



## Trade costs and the Home Market Effect<sup>☆</sup>

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### ABSTRACT

Most of the theoretical and empirical studies on the Home Market Effect (HME) assume the existence of an “outside good” that absorbs all trade imbalances and equalizes wages. We study the consequences on the HME of removing this assumption. The HME is attenuated and, more interestingly, it becomes non-linear. The non-linearity implies that the HME is more important for very large and very small countries than for medium size countries. The empirical investigation conducted on a database comprising 25 industries, 25 countries, and 7 years confirms the presence of the HME and of its non-linear shape.

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### 1. Introduction

Models characterized by the presence of increasing returns to scale, monopolistic competition, and trade costs typically give rise to what has become known as the Home Market Effect after Krugman (1980) and Helpman and Krugman (1985). The Home Market Effect (HME) is defined as a more than proportional relationship between a country's share of world production of a good and its share of world demand for the same good. Thus, a country whose share of world demand for a good is larger than average will have – ceteris paribus – a more than proportionally larger-than-average share of world production of that good.<sup>1</sup> The HME is so closely associated to the presence of increasing returns to scale (IRS) and monopolistic competition (MC) that it has been used as a discriminating criterion to testing trade theory in a novel approach pioneered by Davis and Weinstein (1999, 2003). Since then, as it will be discussed below, further theoretical and empirical research has explored the robustness of the HME and has searched for additional discriminating criteria.

One pervasive assumption in the literature to date is that of the presence of a good freely traded and produced under constant returns to scale (CRS) and perfect competition (PC). This good is often referred to as the “outside good”. The presence of the outside good serves two purposes. First, it guarantees factor price equalization, thereby improving grandly the mathematical tractability of

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<sup>1</sup> An alternative definition of the HME often used in the literature is that a country whose share of demand for a good is larger than average will be a net exporter of that good. In this paper we will always refer to the HME as the more than proportional relationship between the share of production and the share of demand.

models. Second, it offsets all trade imbalances in the IRS–MC good, thereby permitting international specialization. A different way of seeing the second point is that the outside good accommodates all changes in labor demand caused by the expansion or contraction of the IRS–MC sector, thereby allowing for the reaction of production to demand in the latter sector to be more than proportional. The assumption of the existence of a freely traded CRS–PC good is as much convenient as it is at odds with reality. As noted by [Head and Mayer \(2004, p. 2634\)](#) when discussing this issue in their comprehensive account of the literature: “...the CRS sector probably does not have zero trade costs or the ability to absorb all trade imbalances.” The pervasive use of the outside good assumption and its inconsistency with reality raise the question of what are the consequences of its removal on the HME. The present paper investigates this question.

We eliminate the outside good from the main model used in the empirical literature on the HME. This model, in two different variants, has been used in [Davis and Weinstein \(1999, 2003\)](#) and in [Head and Ries \(2001\)](#). We find that, in general, the HME survives when the outside good is absent but its average magnitude is attenuated. More interestingly, both variants of the model predict a non-linear relationship between the production share and the demand share. The non-linearity is characterized by a tenuous HME (or absence thereof) when countries' demand shares are not too different from the world average. The HME becomes stronger when countries' demand share becomes more dissimilar. We put this result to empirical verification on a data set containing 25 countries, 25 industries and 7 years. The non-linearity predicted by both models is strongly present in the data. One interesting consequence of the non-linearity is that the HME is more important for countries whose magnitude of demand shares is very different from the average than for countries whose demand shares are closer to the average. Performing a test of structural change with unknown breakpoints shows indeed that the HME matters only for the largest and smallest demand share, accounting for about one fifth of the observations in the sample. For the remaining observations, the HME is of negligible importance or totally absent.

As for the CRS–PC sectors, the model shows that the less than proportional relationship between share of production and share of demand survives the absence of an outside good. This result, combined with the more than proportional relationship between share of production and share of demand in the IRS–MC industry, confirms the theoretical validity of the HME as a discriminating criterion to test trade theories even in the absence of an outside good. The empirical investigation in this paper finds little evidence of sectors exhibiting a less than proportional relationship.

The remainder of the paper is as follows. Section 2 discusses the related literature, Section 3 presents the model and the theoretical results, Section 4 presents the empirical results, and Section 5 concludes. Appendix A discusses the numerical method, derives analytical results, and presents some robustness checks.

## 2. Relationship to the literature

In the model structures of [Krugman \(1980\)](#) and [Helpman and Krugman \(1985\)](#) the HME is a feature of the IRS–MC sectors and not of the CRS–PC sectors. This distinction has been used to test the empirical merits of competing trade theories. [Davis and Weinstein](#) find stronger evidence of the HME at the regional level ([Davis and Weinstein, 1999](#)) than at the international level ([Davis and Weinstein, 2003](#)). [Head and Ries \(2001\)](#) consider a model where, in addition to the outside good and the IRS–MC good, there is also a CRS–PC good characterized by National Product Differentiation à la [Armington \(1969\)](#). In such model, the IRS–MC good exhibits the HME while the Armington good does not. Using data for U.S. and Canadian manufacturing they find evidence in support of both the IRS–MC and the Armington market structure depending on whether within or between variations are considered.

Both [Davis and Weinstein \(1999, 2003\)](#) and [Head and Ries \(2001\)](#) assume the existence of an outside good. The first investigation on the consequences of removing the outside good is found in [Davis \(1998\)](#). He eliminates the outside good from the model in [Helpman and Krugman \(1985, Ch. 10\)](#) by introducing trade costs in the CRS–PC good. His theoretical paper has shown that in the absence of an outside good the HME may disappear. The HME disappears if and only if trade costs in the CRS–PC good are sufficiently high to impede international trade in this good. Does the HME survive and what shape does it take when trade costs in the CRS–PC good are not high enough to impede trade in this good? This question, which we address both theoretically and empirically in part of this paper, remains unanswered in [Davis \(1998\)](#).

Other papers have addressed the issue of trade costs and international specialization without, however, focusing on the shape of the HME or on the validity of the HME as discriminating criteria. In a theoretical paper, [Amiti \(1998\)](#) studies, among other things, how the pattern of specialization and trade varies with country size when industries have different trade costs. [Laussel and Paul \(2007\)](#), use a two-sector model where the elasticity of substitution differs between industries. They find that, if countries are close in size, a fall in transport costs from a prohibitive level to zero is associated with a reversal in the pattern of trade at some intermediate level of trade costs. If the two countries are instead very different in size the larger country is always a net exporter of the less differentiated good. [Hanson and Xiang \(2004\)](#) theoretically and empirically investigate the pattern of specialization and trade in a model where a continuum of IRS–MC goods differ in terms of elasticities of substitution and trade costs. [Holmes and Stevens \(2005\)](#) focus on how the pattern of trade varies across industries that differ in technology when there are equal trade costs in all sectors. While these papers address issues related to the one in the present study, their focus is different from ours.<sup>2</sup> The

<sup>2</sup> Other papers have studied different manifestations of the HME while keeping the assumption of the existence of an outside good whenever appropriate. Such papers include [Weder \(1995\)](#), [Lundbäck and Torstensson \(1999\)](#), [Feenstra, Markusen and Rose \(2001\)](#), [Trionfetti \(2001\)](#), [Weder \(2003\)](#), [Yu \(2005\)](#), and [Brühlhart and Trionfetti \(2005\)](#).

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