The real exchange rate of the dollar for a panel of OECD countries: Balassa–Samuelson or distribution sector effect?

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A B S T R A C T

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The purpose of this paper is to analyse the role of productivity in the behaviour of the real exchange rate of the dollar against the currencies of a group of OECD countries. To do this, a general specification is tested, with particular attention being paid to the breakdown of the productivity variable into tradables, non-tradables and distribution sector productivity. The applied technique relies on the pool mean group estimation methodology proposed by Pesaran et al. [Pesaran, M.H., Shin, Y., Smith, R.P., 1999. Pooled mean group estimation of dynamic heterogeneous panels, Journal of the American Statistical Association 94 (446), 621–634] to obtain error correction models in panels without imposing equal long-run and short-run parameters. The results point to the relevance of differences in the distribution sector productivity for the real exchange rate, especially in those countries that belong to the European Union. These results are in accordance with New Open Economy Macroeconomics models predictions as far as the role of both distribution sector productivity and fiscal expenditure on the real exchange rate are concerned. *Journal of Comparative Economics* **36** (4) (2008) 620–632. Jaume I University, Campus de Riu Sec, E-12080 Castellón, Spain.

1. Introduction

The Balassa–Samuelson effect has been considered as one of the leading explanations of real exchange rate departures from PPP. However, this model has found only limited support in the empirical literature for most countries, with the exception of Japan. It has been argued that the assumptions implicit in the model are unrealistic, especially in the short-run. Mixed evidence was provided during the 1990s (Asea and Mendoza, 1994; Strauss, 1996). More recently, and using different measures of aggregate productivity, Alquist and Chinn (2002), Camarero et al. (2005) and Schnatz et al. (2004) have found empirical evidence to support the role of productivity to explain the behaviour of the euro–dollar real exchange rate. However, given that they use aggregate productivity measures, the estimated models do not allow for a fully specified Balassa–Samuelson effect.

Within the setting of a New Open Economy Macroeconomics model (hereafter NOEM), Devereux (1999) discusses the main prediction of the Balassa–Samuelson model and describes a puzzle which is to be found in several Asian countries amongst others: results by Isard and Symansky (1995) indicate not just a departure from the Balassa–Samuelson hypothesis but also substantial and persistent deviations from the law of one price in traded goods across countries. MacDonald and

Ricci (2005) stress the relevance of dividing productivity into three sectors: traded goods, non-traded goods and distribution services. Discrete consideration of each of these sectors allows for careful analysis of the theoretical arguments put forward by Devereux (1999) concerning the role of distribution sector productivity and its influence on real exchange rate behaviour.

According to Devereux (1999), the deregulation process which many economies had recently undergone as they opened up to international competition in the distribution services may have caused real exchange rate depreciation through a reduction in the price of traded goods. In a NOEM setting, the repercussions of this effect may have been such that they compensated the Balassa–Samuelson effect, with the total effect perceived being a depreciation of the currency.

Two empirical contributions to this strand of the literature should be mentioned here: MacDonald and Ricci (2005) and Lee and Tang (2007) have studied the role that distribution sector productivity plays in the real exchange rate. Using total factor productivity (hereafter TFP), MacDonald and Ricci (2005) study the real exchange rate of the dollar for a group of OECD countries. Due to the limitations of the International Sectoral Database, their sample covers the period 1970–1991. Using Dynamic OLS techniques in a cointegrated panel and assuming homogeneous long-run parameters, their results point to the significance of the three productivity variables (for traded-goods, non-traded-goods and the distribution sector) in a general specification that also contains other variables. They conclude that distribution sector productivity behaves in the same way as traded goods productivity (a positive shock provokes an appreciation of the real exchange rate). Lee and Tang (2007) also analyse the behaviour of the real exchange rate also for a panel of OECD countries through the use of cointegration techniques. They compare the results of the two main different measures of productivity, i.e. TFP and labour productivity, and obtain sign reversals when TFP is used. In addition, they do not find the relative productivity variable in the distribution sector to be significant, but conclude that it is the traded-goods sector productivity which matters for real exchange rate determination, rather than relative prices between tradables and non-tradables. Also in this case, no allowance is made for the long-run parameters to differ among the countries in the panel.

From a theoretical point of view, therefore, the NOEM models provide a wider theoretical framework for real exchange rate determination, and shed light on the complex mechanism that links productivity (and also fiscal policies and other macroeconomic variables) to the real exchange rate. Moreover, due to the existence of multiple channels through which the fundamental variables can influence the real exchange rate, potential sources of endogeneity may arise. Therefore, for an adequate characterisation of the real exchange rate a wide and flexible empirical specification should be adopted. This approach would avoid the problems of biased or inconsistent estimates, which is related to the omission of relevant variables.

The present paper analyses the behaviour of the real exchange rate of the dollar against a group of OECD countries for the period 1970–1998. Using the econometric methodology proposed by Pesaran et al. (1999) we specify a general model that encompasses the most important explanatory variables suggested by the theory: from the simpler form of the Meese and Rogoff (1988) monetary model, to the Balassa–Samuelson effect. In addition, the adopted specification allows us to test the distribution sector effect on real exchange rates and the NOEM predictions.

This paper contributes to literature on the role of productivity in real exchange rate determination in several respects. First, the chosen productivity measure is based on OECD labour productivity, available for a longer data span[1] and allowing for three sectors: tradables, non-tradables and distribution. Second, the variable we are focused on is the real exchange rate of the dollar for the pre-euro currencies of the euro-zone countries, within a wider panel that is made up of OECD countries. A special emphasis is placed on the potential effects of tighter European integration after the implementation of the Internal Market liberalisation process. Third, we adopt an empirical model specification which, in addition to the productivity variables, includes those fundamentals proposed in the real exchange rate literature. Finally, the econometric methodology applied allows for the application of the general-to-specific approach, so that alternative models can be compared and hypotheses about the homogeneity of long-run parameters can be tested. A considerable degree of heterogeneity is therefore allowed for in the long-run parameters and also in the dynamics of the model.

The rest of the paper is organised as follows. Section two is devoted to a brief summary of the theoretical issues. The third section describes the data and the model specified. The empirical results are discussed in section four, and the final section sets out the conclusions.

2. Theoretical issues

Although the point of departure of this empirical paper is the Balassa–Samuelson effect, following the recent contributions by the NOEM literature a special emphasis is placed on the breakdown into traded, non-traded and distribution sector productivity. Moreover, the general-to-specific approach adopted in this paper recommends the formulation of a model that includes the fundamental variables suggested in the theory. Therefore, in order to provide a summarised presentation of these fundamental variables, the subsection that follows gives a brief summary of what can be called the "traditional" real exchange rate theory. Section 2.2 then describes the main hypotheses related to real exchange rate determination that derive from NOEM models.

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[1] Although TFP is the productivity measure commonly suggested by the theory, data availability creates a considerable problem. Lee and Tang (2007) are able to extend the TFP series by 3 years, but further extension of the variables is limited by capital stock data availability. Moreover, according to Tyrväinen (1998), for many purposes, labour productivity is the most useful productivity measure, more robust as it is than most of the alternatives. The reason for this is that there is not a homogeneous methodology to calculate TFP, and the results obtained depend critically on the computation method used in each case. By using labour productivity, therefore, we avoid biases in cross-country comparisons.