Recently there has been considerable interest in modelling ‘long-run’ real and nominal exchange rates (see the surveys by Froot and Rogoff (1995) and MacDonald (1995)). In part, this literature has been stimulated by the existence and development of time series methods in econometrics. More fundamentally, perhaps, the perception that freely floating exchange rates are rarely, if ever, at their equilibrium levels has generated a desire to understand just how far away from equilibrium a current exchange rate might be. The recent applied work in this area has suggested that researchers who have completely abandoned purchasing power parity (PPP) may have thrown the baby out with the bathwater, since for most bilateral currencies there does appear to be a stable ‘long-run’ relationship between exchange rates and relative prices. This relationship, however, does not conform exactly to what would conventionally be regarded as PPP since often, particularly for US dollar bilateral rates, standard symmetry and degree one homogeneity restrictions (given by absolute PPP) are strongly rejected. Furthermore, the implied mean reversion of the real exchange rate seems too slow to be consistent with traditional PPP and therefore there would appear to be more to exchange rates than relative prices.
In testing long-run PPP all previous research has concentrated on bilateral exchange rates and prices. In thinking about equilibrium exchange rates, it may, however, be more appropriate to use effective exchange rates and effective prices since these more closely correspond to the kind of real exchange rates referred to in theoretical models of the equilibrium exchange rate. Thus, in such models emphasis is placed on the current account of the balance of payments and the requisite conditions necessary for equilibrium (zero balance in the case of the portfolio balance model, or a ‘sustainable’ balance as in the models of Williamson (1994) and Mussa (1984)). Since the current account is a multilateral, rather than bilateral, concept the use of effective rates in empirical tests of long-run exchange rate relationships seems appropriate.

However, as explained later, PPP is not well-suited to explaining the long-run behaviour of effective exchange rates. We therefore propose and estimate what we refer to as an eclectic exchange rate model (EERM). This model allows for both temporary and permanent deviations of the nominal effective exchange rate from relative prices, and is consistent with recent theorising in the exchange rate literature. The model facilitates an analysis of nominal effective exchange rates in terms of the key real and nominal determinants of exchange rates. In contrast to purely monetary based models, a central feature of the present model is that it allows for real exchange rate changes consistent with optimising behaviour; that is, it allows for sustainable real exchange rate changes.1, 2

The short- and long-run EERM relationships are estimated using a vector error correction mechanism (VECM). The methods of Johansen are applied to the VECM in order to determine the number of cointegrating, or long-run, relationships amongst the variables. For two of the currencies studied, we find evidence of multiple cointegrating vectors and one novel feature of our work is that we attempt to interpret these vectors in terms of the underlying model (other researchers who have examined related exchange rate relationships—see, for example, Faruqee (1995)—have ignored this issue and simply concentrated on the first significant vector). An impulse response representation of the VECM is then used to analyse the short-run dynamics of the model; the fact that our impulse response functions are calculated subject to the cointegrating constraints is a further novel feature of our approach. Finally, the VECM models are used to construct exchange rate error variance decompositions and these indicate that a much higher proportion of the error variance is attributable to real shocks than other studies have suggested. We attribute this latter finding to the richer ‘real’ specification used in this paper.

The outline of the remainder of this paper is as follows. The next section presents the theoretical model used in our empirical investigation of the effective exchange rates of the German mark, Japanese yen and US dollar. Section 2 outlines the econometric methods used to implement the EERM. The data set is discussed in Section 3. Three sets of results are presented in Section 4. First, the validity of long-run PPP is examined using effective exchange rates.