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US trade and exchange rate volatility: A real sectoral bilateral analysis

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Abstract

In this paper we consider the impact of exchange rate volatility on the volume of bilateral US trade (both exports and imports) using sectoral data. Amongst the novelties in our approach are the use of sectoral industrial price indices, rather than an aggregate price index, and the construction of the sectoral groupings, which is based on economic and econometric criteria. We find that separating trade into differentiated goods and homogeneous goods results in the most appropriate sectoral division, and we also report evidence to suggest that exchange rate volatility has a robust and significantly negative effect across sectors, although it is strongest for exports of differentiated goods.

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1. Introduction

It is often argued, since at least Ethier (1973), that exchange rate volatility should have a negative impact on international trade. This work is predicated on the assumption that

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firms are risk averse and exchange rate risk reduces the benefits of international trade. The existence of financial markets allows agents to hedge exchange rate risk and this may reduce or eliminate the potentially negative effect of exchange rate volatility on trade. However, forward markets are not complete, or fully utilised (see Dominguez and Tesar, 2001) and indeed some theoretical papers have suggested that the basic effect of exchange rate volatility on trade is unchanged even with complete capital markets (see Demers, 1991).

Rose (2000) notes that empirical research on the link between exchange rate volatility and trade had essentially ceased towards the end of the 1990s. However, with analytical developments and improvements in the quantity and quality of data, there has recently been a re-examination of this issue (see, for example, Peridy, 2003; Broda and Romalis, 2004; Clark et al., 2004; Tenreyro, 2004; Klein and Shambaugh, 2004). Because there may be differences in the impact of exchange rate volatility across sectors, recent studies have often used sectoral trade data and sought economic justifications for differences across industry. For example, Rauch (1999) develops a justification for different disaggregate trade behaviour based on the business networks involved in international trade and incomplete information.

In particular, Rauch (1999) emphasises the importance of search costs involved in matching buyers and sellers for differentiated goods: trade of this kind is facilitated by knowledge of particular markets or networks since the characteristics of some manufactured products are not readily known (e.g. performance and reliability). Given these search costs this also means that it is not easy for firms to switch foreign suppliers or find new buyers in response to changes in the exchange rate. This will consequently affect profitability, with negative effects in instances where individuals dislike increased risk. In contrast, homogeneous, or intermediate, goods are typically traded on exchanges, product characteristics do not vary between suppliers, can be substituted quickly and are therefore not regarded as having search costs. There will be considerable indifference between homogeneous goods sourced from different suppliers.

However, existing studies of the effect of exchange rate volatility on detailed sectoral and bilateral trade, use the CPI as the price deflator for trade. Such a deflator is likely to be inappropriate at the individual sectoral level since it abstracts from the sharply differing sectoral price trends (e.g. in agriculture and in computers). In this paper we follow a number of general international trade studies (see, for example, Head and Mayer, 2000; Erkel-Rousse and Mirza, 2002; Saito, 2004) and use price series at the industrial level as our deflator in our trade/exchange rate volatility relationships. Importantly, these general studies do not condition on exchange rate volatility.

A further novelty in our work is that we propose using economic and econometric criteria to underpin our sectoral disaggregation, while revisiting the effects of exchange rate volatility on international trade. In particular, we implement Rauch's approach to disaggregation in examining the impact of the second moment of the exchange rate on imports and exports. Furthermore, in our econometric modelling of the trade relationships we consider issues of measurement error associated with exchange rate volatility and also the endogeneity of trade and volatility, as suggested by Hau (2002), Broda and Romalis (2004) and Tenreyro (2004). Both of these econometric issues can be dealt with using instrumental variables and that is the approach we follow here. In our estimation we fully utilise a large cross sectional data set by adopting a fixed-effects panel approach, which allows us to test for cross sectional parameter heterogeneity.