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Home bias, distribution services and determinants of real exchange rates

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ABSTRACT

This paper examines empirically how exogenous changes in the terms of trade affect the real exchange rate through the relative price of traded goods with Canada–US data. The relative price of traded goods is constructed using prices at the dock and retail prices. The first measure emphasizes the importance of home bias in consumption of traded goods. The second measure highlights the importance of distribution services required for consumption of traded goods. It is found that terms of trade shocks affect the relative price of traded goods using both measures. A possible interpretation of empirical findings is that home bias and distribution services are important for understanding the relative price of traded goods.

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1. Introduction

An extensive empirical literature has analyzed the relationship between the terms of trade (the relative price of imports in terms of exports) and the real exchange rate (the relative price of goods and services in one country versus another).¹ The theoretical justification for these studies stems from the classical literature on real exchange rate determination that associates the real exchange rate with the relative price of nontraded goods in terms of traded goods. This is because trade arbitrage is supposed to make prices of traded goods equal when measured in the same currency. Nontraded goods are not subject to trade arbitrage and therefore their prices, even if measured in the same currency, may differ across countries. These deviations in prices of nontraded goods versus prices of traded goods in one country versus another cause long-run fluctuations in real exchange rates. Exogenous changes in the terms of trade affect real exchange rates through the relative price of nontraded versus traded goods by affecting the demand and supply of nontraded goods (Edwards and van Wijnbergen, 1987; Edwards, 1989; Connolly and Devereux, 1992).

Recent empirical evidence of Engel (1999), Burstein et al. (2006), and Betts and Kehoe (2006) indicates that movements in the relative price of traded goods play as important and sometimes even more important role than the relative price of nontraded in terms of traded goods in explaining movements of the real exchange rate at different horizons. In the light of this evidence, an interesting area for empirical research is to investigate the impact of real shocks on the relative price of traded goods and the relative price of nontraded in terms of traded goods. This is the direction undertaken in this paper. I decompose the real exchange rate into the relative price of traded goods and the relative price of nontraded versus traded goods and analyze terms of trade effects on these two relative prices. The classical literature assumes that traded goods are

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homogeneous and the law of one price holds. Under these assumptions, the relative price of traded goods is directly proportional to the terms of trade. This paper, as discussed below, relaxes these assumptions and breaks the direct proportionality link between the terms of trade and the relative price of traded goods making it interesting to investigate the impact of the former on the latter.

If the relative price of traded goods is empirically important for the transmission of terms of trade shocks to the real exchange rate than the theoretical justification that links the terms of trade and the real exchange rate needs to be revised. This is because long-run movements in the relative price of traded goods are precluded in the classical studies since the law of one price is assumed for homogenous traded goods and, therefore, any deviations in the relative price of traded goods can only be temporary. As a possible explanation of the importance of the relative price of traded goods I focus on distribution services and home bias in preferences.² I consider a simple modification of the model in Neary (1988) in which long-run deviations in the relative price of traded goods are possible. The model assumes that: (i) traded goods are heterogeneous, and domestic and foreign goods are not perfect substitutes; (ii) there is a home bias in consumption of domestically produced traded goods; and (iii) consumption of traded goods requires distribution services.

Nontraded distribution services imply a distinction of prices of traded goods at the production and consumption levels. At the production level, the law of one price holds for each individual traded goods. At the consumption level, the law of one price does not have to hold. Distribution services also result in low trade elasticity of substitution among traded goods at the consumption level allowing to treat the final consumption traded goods as nontraded. These modifications allow real shocks to propagate through the relative price of traded goods. The first channel is called the *home bias* channel to reflect the importance of home bias in consumption of traded goods. Suppose there is an increase in income coming from exogenous changes in the terms of trade. The terms of trade are constructed using import and export prices before traded goods enter the distribution network. That is why these prices can be assumed to be given exogenously as in the classical literature. The relative price of traded goods is constructed using consumption prices. Due to distribution margins this relative price is endogenous. Since a higher share of income at home is spent on domestically produced traded goods their consumption price increases. This effect is discussed in Buiter (1989). The home bias also allows changes in the price of domestically produced traded goods to affect the relative price of traded goods even in the absence of distribution margins. This is due to different weights given to domestic and foreign goods in domestic and foreign aggregate price indices. The second channel is called the *distribution services* channel to reflect the assumption that distribution services are required for consumption of traded goods. The final consumption goods are nontraded since distribution services are not traded. Changes in the distribution costs would be passed to consumers. In this case, higher income stemming from exogenous improvements in the terms of trade, drives the cost of distribution services up appreciating the relative price of traded goods. This effect is discussed in Jones and Purvis (1983).

The empirical evidence on the relevance of distribution services for traded goods is abundant. Burstein et al. (2003) report that local distribution services account for 40–60% of the retail prices of consumer goods for the United States and Argentina. A more detailed study by Goldberg and Campa (2006) puts approximately 33–50% range on the importance of distribution services for household consumption goods for many industrialized countries. Crucini et al. (2005) analyze cross-sectional price dispersion for over 1,800 retail goods and services in the European Union countries and find that the dispersion is negatively related to the tradability of the good and positively related to the share of nontraded inputs. This evidence is consistent with the view that nontraded inputs, like distribution services, play an important role in explaining retail prices.³ Crucini and Yilmazkuday (2009) use long-run variance decomposition of law of one price deviations for 123 cities in 79 countries. The variance is decomposed into the contribution of distribution costs, trade costs and a residual. When using the median good on an expenditure-weighting basis, the authors find that distribution costs account for 43%, more than trade costs with 36%. The importance of home bias to break the law of one price for traded goods with respect to productivity shocks is analyzed in Benigno and Thoenissen (2003) and MacDonald and Ricci (2007). Both papers allow traded goods to be imperfect substitutes and both papers allow for a taste bias towards home-produced traded goods.

In order to distinguish the impact of home bias and distribution services in the empirical analysis I consider two measures of the relative price of traded goods. The first measure is constructed using prices at the dock which are defined as a weighted average of import and export prices following Burstein et al. (2006). Prices at the dock are free of the distribution services, and therefore should be able to capture the importance of the home bias. To measure the price of traded goods at the retail level I use the Consumption Price Index (CPI). The paper analyzes the relative price of traded and the relative price of nontraded versus traded goods for Canada–US data. This pair of countries is chosen because Canada is a country with a well developed manufacturing base and with a high share of primary commodities in exports. The prices of primary commodities are given in the world market and Canada has little or no control over them. Therefore, it is possible to identify an exogenous shock to Canada's terms of trade.⁴

The contribution of this paper is an empirical analysis of the impact of terms of trade shocks on the relative prices of traded and the relative price of nontraded versus traded goods. Focusing on these relative prices, rather than the real exchange rate, can uncover the role played by home bias and distribution services in the transmission of real shocks. Related

² There are other approaches discussed in the literature how the law of one price can be relaxed theoretically: (i) pricing to market (PTM); (ii) translog preferences; and (iii) Constant Elasticity of Substitution (CES) preferences and distribution costs. See Benigno and Thoenissen (2003), Engel (2005), Bergin (2003), Corsetti and Dedola (2005).

³ See also Berka and Devereux (2010) for a more detailed study of disaggregated data of European prices.

⁴ Identifying terms of trade shocks is a difficult task in general as argued by Obstfeld and Rogoff (2000).

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