European Economic Review 53 (2009) 830–845

Contents lists available at ScienceDirect

European Economic Review

journal homepage: www.elsevier.com/locate/eer

A test of trade theories when expenditure is home biased ☆

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ARTICLE INFO

Article history:
Received 19 March 2007
Accepted 4 March 2009
Available online 21 March 2009

JEL classification:
F1
R3

Keywords:
International specialisation
New trade theory
Home-market effects
Border effects

ABSTRACT

We develop a criterion to distinguish two dominant paradigms of international trade theory: homogeneous-goods perfectly competitive models, and differentiated-goods monopolistically competitive models. Our analysis makes use of the pervasive presence of home-biased expenditure. It predicts that countries' relative output and their relative home biases are positively correlated in differentiated-goods sectors (the "home-bias effect"), while no such relationship exists in homogeneous-goods sectors. This discriminating criterion turns out to be robust to a number of generalisations of the baseline model. Our empirical results, based on a world-wide cross-country data set, suggest that the differentiated-goods model fits particularly well for the machinery, precision engineering and transport equipment industries, which account for some 40% of sample manufacturing output.

1. Introduction

International trade theory is dominated by two major paradigms. One paradigm belongs to the neoclassical world with homogeneous goods and perfectly competitive product markets (PC). The second paradigm, frequently referred to as the "new trade theory", rests on the assumption of differentiated goods and monopolistically competitive markets (MC). While other important models exist, which combine features of both paradigms, much of the theoretical and empirical literature has concentrated on these two benchmark cases.

We develop a discriminating criterion that is amenable to empirical estimation. The criterion rests on the assumption that demand is home biased, in the sense that some buyers perceive home-produced goods *ipso facto* to be different from imports. It posits that the home bias influences international specialisation in sectors that are characterised by product differentiation associated with monopolistic competition and increasing returns (MC), while such bias is inconsequential for the location of sectors characterised by homogeneous goods associated with perfect competition and constant returns

☆ We have benefited from helpful suggestions made by the editor (Jonathan Eaton), by an anonymous referee, as well as by Richard Baldwin, Gert-Jan Linders, Thierry Mayer, Marcus Miller, Dennis Novy, Alan Winters, and by participants in the Empirics of New Economic Geography conference at HWWA (Hamburg) and in seminars at Bocconi, Dublin (Trinity College), Konstanz, the Kiel Institute of World Economics, Pompeu Fabra, York (Toronto) and Warwick. We thank Nicole Mathys for excellent research assistance, and the CEPII (especially Yvan Decreux and Soledad Zignago) for the generous provision of data on trade barriers. We gratefully acknowledge financial support from the Swiss National Science Foundation (grants 100014-113938, 612-65970 and PP001-68840/1).

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doi:10.1016/j.euroecorev.2009.03.003

(PC). We find this discriminating criterion to be robust to a number of generalisations of the baseline model, including imperfectly elastic sectoral factor supplies and multiple non-equidistant countries.

In a second step, we test the discriminating hypothesis across 17 industries, based on a cross-country data set for 1997. By combining production data with trade data, we can compute internal trade volumes and thereby estimate country-sector level home biases via a generalised gravity specification. By matching trade and production data with input–output tables, we can compute final expenditure values, which the theory prescribes as another ingredient to the testing equation. Our results suggest that the MC model fits particularly well for the engineering industries (fabricated metal products, non-electrical machinery, electrical machinery and precision engineering, and transport equipment), which account for some 40% of manufacturing output in our sample.

The paper is structured as follows. In Section 2 we review the relevant literature. Section 3 sets out our theoretical model and derives the discriminatory criterion. Section 4 discusses the robustness of that criterion. We operationalise the theoretical criterion empirically in Section 5. Section 6 concludes.

2. Related literature

Numerous studies have directly or indirectly attempted to gauge the relative explanatory power of the main paradigms in trade theory. One prominent approach has enlisted the excellent empirical performance of the gravity equation in support of the MC paradigm.[1] It has indeed been shown that the gravity equation has a straightforward theoretical counterpart in the MC model (Helpman, 1987). However, gravity-type predictions have also been derived from a variety of other models (Davis and Weinstein, 2001; Deardorff, 1998; Eaton and Kortum, 2002; Evenett and Keller, 2002; Feenstra et al., 2001; Haveman and Hummels, 1997). Furthermore, it was found that the gravity equation is an excellent predictor of trade volumes among non-OECD economies, a piece of evidence that Hummels and Levinsohn (1995) plausibly interpret as being at odds with the MC paradigm.

Another, more direct, approach was to derive a testable discriminating hypothesis from the theory that can serve to distinguish among theoretical paradigms through statistical inference. Work along this line started with Davis and Weinstein (1996, 1999, 2003). They developed a separation criterion based on the feature of MC models that demand idiosyncrasies are reflected in the pattern of specialisation more than one for one, thus giving rise to a "home-market effect" (HME, first identified by Krugman, 1980). Since the HME does not appear in a PC model, this feature can serve as the basis for discriminating empirically between paradigms. Davis and Weinstein have estimated the HME using data for Japanese regions (1999) and for OECD countries (1996, 2003), which allowed them to associate industrial sectors with one of the two paradigms.

The work of Davis and Weinstein has stimulated a lively research programme. Head and Ries (2001) have exploited the sensitivity of the HME to trade costs for an alternative discriminating hypothesis: in PC sectors (with product differentiation by country of origin) the HME is amplified by trade costs, whilst in MC sectors it decreases with trade costs. They estimated this prediction in a panel of 3-digit Canadian and US industry data covering the period 1990–1995. Alternatively using cross-sectional and time series variation in the data, they computed the slope of the line relating a country's share of output in an industry to its share of expenditure in that industry. Their sample period included a tariff reduction (NAFTA) that allowed them to relate the slope to the changes in trade costs (after controlling for other factors). They found evidence in support of both models depending on whether parameter identification comes from the cross-section or from the time series, but the PC model with product differentiation by country of origin seems to be supported more strongly.

Some researchers have classified sectors according to extraneous information on their characteristics, and tested whether those classifications map into different structural relationships predicted by the theory. Hanson and Xiang (2004) have employed a difference-in-difference gravity specification in order to allay concerns about endogeneity bias or specification bias. Their version of the HME is that larger countries tend to export relatively more of high-transport-cost, strong-scale-economies goods and relatively less of low-transport-cost, weak-scale-economies goods. They tested this prediction on country pairs' exports to third markets and found evidence of HMEs in high transport-cost, strong-scale-economies industries, as predicted by the theory. Weder (2003) has formulated the HME in terms of relative exports: a country tends to export more of the goods for which it has a larger home market, and the strength of this relationship increases in the importance of scale economies. His empirical findings, based on US-UK trade, support the theoretical predictions: HMEs become stronger the larger are an industry's economies of scale, measured by average firm size.

Related work has shown that the association between HMEs and the imperfectly competitive model with differentiated goods is neither necessary nor exclusive once one departs from the benchmark variant of the model. Three issues have been identified that limit the generality of the HME as a discriminatory criterion. First, as demonstrated by Davis (1998), the existence of HMEs relies on trade costs in the PC sector being sufficiently smaller than those of the MC sector. Second, Head

[1] An earlier literature had focused on intra-industry trade as evidence of the importance of the MC paradigm (see Greenaway and Milner, 1986; and, for a critical appraisal, Leamer and Levinsohn, 1995). Since intra-industry trade was generally associated with MC models, the observed large and increasing shares of intra-industry trade were interpreted as evidence of the growing relevance of non-neoclassical trade models. The theoretical relevance of this evidence became uncertain when some studies, such as Falvey and Kierzkowski (1987) and Davis (1995), demonstrated that intra-industry trade could also be generated in suitably amended versions of the PC framework.