



Real exchange rates, imperfect substitutability, and imperfect competition

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Abstract

This paper theoretically derives and empirically tests the implications of a trade theory framework with imperfect substitution of tradables for the systematic movements in the real exchange rate. Using a panel DOLS estimator, we derive long-run coefficients for relative productivity and product market competition (for which we construct an original proxy) in both the tradable and non-tradable sectors, controlling for standard macroeconomic variables. The implications of imperfect substitutability of tradables fit the data better than the standard neoclassical assumption of price equalization, and our new measure of product market competition is a statistically significant determinant of the real exchange rate.

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1. Introduction

This paper contributes to the understanding of how the relaxation of standard neoclassical trade theory assumptions helps explaining the long-run behavior of the real exchange rate and the deviations from purchasing power parity (PPP).

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The failure of PPP is neatly summarized by the so-called PPP puzzle (Rogoff, 1996), which indicates that the mean reversion evidenced in CPI-based real exchange rates is too slow to be consistent with PPP.¹ Empirical work has shown that macroeconomic variables, such as the relative real interest rate and relative net foreign assets positions, as well as relative productivity levels in the tradables and non-tradables sectors (the so-called Balassa–Samuelson effect; see Balassa, 1964 and Samuelson, 1964), are important in explaining deviations from PPP.² In particular, the Balassa–Samuelson effect suggests that in the presence of price equalization of tradables, productivity of tradables appreciates the real exchange rate via its positive impact on wages—and prices of non-tradables—while productivity of non-tradables depreciates the real exchange rate via its negative impact on prices of non-tradables. Several contributions have provided empirical support to the Balassa–Samuelson hypothesis, particularly recent ones based on a more accurate disaggregation of the tradable and non-tradable sector (such as De Gregorio et al., 1994; Canzoneri et al., 1999; Chinn and Johnson, 1999; and MacDonald and Ricci, 2005).³

In its traditional form, the Balassa–Samuelson hypothesis assumes that the law of one price holds at all points in time and therefore suggests that changes in the real exchange rate should be accounted for by changes in the internal price ratio (that is, the domestic price ratio of traded to non-traded goods, relative to the one in the foreign country). However, Engel (1999) has demonstrated that the source of systematic movements in real exchange rates seems to come from movements in the relative price of traded goods, rather than the internal price ratio (see also Engel and Rogers, 1996).⁴

There are a number of theoretical explanations for the persistence of the deviations of relative prices of traded goods across countries. One is in terms of the frictions introduced into international trade by transactions costs (see Obstfeld and Rogoff, 2000), such as transportation costs, tariffs and non-tariff barriers. Another theoretical explanation for this persistence is when multinational firms engage in pricing to market (see, for example, Betts and Devereux, 1996), or when countries face differences in productivities or market structure (Faruqee, 1996). Benigno and Theonissen (2003) generate a model encompassing three factors affecting the real exchange rate: a Balassa–Samuelson effect via the price of tradable and non-tradables, a demand bias towards home goods, and international price discrimination. One of the main results of their paper is that an increase in the relative productivity of the domestic tradable sector does not necessarily appreciate the real exchange rate (as in the standard Balassa–Samuelson framework) because of the additional direct negative effect on domestic prices of tradables (allowed by the imperfect substitutability of tradables).

From the empirical point of view, some evidence for the role of trade costs has been offered by Obstfeld and Taylor (1997). The empirical relevance of market structure in explaining real exchange rate persistence is highlighted by Cheung et al. (1999). These

¹ Recent research, however, suggests that mean reversion could be much higher if one takes into account a dynamic aggregation bias (Imbs et al., 2005).

² For recent contributions on the importance of net foreign assets or interest rate differentials, see, *inter alia*, Lane and Milesi-Ferretti (2004) and Obstfeld and Rogoff (1996).

³ For studies based on comparisons of aggregate productivity across countries, see for example Hsieh (1982), Marston (1990) and Ito et al. (1999).

⁴ In a related empirical work to ours, Zachariadis (2004) uses microeconomic price data for Europe, over the period 1975–1990, and finds a robust negative relationship between the productivity of manufactures (tradables) and international price differences.

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