Productivity shocks and real exchange rates ☆

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Abstract

Previous studies have concluded that productivity shocks have negligible effects on real exchange rate fluctuations. This paper shows that when long-run equilibrium relationships between real exchange rate levels and fundamental variables are taken into account, relative productivity shocks account for most of the long-run movements in the real exchange rates. This can be interpreted as empirical support for the Balassa (1964. Journal of Political Economy 72, 584–596) and Samuelson (1964. Review of Economics and Statistics 46, 145–154) model where differences in relative productivity is the main source of long-run deviations for purchasing power parity.
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1. Introduction

As purchasing power parity (PPP) is typically rejected in empirical test, equilibrium real exchange rates appear to be changing over time. Previous studies

of the sources of real exchange rate fluctuations have concluded that real demand shocks account for most of the movements in the long-run as well as in the short-run (Clarida and Gali, 1994; Weber, 1997; Chadha and Prasad, 1997). Diverging results are presented by Rogers (1999) and Eichenbaum and Evans (1995), who document a larger relative influence of monetary shocks. However, all these studies conclude that the effects of productivity shocks on real exchange rates are negligible at all horizons. This is surprising in light of the related literature on long-run real exchange rate determination, where versions of the Balassa–Samuelson model dominate and exchange rates are modelled primarily as functions of relative productivity (Canzoneri et al., 1999; Chinn and Johnston, 1996).

Another notable feature of the variance decomposition literature is that virtually all studies model only *changes* in real exchange rates and the fundamental variables. The presence of long-run relationships between the levels of the variables is either rejected (as in Clarida and Gali, 1994 and Rogers, 1999) or not investigated (as in Weber, 1997).[1] Again, there is a gap between this empirical literature and related studies of long-run real exchange rate determination. Most papers in the latter field do find long-run equilibrium relationships between real exchange rates and various fundamental variables. There is ample documentation of cointegration between levels of real exchange rates and, for instance, relative productivity (see MacDonald, 1998, for a survey).

Hence, previous studies of the sources of real exchange rate fluctuations (i) invariably conclude that productivity shocks have a negligible impact and (ii) do not find cointegration between real exchange rates and fundamental variables (or do not investigate whether they are cointegrated). After confirming the presence of cointegration, this paper demonstrates that relative productivity shocks dominate the long-run variance decompositions of real exchange rates when long-run equilibrium relationships are taken into account. The result is robust across a number of alternative empirical specifications.

2. Statistical methods

If real exchange rates are cointegrated with fundamental variables, models using only differenced data are misspecified and do not utilize the information contained in the levels of the data. In particular, the absence of cointegration implies that it is not possible to model a time varying equilibrium level of the real exchange rate as function of the included fundamental variables. The VAR models used by Clarida and Galí (1994) and others to identify structural shocks and obtain variance decompositions can however incorporate long-run equilibrium relationships between the levels of the variables. Following King et al. (1991), structural shocks are

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[1]Actually, Clarida and Gali (1994) find cointegration for one of the four bilateral systems studied, but this is ignored in the subsequent empirical analysis. In Rogers (1999), the null hypothesis of cointegration would not be rejected if the 90% critical values of the Johansen (1988) tests were used instead of the 95% critical values.