Abstract

This paper proposes a discriminating hypothesis apt to distinguish between two paradigms of international trade: (1) Constant-Returns-Perfect-Competition (CRS-PC) and (2) Increasing-Returns-Monopolistic-Competition (IRS-MC). The discriminating hypothesis rests on the different degree of home bias among “consumers”. It predicts a positive relationship between a country’s share of world’s output (in any particular sector) and the country’s share of world’s home biased expenditure if the sector is IRS-MC and no relationship if the sector is CRS-PC. Accordingly, six sectors (covering 43.85% of industrial activity) are associated with IRS-MC, nine sectors (30.15% of industrial activity) with the CRS-PC paradigm. Results were not conclusive for the remaining three sectors.

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On The Home Market Effect:
Theory And Empirical Evidence

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Introduction

Explaining the determinants of international specialization is one of the most important questions in international economics. The last thirty years have witnessed a competition between two theoretical paradigms: one characterized by Constant Returns and Perfect Competition (CRS-PC) and the other one characterized by Increasing Returns and Monopolistic Competition (IRS-MC). The two paradigms are not mutually exclusive. On the contrary, as shown for instance in Helpman and Krugman (1985), they may coexist in a single model where some sectors are governed by IRS-MC while some others are governed by CRS-PC. In order to assess the relative importance of the two paradigms, therefore, it seems important to ascertain which sectors can be associated with which paradigm. This requires a discriminating hypothesis suitable for empirical testing. This is the scope of this paper. In the theoretical part, I identify a discriminating hypothesis that permits to discern between the paradigms. In the empirical part, I associate industrial sectors with paradigms. The empirical investigation shows that, on the bases of the discriminating hypothesis, about 44% of the industrial activity can be associated with the IRS-MC paradigm and about 30% with the CRS-PC paradigm. The remaining 16% yield ambiguous results.

1. Related Literature

Several studies have attempted to assess the importance of the two paradigms. A first group of studies pertains to the empirical industrial organization literature, for a review see Scherer and Ross (1990) and Tybout (1993). These studies focused on the direct measure of economies of scales and found little supporting evidence in favor of their existence. A second group of studies focused on intra-industry trade as evidence of the importance of the IRS-MC paradigm, for a review see Leamer and Levinsohn (1995). Helpman (1987) is a milestone work in this group. He derives a formulation of the gravity equation explicitly from an IRS-MC type of model. The excellent empirical performance of the derived gravity equation on data for the OECD countries stood for long time in support of the IRS-MC paradigm. Recently, the IRS-MC paradigm has been challenged on two grounds. First, theoretical studies, such as Davis (1995, and 1997), Chipman (1992), Deardorff (1995), and Falvey and Kierzkowski (1987) demonstrated that intra-industry trade could be generated also by amended versions of the CRS-PC paradigm. Second, Hummels and Levinsohn (1995) showed that the gravity equations fitted excellently on the set of non-OECD countries, a piece of evidence at odds with the assumptions of the IRS-MC paradigm. Feenstra, Markusen, and Rose (1998) reconcile this finding with theory. They argue that the gravity equation is compatible with CRS-PC but its empirical performance depends on the underlying model. They find that, consistently with the theory, differentiated commodities exhibit higher domestic income export elasticity than homogeneous goods. Lack of convincing evidence in support of the IRS-MC paradigm is also the result of two studies by Harrigan (1994 and 1996). In a more recent study, Harrigan (1997) finds evidence in support of a generalized version of the CRS-PC model where factor endowments and technologies jointly determine international specialization. Additional evidence in favor of emended models of factor endowments that include technological differences and home biased demand are found in Trefler (1995) and Davis and Weinstein (1998c).

The magnification effect. An innovative approach is found in a series of three papers by Davis and Weinstein (1996, 1998a, 1998b). Their focus is on the importance of the New Economic Geography (NEG) as a paradigm for international specialization. The novelty of their approach is that they identify and use a clear-cut discriminating hypothesis. This discriminating hypothesis allows them to distinguish between the NEG and the CRS-PC paradigm *with* trade costs (henceforth CRS-PC-T). They make use of an exclusive feature of NEG models that appears, in different settings, in Krugman (1980), Helpman and Krugman (1985), and in Weder (1995). The feature is that demand idiosyncrasies are reflected on the pattern of specialization more than one for one, thus giving place to a sort of magnification effect.[1] Conversely, in a CRS-PC-T model, there is no magnification effect. The magnification effect serves as the basis for empirical investigation. Sectors that exhibit the magnification effect are associated with the NEG paradigm while sectors that do not exhibit the magnification effect are associated with CRS-PC-T. In their first paper, Davis and Weinstein find that all the industrial sectors fail to exhibit the magnification effect. On this ground they reject the economic geography model in favor of a comparative advantage model with trade costs. Using the same methodology, in the second paper they conclude in favor of NEG as a paradigm for regional specialization within a country. Their third paper differs from the first two by introducing a dissipation parameter related to bilateral trade costs between each pair of countries. Regressing output against dissipated idiosyncratic demand showed evidence of the magnification effect in a number of sectors. This new evidence led to the acceptance of NEG as a relevant paradigm for international specialization. The dramatic contrast between the conclusion to their first paper and the conclusion to their third paper reflects the extreme sensitivity of the discriminating hypothesis to the way trade costs are modeled and captured by econometric techniques. This is certainly not a criticism to their approach (this paper is greatly inspired by theirs), rather, it is an acknowledgement of the difficulty of the task. In this paper, I propose a discriminating hypothesis that is free from this fragility for it does not rest on the presence or absence of trade costs. It is convenient to start by examining the following stylized facts.

2. Descriptive Statistics About Import Shares

One documented stylized fact about demand is that it is home biased. There is a substantial amount of empirical research showing the consequences of home biased demand on trade flows and/or on the pattern of specialization. This literature includes Davis and Weinstein (1998c), Lundb@ck and Torstensson (1998), Rauch (1996), Trefler (1995), Wei (1996), Brhlhart and Trionfetti (1998), and, in a different perspective, Helliwell (1996), and McCallum (1995). In particular, Trefler's influential work shows that the home bias is responsible (together with technological differences) for the mystery of the "missing trade".

One interesting and yet overlooked feature of the home bias is that not all sources of demand seem to be equally home biased. The home bias is not observable directly, yet, other

[1] This feature is also known as the "home-market" effect. Yet, in the context of this paper, it seems preferable to follow Davis and Weinstein and use the term "magnification" effect.

things equal, a home biased consumer would import less than a consumer who is not home biased. Thus, comparing import shares across sources of demand may give an estimate of which sources are more home biased than others. Input-output tables give this information (Eurostat, 1992). For each country, the tables report 63 domestic sources of demand (the complete list is in Table A1 in the Appendix). Import shares are computed for each source of demand and for each category of commodity. The import share obtains by dividing the expenditure on imported items by total expenditure on that item. As an example, Table 1 reports the import shares of some of the 63 different sources of demand in the Office Machines sector in Germany (to save space, the table reports only 15 sources). Some sources of demand import every office machine they buy (ie, import share = 1), some other sources relay totally on domestic suppliers (ie, import share = 0), and some others are in between.

Table A2 in the Appendix reports the minimum, the maximum, the average and the standard deviation of import shares across all sources of demand and across countries for 18 NACE industrial sectors. In many cases, the observed import shares cover the entire possible range, ie, from zero to one.

The determinants of the home bias may change across different sources of demand. It is natural than, that different sources of demand have different import shares.[2] This paper uses the stylized fact that import shares differ across sources of demand for two purposes. (1) It derives a discriminating hypothesis apt to distinguish between the two paradigms of international trade; and (2) perform an empirical test.

3. A Preview Of The Discriminating Hypothesis

Consider a world composed of two countries (*1* and *2*), each endowed with 100 units of labour (for simplicity, the only factor of production and total population). Only two commodities are produced: food (a homogeneous good subject to CRS-PC) and washing machines (a differentiated commodity subject to IRS-MC). There are two "kinds" of consumers: the "machine kind" who buys only washing machines, and the "food kind" who buys only food. Within each of these kinds, there are two "types". One type is "home biased" and spends all her/his income on domestic commodities while the other is "ordinary" and is indifferent about the country of production of commodities. Assume that, initially, there are 50 "machine kind" and 50 "food kind" of consumers in each country. Within each kind, in each country there are 20 "home biased" and 30 "ordinary" consumers. As an initial equilibrium take a situation in which output of food and machines is 50 euros in each country (for the sake of the example I use a common currency). As a result of these assumptions, aggregate home biased expenditure on food is 20 euros in each country and so is aggregate home biased expenditure on machines. Now consider the following thought experiment. Suppose that, within the food kind only, the ratio of home biased to ordinary consumers increases to 25/25 in country *1* and decreases to 15/35 in *2*. This means that country *1* increases its share of world home biased demand from 20/40 to 25/40. Note that there is no idiosyncratic demand in this experiment. Indeed, total demand for food in each country and worldwide remains constant. Since domestic output (50 euros) exceeds home biased demand (25 euros), there is no consequence on the pattern of specialization. The only consequence of this experiment is simply that ordinary consumers will import more but total imports of food remain the same (ie, equal to zero). This simple but

[2] The theoretical literature identifies various causes of the home bias: psychological bias in final consumption (Armington, 1969); Government home bias due to political interplay (McAfee and McMillan, 1989; Branco, 1994); multidimensional features of intermediate inputs non conveyed through the price system (Rauch, 1996). In addition, one could speculate that different source of demand face different trade costs. This is an issue briefly addressed in section A.3 in the Appendix.

illuminating example for the CRS-MP paradigm is drawn from Baldwin (1970). Let us now examine the IRS-MC sector. Suppose that, within the "machine kind" only, the ratio of home biased to ordinary consumers increases to 25/25 in country *1* and decreases to 15/35 in *2*. Total demand for machines in each country and worldwide remains constant. Yet, there is an effect on the pattern of specialization because expenditure on domestic varieties of machines has increased in country *1* and decreased in country *2*. Therefore, the size of the market for machines has expanded in country *1* and contracted in country *2*. Consequently, new producers of machines will appear in *1* and some will disappear in *2*. Country *1* becomes an exporter of machines and an importer of food.

This result gives us a discriminating hypothesis based on the relative size of home biased expenditure. *A country that has a relatively larger share of world's home biased expenditure on a particular commodity will relatively specialize in the production of that commodity if the commodity is subject to IRS-MC. Conversely, if the commodity is subject to CRS-PC, the country's share of world's home biased expenditure has no effect on the relative specialization of the country.* Two features of this discriminating hypothesis make it different from the one of Davis and Weinstein. First, it identifies a home market effect that does not relate to idiosyncratic demand but to idiosyncratic home biased demand. Second, the discriminating hypothesis is independent from the presence of trade costs in the model. The second feature is especially useful for two reasons. First it widens the scope of the test. Indeed, idiosyncratic home biased demand can be used to distinguish between IRS-MC, and CRS-PC, while the magnification effect can be used to distinguish only between the NEG and "everything else" (where "everything else" is CRS-PC-T when trade costs are positive and both CRS-PC and IRS-MC when trade costs are zero). Second, it frees the discriminating hypothesis from the extreme sensitivity to the way trade costs are modeled and measured. Naturally, this is not to say that trade costs are irrelevant. On the contrary, because the empirical investigation seems to be very sensitive to them, constructing a test that is independent from them makes the test more reliable.

4. The Model

The model suitable for the analysis needs to incorporate the paradigm of Constant-Returns-to-Scale-and-Perfect-Competition (CRS-PC) and the paradigm of Increasing-Returns-to-Scale-and-Monopolistic-Competition (IRS-MC). To this purpose I will us the widely adopted framework found in Helpman and Krugman (1985, part III). The world is composed of two countries indexed by i ($i=1, 2$) and two homogeneous factors of production indexed by V ($V = L, K$). Each country is endowed with a fixed and exogenous quantity L_i and K_i of the factors. L and K are used to produce three commodities indexed by S ($S = Y$, X, and Z).

4.1 Technologies and factors markets

Commodity Y and Z are assumed to be produced by use of a CRS technology and subject to a perfectly competitive market structure. The average and marginal cost function associated with the CRS sector is $c_S(w,r)$, where $S = Y, Z$ and w and r are the reward to L and K. Commodity X is assumed to be subject to an IRS technology that requires a fixed cost $f(w,r)$ and a constant marginal cost $m(w,r)$. As usual, it is assumed that technologies are identical across countries. In order to make the factor intensities independent of the scale of the firm it is assumed that the functions $m(w,r)$ and $f(w,r)$ use factors in the same relative proportion. Thus, the factor proportion depends only on relative factor prices and not on the scale of the firm. This convenient assumption is used in Markusen (1986). The average cost function in the X sector is

$c_X(w,r,x) = m(w,r)+f(w,r)/x$, where x is firm's output. The number of varieties of X produced in the world, denoted by N, is endogenously determined and so is n_i that denotes the number of varieties produced in country i. The demand functions for L and K obtain from the cost functions through the Shephard's lemma and are denoted by $l_s(w,r)$ and $k_s(w,r)$. Further, it is assumed no factor intensity reversal. The efficiency conditions and the market clearing conditions in the factors market are:

$$p_S = c_S(w,r), \qquad S = Y, Z \qquad (1a)$$

$$p_X(1-1/\sigma) = m(w,r), \qquad (1b)$$

$$p_X = c_X(w,r,x), \qquad (2)$$

$$l_Y(w,r)Y_i + l_X(w,r)xn_i + l_Z(w,r)Z_i = L_i \qquad i = 1,2 \qquad (3a)$$

$$k_Y(w,r)Y_i + k_X(w,r)xn_i + k_Z(w,r)Z_i = K_i \qquad i = 1,2 \qquad (3b)$$

Equations (1a) and (1b) state the usual conditions of price = marginal cost in all sectors and countries (sigma is the elasticity of substitution among varieties as further illustrated below). Equation (2) states the zero profit condition in sector X in all countries. Equations (3a) and (3b) state the market clearing conditions for factors in all countries. These eight equations describe the supply side of the model. Free trade assures commodity price equalization. In addition, it is assumed that factor endowments are such that there exists a factors price equalization set of full dimensionality.

4.2 Home biased and ordinary demand

As anticipated above, the empirical investigation makes use of the difference in the import shares of various sources of demand observed in the data. Accordingly, it is assumed that there are two types t of consumers (but one could think of a continuum of them) the "ordinary" type ($t = o$) and the "home biased" type ($t = h$). Accordingly, preferences are described by a CES-Cobb-Douglas utility function *cum* home bias. I follow Trefler (1995) and use a simple parameter to represent an Armington-type of home bias. The utility function of consumer type t in country i is:

$$U_{ti} = X^{(1-\delta_{Xti})\alpha_{Xi}} X_i^{\delta_{Xti}\alpha_{Xi}} Y^{(1-\delta_{Yti})\alpha_{Yi}} Y_i^{\delta_{Yti}\alpha_{Yi}} Z^{(1-\delta_{Zti})\alpha_{Zi}} Z_i^{\delta_{Zti}\alpha_{Zi}},$$

with:

$$\sum_S \alpha_{Si} = 1.$$

For simplicity, and without loss of generality, it is assumed that $\alpha_{Soi} = \alpha_{Shi}$ for any i, thus the type subscript is suppressed. The crucial assumption is that $\delta_{Soi} \neq \delta_{Shi}$.

Thus, without loss of generality but saving notation, it is assumed that $\delta_{Soi} = 0$ for any S and i, while $\delta_{Shi} > 0$ for at least $S = X$ in *1* or *2* or both.

In each country there are μ_i individuals of type h and $(L_i - \mu_i)$ individuals of type o. I_i denotes income of country i and is the inner product between factor endowments and factor rewards (it is assumed that individuals -labour- have claims on *K*). I_{ti} is the aggregate income of consumers of type *t* in country *i*, where I_{hi} = $:_i I_i$ and I_{oi} = $(L_i - :_i)I_i$. Denoting with E_{Sti} the aggregate expenditure of consumers of type *t* of country *i* on commodity *S*, we have E_{Sti} = $"_{Si} I_{ti}$. The utility deriving from the consumption of *X* as an aggregate of varieties is assumed to be a CES function with elasticity of substitution among varieties equal to the constant $s \in (1, \infty)$. The aggregate *X* in the utility function contains all varieties, while the aggregate X_i contains only domestic variety. Two-stage utility maximization and aggregation over individuals yields the aggregate expenditure of type *t* consumers of country *i* on each domestic variety of the commodity *X*. This is:

$$p_X^{1-s} p_X^{s-1} d_{Xti} E_{Xti} + p_X^{1-s} P_X^{s-1} (1 - d_{Xti}) E_{Xti} ,$$

where P_X is the price index associated with the aggregate *X* and B_{Xi} is the price index associated with the aggregate X_i. These are:

$$(P_X)^{1-F} = N(p_X)^{1-F}, \text{ and } (B_{Xi})^{1-F} = n_i(p_{Xi})^{1-F} .$$

The ratio,

$$E_{Shi} / \sum_i E_{Shi}$$

is country *i*'s share of world's home biased demand in sector *S*. The ratio,

$$E_{Shi} / E_{Shj}$$

is the country *i*'s relative size of home biased demand. Both of these ratios are used in what follows and are referred to as *idiosyncratic home biased demand*. The ratio,

$$E_{Si} / \sum_i E_{Si}$$

is country *i*'s share of world's demand in sector *S*. The ratio E_{Si} / E_{Sj} is the country *i*'s relative size of demand for *S*. These two ratios are used in what follows and are referred to as *idiosyncratic demand*.

4.3 Equilibrium in the products markets

The equilibrium conditions in the product market are:

$$\frac{p_X^{1-s}}{P_X^{1-s}} \sum_i \left[E_{Xoi} + (1 - d_{Xhi}) E_{Xhi} \right] + \frac{p_X^{1-s}}{p_{X1}^{1-s}} d_{Xh1} E_{Xh1} = p_X x \qquad \text{(4a)}$$

$$\frac{p_X^{1-s}}{P_X^{1-s}} \sum_i \left[E_{Xoi} + (1 - d_{Xhi}) E_{Xhi} \right] + \frac{p_X^{1-s}}{p_{X2}^{1-s}} d_{Xh2} E_{Xh2} = p_X x$$

$$E_{Yo1} + E_{Yh1} + E_{Yo2} + E_{Yh2} = p_Y (Y_1 + Y_2) \qquad \text{(4b)}$$

and

$$p_X n_i x \geq d_{Xhi} E_{Xhi} \qquad i = 1,2 \qquad (5a)$$

$$p_S S_i \geq d_{Shi} E_{Shi}; \qquad i = 1,2; \text{ and } S = Y,Z. \qquad (5b)$$

By Walras's law, the equilibrium condition for commodity Z is redundant. The model so far is standard except for the home-bias. The system (1)-(4) is composed of 11 independent equations and 12 unknown (p_X, p_Y, p_Z, x, n_1, n_2, Y_1, Y_2, Z_1, Z_2, w, r). Taking p_Y as the numJraire the system is perfectly determined. The usual conditions of existence and stability of a unique equilibrium are assumed to hold. Naturally, under appropriate conditions, the dimensionality of the model could be extended to any V, S and i (see Dixit and Norman, 1980). It is immediate that the only consequence of the two inequalities (5) is that the size of the factor price equalization set is reduced.

5. Discriminating Hypothesis

To illustrate the effect of the relative size of the home biased demand, consider the following experiment. Assume a change $d{:}_1 = - d{:}_2 > 0$. This change has the effect of increasing country *1*'s share of world's home biased demand (and country *1*'s relative size of home biased demand) leaving world's demand and individual countries' demand unchanged. That is:

$$dE_{Yh1} = - dE_{Yh2} > 0; \quad dE_{Xh1} = - dE_{Xh2} > 0, \text{ but } dE_{Y1} = dE_{X1} = dE_{Y2} = dE_{X2} = 0.$$

The fact that individual country's demand remains constant rules out idiosyncratic demands. The remaining effect on output, if any, is due to idiosyncratic home biased demand.

Proposition 1. *In the factor price equalization set, home biased idiosyncratic demand is inconsequential on the pattern of international specialization if the sector is governed by CRS-PC.*

Proposition 1 can be illustrated by simple inspection of (4b). It is apparent that the change $dE_{Yh1} = - dE_{Yh2}$ leaves the l-h-s of (4b) unaffected. Therefore, in the factor price equalization set the composition of any country's expenditure on Y (and Z) is inconsequential on international specialization. Naturally, if the change dE_{Yh1} implies that (5b) becomes binding then there is going to be an effect on the pattern of specialization.

Proposition 2. *Home biased idiosyncratic demand influences the pattern of specialization if the sector is governed by IRS-MC. Ceteris paribus, a country tends to specialize in the production of the commodity for which it has a relatively large share of world's home biased demand.*

Simple inspection of (4a) gives the intuition. The change $dE_{Xh1} = - dE_{Xh2}$, while it leaves E_{Xi} unchanged, induces a change in the l-h-s of the first equation in (4a) of magnitude,

$$p_X^{1-s} \left[\left(p_1^{s-1} - P_X^{s-1} \right) d_{Xhi} + P_X^{s-1} d_{Xh2} \right] dE_{Xhi} > 0 .$$

Inequality holds since $(P_X)^{1-\sigma} > (\pi_{Xi})^{1-\sigma}$. As a consequence, the solution of the system must change. This means that the composition of expenditure for the IRS-MP commodity affects international specialization. Note that, as it is intuitive,

$$dE_{Xh1} > 0$$

implies that the demand for domestic varieties increases since,

$$p_{Xi}^{s-1} < P_X^{s-1}.$$

Then n_1 will increase and n_2 will decrease. Thus, *ceteris paribus*, a country with relatively large share of world's home biased demand tends to have a relatively larger share of world' output in the differentiated commodity. Formally, proposition 2 can be proven by direct solution of sub-system (4a)-(4b). This gives the following reduced forms:

$$\frac{n_i}{N} = \frac{d_{Xhi} E_{Xhi}}{\sum_i d_{Xhi} E_{Xhi}} \tag{6}$$

$$p_X xN = \sum_i \sum_t E_{Xti} \tag{7}$$

Propositions 1 and 2 together provides a testable discriminating hypothesis. Equation (6) provides the basis for the empirical investigation.

Before proceeding to the empirical implementation it is important to address the issue of trade costs in relation to the magnification effect.

6. Trade Costs And The Magnification Effect

Trade costs are crucial in economic geography models and the magnification effect criterion relies entirely on them. Suppose that the *X* commodity is traded internationally at an iceberg type trade cost. For one unit of *X* sent, only a fraction $\tau < 1$ arrives at destination. If this is the case, then the price of *X* and the price index associated with *X* will be country specific and will bear a country index. In particular:

$$p_{Xi} = (1/\tau)\, p_{Xj} \text{ and } P_{Xi} = \mathbf{[n_1(p_{Xi})^{1-s} + n_2(p_{Xj})^{1-s}]^{1/(1-s)}}.$$

Naturally, π_i remains unchanged since it is composed of domestic varieties only.

An interesting feature of this set up is that, in the absence of home biased demand, the IRS-MC sector exhibits a magnification effect. This is to say that *idiosyncratic differences in the size of countries' expenditure are reflected on the specialization pattern in a magnified way*. The magnification effect can be easily shown in the model of this paper by setting $\delta_{Xti} = 0$ for all *t* and *i*, replacing the new price indexes in (1)-(4) where appropriate, and solving (4a) for n_1/n_2.

This gives:

$$\frac{n_1}{n_2} = \frac{(E_{X1}/E_{X2}) - t^{s-1}}{1 - t^{s-1}(E_{X1}/E_{X2})}.$$

The interesting feature is in the size of the following derivative:

$$\left.\frac{d(n_1/n_2)}{d(E_{X1}/E_{X2})}\right|_{t<1} = \frac{\left(1 - t^{2(s-1)}\right)}{\left[1 - t^{s-1}(E_{X1}/E_{X2})\right]^2} > 1 \qquad \text{(8a)}$$

The magnification effect shows itself in the fact that the derivative is larger than one.[3] In words, a country that has a relatively larger expenditure for the IRS-MC commodity will have a more than proportionally larger share of world's output. In contrast, as argued by Davis and Weinstain (1996, and 1998a, 1998b), in the CRS-PC sectors the derivative,

$$d(S_1/S_2)/d(E_{S1}/E_{S2}),$$

is less than one (*S = Y or Z*) even if J<1. Davis and Weinstain use the magnification effect in the empirical investigation. Sectors that exhibit the magnification effect are assigned to the IRS-MC paradigm while sectors that do not exhibit the magnification effect are assigned to the CRS-PC paradigm.

Proposition 3. *In the presence of idiosyncratic home biased demand, idiosyncratic demand does not necessarily generate a magnification effect.*

Proposition 3 is easily proven by resuming the assumption that *$_{Soi}$ … *$_{Shi}$ and differentiating (4a) around an equilibrium point.[4] Total differentiation gives:

$$\left.\frac{d(n_1/n_2)}{d(E_{X1}/E_{X2})}\right|_{t<1} = \frac{\left(1 - t^{2(s-1)}\right)\sum_t (1 - d_{Xti})E_{Xti} + \left(1 + t^{s-1}\right)d_{Xhi}E_{Xhi}}{\left(1 - t^{s-1}\right)^2 \sum_t (1 - d_{Xti})E_{Xti} + \left(1 + 5t^{s-1}\right)d_{Xhi}E_{Xhi}} \qquad i=1, \text{ or } 2$$

(8b)

Expression in (8b) is not necessarily larger than one. Specifically,

[3] This derivative appears in Krugman (1980), Helpman and Krugman (1985), Weder (1995) and Davis and Weinstein (1996, 1998a, 1998b). The inequality holds since, in incomplete specialization, E_{X1}/E_{X2} is bounded. See, for instance, Helpman and Krugman (1985).

[4] An alternative way to show the size of the derivative is to solve (4a) for n_1/n_2 and than take the derivative. This route is rather long because it requires the use of Ferrari's formula to solve a cubic equation. Total differentiation is more direct and it suffices to show that the derivative in question is <u>not necessarily</u> larger than one. The point of differentiation is chosen at "$_{S1}$ = "$_{S2}$, *$_{St1}$ = *$_{St2}$ for every *S* and *t*; $L_1 = L_2$; and $K_1 = K_2$ (there is only intra-industry trade), so that $E_{S1} = E_{S2}$. At this point of differentiation $n_1 = n_2$. From this point we let the expenditure change by $dE_{X1} = -dE_{X2}$. This is done by shocking the system by d"$_{X1}$ = -d"$_{X2}$. In this way the composition of expenditure remains unchanged in both countries. Obviously, this derivative is taken in the domain $t \in (0,1)$, at zero trade costs the solution of the system is given by expression (6).

$$\frac{d(n_1/n_2)}{d(E_{X1}/E_{X2})} < 1 \text{ if } \sum_t (1-d_{Xti})E_{Xti} < \frac{2}{(1-t^{s-1})} d_{Xhi} E_{Xhi} .$$

Since,

$$\frac{2}{(1-t^{s-1})} \in (2,\infty)$$

it follows that for any finite,

$$\sum_t (1-d_{Xti})E_{Xti} / d_{Xhi} E_{Xhi}$$

it is possible that the derivative is less than one. Therefore, as long as $*_{\text{Soi}}$ ... $*_{\text{Shi}}$, it is not correct to reject the assumption that a sector belong to the IRS-MC paradigm on the grounds that the estimated value of the derivative in question is less than one.

To be fair, Davis and Weinstein' third paper amends the empirical implementation of the previous papers in a substantial way. Since the present work closely relates to theirs I abstract a moment from the issue of home biased demand and address their third paper more closely. They note that, because of trade costs, demand from country *i* "dissipates" before it "reaches" country *j*. This can be seen by distinguishing between the term E_{Xi} and the term,

$$t^{s-1} E_{Xi} .$$

The first one is demand for good X of country *i*; the second one is demand for good X of country *i* as faced by producers in country *j*. In the empirical implementation they use a gravity equation to estimate the dissipation parameter t^{s-1}, then they multiply expenditure by it, and use the resulting "dissipated demand" in the regression in place of the non-dissipated demand they had used in the first two papers. Then, they associate with the IRS-MC paradigm sectors that exhibit the magnification effect with respect to dissipated idiosyncratic demand. There seem to be an inconsistency. The inconsistency appears by taking the derivative of n_1/n_2 with respect to the "dissipated" idiosyncratic demand $(E_{X1}/t^{s-1}E_{X2})$.

Rearranging the expression for n_1/n_2 as,

$$\frac{n_1}{n_2} = \frac{t^{s-1}(E_{X1}/t^{s-1}E_{X2}) - t^{s-1}}{(1-t^{s-1})^2 (E_{X1}/t^{s-1}E_{X2})}$$

and taking the derivative with respect to "dissipated" idiosyncratic demand gives:

$$\left.\frac{d(n_1/n_2)}{d(E_{X1}/t^{s-1}E_{X2})}\right|_{t<1} = \frac{t^{s-1}\left[1-2t^{s-1} + (2-t^{2(s-1)})(E_{X1}/E_{X2})\right]}{\left[1-t^{s-1}(E_{X1}/E_{X2})\right]^2} . \tag{8c}$$

Expression (8c) is not necessarily larger than one for the dissipation parameter t^{s-1} can be arbitrary close to zero. This means that, quite apart from the issue of home biased demand, dissipated idiosyncratic demand does not necessarily produce a magnification effect.

Therefore, it is not entirely correct to reject the assumption that a sector belongs to IRS-MC on the grounds that the estimated value of the derivative (8c) is less than one.

In conclusion, while idiosyncratic demand does not necessarily produce a magnification effect when some demand is home biased, dissipated idiosyncratic demand does not necessarily produce the magnification effect even in the absence of home biased demand. It seems that the magnification effect offers very little reliability as a criterion to distinguish between paradigms.

The last bit is to show the relationship between n_1/n_2 and E_{Xh1}/E_{Xh2} in the presence of trade costs. This is done by differentiating totally system (4). This gives

$$\left.\frac{d(n_1/n_2)}{d(E_{Xh1}/E_{Xh2})}\right|_{t<1} = \frac{2(1-d)(1-t^{s-1}) + 2d(1+2t^{s-1})}{H} > 0 \qquad (8d)$$

where H is a positive term the full expression of which is given in the Appendix and, to simplify algebra, we set $*_{hi} = *_{hj}$ / * (although $*_{oi}$ ... $*_{hi}$).

Equation (6) or (8d) are utilized to distinguish between CRS-PC and IRS-MC for they hold for IRS-MC sectors and they do not hold for CRS-PC sectors.

7. Empirical Implementation

This section identifies a testable hypothesis, sets the econometric specification, describes the data and discusses some econometric issues.

7.1 Econometric specification and discriminating hypothesis

The model predicts that a country share of world output in an IRS-MC sector is positively related to (1) the country share of world expenditure on that commodity if trade costs are not zero (equation (8b)) and (2) to the country share of world home biased expenditure (equation (8d) and/or (6)). Therefore, the following equations are estimated separately (for each sector *S*).

$$\frac{n_{Si}}{N_S} = \mathbf{b}_0 + \mathbf{b}_1 \frac{E_{Si}}{\sum_i E_{Si}} + \mathbf{b}_2 \frac{E_{hSi}}{\sum_i E_{hSi}} + u_i \qquad (9)$$

The discriminating hypothesis that serves to associate sectors with paradigms obtains from Propositions 1 and 2.

Discriminating Hypothesis. *A country's share of world home biased expenditure (in each sector) is positively related to the country share of world output (in the sector) if the sector is IRS-MP, and it is not related to it if the sector is CRS-PC.*

Table 2 relates the value of parameters with the paradigm of association according to Propositions 1, 2 and 3. The last two columns relate paradigms to $\$_2$ according to Propositions 1 and 2. A positive $\$_2$ is consistent with IRS-MC and inconsistent with CRS-PC. Similarly, $\$_2$ = 0 is consistent with CRS-PC and inconsistent with IRS-MC. Thus, if the estimate of $\$_2$ is positive and statistically significant, then the sector is associated with IRS-MC. If the estimate of $\$_2$ is not statistically different from zero, then the sector is associated with CRS-PC.

According to Proposition 3, the parameter β_1 cannot to be utilized to discriminate between paradigms. Yet, the parameter β_1 can be utilized to test for the presence of trade costs. A positive β_1 is consistent with positive trade costs and inconsistent with zero trade costs as shown by equation (8b). Conversely, $\beta_1 = 0$ is consistent with zero trade costs and inconsistent with positive trade costs as shown by equation (6). Thus, a statistically positive estimate of β_1 is interpreted as an indication of the presence of (important) international trade costs in the sector. A statistically insignificant β_1 is interpreted as absence of (or unimportant) trade costs. Once again, in contrast with the tests based on the magnification effect, an estimated $\beta_1 < 1$ is consistent both with IRS-MC and CRS-PC.

Note that we have not imposed the restriction that there are as many goods as there are factors. This is welcome, for it widens the theoretical validity of the test. Note that, without this restrictive assumption, factor endowments are redundant as an explanatory variable since, when there are more goods than factors, factor endowments do not determine the output pattern anyway. The fact that the empirical test does not need factor endowments is welcome also because it frees the test from the problem of relating output data and factor endowment data. The problem is that the industrial classification of output is only loosely related to measures of factor intensities (see Maskus, 1991).

A final note is in order. If inequalities (5b) were not satisfied there could be a potential pitfall in interpreting a positive estimate of β_2 as evidence of IRS-MC. Inequalities (5b) can be inspected directly by use of the data described below. Indeed, as discussed below, direct inspection has shown no sign of binding (5b).

7.2 Data

The testable hypothesis posits a relationship between three variables: share of output (n_i/N), share of expenditure,

$$(E_{Xi}/\Sigma_i E_{Xi}),$$

and share of home biased expenditure,

$$(d_{Xhi}E_{Xhi}/\sum_i d_{Xhi}E_{Xhi}).$$

Data for the first two variables abound. For the third one the only sources available are input-output tables. These tables contain: (1) the value of expenditure of each of the sources of total demand (ie, E_{Xti} for all t) and (2) the corresponding import shares. Input-output tables that are compatible across countries are in Eurostat (1985). A limitation of this data set is that it includes only eight countries, but it has two advantages. First, it includes a separate input-output table of imports from which one can compute the import shares. Second, the input-output tables permit to address the problem of simultaneity and causality in a simple way (see below).

The tables refer to the year 1985 only. They includes eight countries identified by i (i = *de, dn, es, fr, ir, it, nl, uk*) and 18 industrial sectors identified by S (see Table A1 in the Appendix for the complete list of sectors). The output share (n_i/N) is measured by Value Added. The values of E_{Xi} are directly computed from the input-output tables by summing expenditure over all sources of demand, that is $\Sigma_t E_{Xti}$. The input-output database counts 63 sources of demand for each country, ie, $t = 1,\ldots 63$ (the complete list is in Table A2 in the Appendix). The presence of the home bias cannot be observed directly. Yet, if a component of expenditure is particularly home biased it must exhibit particularly low import shares. The observed import share serves as a criterion by which to split total demand between home biased and ordinary. I have used two splitting criteria. I call the first one the "below average" criterion. This criterion sorts the Home Biased (HB) sources of demand as follows. First, I ranked the sources of demand according to their import share. Second, I label those sources below average import share as Home Biased while the other ones I labeled as Ordinary. For each sector, the demand of Home Biased sources were summed up. This sum is the variable E_{Xhi}, aggregation over countries gives,

$$\sum_i E_{Xhi} \ .$$

This criterion is admittedly arbitrary. Its arbitrariness, however, may result in an underestimation of the importance of IRS-MC. Indeed, according to the discriminating hypothesis, if a sector is CRS-PC any repartition of aggregate expenditure into two or more groups will yield a non-significant $\$_2$. Instead, if the sector is IRS-MC, an inaccurate identification of the home biased and ordinary sources may result in a non-significant $\$_2$. Thus the arbitrariness, at the most, contributes to an underestimation of the importance of IRS-MC. To make sure that the results of the estimation do not rest on this specific split, I have computed a second split that I call "twice below average". This criterion yields the Strongly Home Biased (SHB) sources of demand. The computation is straightforward. I rank by import share the sources of demand already classified as home biased according to the below average criterion. I take the average import share of this group and classify as Strongly Home Biased the component of expenditure exhibiting an import share below the average of the Home Biased. For each sector, the expenditure of all the Strongly Home Biased components have been summed up. This sum is a new measure of the variable E_{Xhi}, aggregation over countries gives a new measure of,

$$\sum_i E_{Xhi} \ .$$

A final note is in order. Home biased demand was compared to the size of output (by sector and country) to ascertain that inequalities (5) are indeed satisfied. The ratios,

$$d_{Xhi} E_{Xhi} \,/\, p_X n_i x$$

are all smaller than 1 and most of them are below ½. The highest value is 0.76, found in sector Metal Products in Germany. This means that inequalities (5) are fare from being binding.

7.3 Advantages and disadvantages of input-output data

The use of the Input-output table is dictated by the need to have data on the expenditure and import share of each single source of demand. Some features of this data set are worth discussing.

Micronumerosity. Each regression relies on a very small sample size of only eight cross-sectional observations (eight countries).[5] The major consequence of micronumerosity is large confidence intervals (see Goldberger, 1991, pp. 248-50 for a detailed treatment). In our context, this effect increases the probability of accepting the hypothesis $\$_2 = 0$. This means a possible underestimation of the importance of the IRS-MC paradigm. In addition, the point

[5] The existing literature does slightly better. For instance, Davis and Weinstein (1996) individual sector runs rely on 13 observation and nine degrees of freedom.

estimates are sensitive to sample size. It should be noted, however, that micronumerosity leaves intact the fact that the least square estimator is BLUE.

Reversed causality. Regressing output on expenditure raises the following problem. Suppose that one finds that output patterns correlate with demand patterns, this is subject to two interpretations. It could be that, as posited by the model, output patterns respond to demand patterns. Alternatively, it is possible that output patterns determined by causes outside the model induce matching demand patterns. For instance, suppose that for reasons outside the model country *i* is relatively specialized in industry *S*. Suppose also that industry *S* requires a large share of its output as its own input. Then, it is trivial that country *i* will have relatively large demand for *S*. The causal chain is from output to demand *via* intermediate inputs. This causal chain is unrelated to the home market effect but creates the statistical illusion of it. This problem is not easy to disentangle. Davis and Weinstein (1996, and 1998b especially through pages 29-31) acknowledge that all their results may be influenced by this problem. The input-output tables allow for a simple solution to this problem. That is to remove the main diagonal from the input-output matrix when computing E_{Xhi}.

Simultaneity. Previous studies have used trade data to measure E_{Xi} by subtracting net exports from production. This method is subject to the following problem. If production is high in one year, then the residual measure of E_{Xi} is also high, simply because it is obtained by subtracting the trade balance from output and not because high expenditure caused output to increase. Davis and Weinstein (1996, p. 31, and 1998b) acknowledge this problem. The input-output tables are immune from this problem for output and expenditure data (horizontal and vertical entries) are collected from independent sources.

Note that both reversed causality and simultaneity may generate the illusion of the magnification effect but do not generate the illusion of large home biased demand. Therefore, while reversed causality and simultaneity are serious problems for a test based on the magnification effect, they are only a minor problem for the test based on home biased expenditure.

8. Estimation

Tables 3 to 6 summarize the results of OLS regressions. Each row reports the results for one sector. For the sectors where the estimated β_2 is not statistically significant, the second line reports the result of re-estimating the equation using the first variable only. The constant was not significant in any regression and has been eliminated. The first set of estimation uses the full input-output matrix (section 8.1, Tables 3 and 4). The second set of estimation uses the same matrix but without the diagonal (section 8.2, Tables 4 and 5). This is done in order to remove the potential reversed causality problem. Within each set of regressions, I have used two measures of home biased demand. In Tables 3 and 5 I used the measure labelled as HB, in Tables 4 and 6 I used the measured labeled as SHB. This is done to check the robustness of the results to the split criterion. All regressions use the White's correction method for heteroscedasticity.

8.1 Estimation using the full matrix

Both tables (3 and 4) show estimates of β_2 not statistically different from zero for ten sectors out of eighteen. These ten sectors, therefore, are associated with the CRS-PC paradigm. Both tables show estimates of β_2 statistically different from zero (positive) for seven sectors: Metal-Products (X190), Agricultural-and-Industrial-Machines (X210), Electrical-Goods (X250), Motor Vehicles (X270), Pulp-Paper-and-Printing-Products (X470), Rubber-and-Plastic-Products (X490), and Other-Manufactures (X510). Therefore, these sectors are associated with the IRS-MC paradigm. The sectors Timber-and-Furniture (450), give ambiguous results for $\$_2$ is statistically significant in Table 3 but not in Table 4. It is comforting to see that the estimation results largely confirm the belief that manufactures are associated with IRS-MC while food and beverages are associated with CRS-PC. It is interesting to note that in most sectors $\$_2$ is either "strongly" significant (very small P in both tables) or "not at all" (very large P in both tables). This is reassuring, for it suggests that micronumerosity (large confidence intervals) may not influence the results so strongly one may suspect. Finally, one may observe that the estimation results are substantially robust to the way home biased expenditure is selected. Out of eighteen sectors only Timber and Furniture (X470) is sensitive to the split criterion.

8.2 Estimation removing the diagonal

Tables 5 and 6 show the results of the estimation obtained by removing the diagonal from the input-output matrix. Two sectors out of eighteen exhibit a qualitative change in the estimated parameters as the result of the elimination of the diagonal. These are Agricultural and Industrial Machines (X210) and Chemical Products (X170). The sector Agricultural and Industrial Machines (X210) passes from being associated with IRS-MC to being associated with CRS-PC. This could, in principle, be due to reversed causality. The sector Chemical Products (X170) passes from CRS-PC to IRS-MC. This is quite strange and does not have a clear theoretical explanation. Overall, except for Agricultural and Industrial Machines and except for the curious case of Chemical Products, it seems that reversed causality is not an overwhelming problem.

In addition to the comparison between the Full Matrix runs and the No-Diagonal runs we can compare the HB with the SHB runs. In the last two sets of runs (Tables 5 and 6) as well as in the previous ones (Tables 3 and 4) the sector Timber and Furniture (X450) is sensitive to the split criterion. In the Full Matrix run, as well as in the No-Diagonal run the estimated $\$_2$ becomes insignificant when we pass from the HB to the SHB criterion. It seems as if something specific to this sector makes it sensitive to the split.

8.3 Summary

Table 7 summarizes the results. Nine sectors exhibit an estimated $\$_2$ statistically not different from zero in all the estimation runs and, therefore, are unambiguously associated with the CRS-PC paradigm.[6] A star (*) indicates association with the IRS-MC paradigm in a particular type of estimation runs.

In six sectors the estimated $\$_2$ is statistically positive in all estimation run (four *). These sectors are unambiguously associated with the IRS-MC paradigm. These sectors appear in Table 7 individually and, in the last row, as a group labeled as X..IRS-MC. Estimation results are not conclusive for three sectors. Although the results are not conclusive, there seems to be a pattern for two of them. Sector X450 is sensitive to the split criterion in the same way in both sets of runs, sector X210 seems affected by reversed causality. Finally, all sectors in all runs, except Chemical Products in Table 5, exhibit a significant $\$_1$ which, according to theory, is evidence of important trade costs.

[6] These sectors are: X230, X290, X310, X330, X350, X370, X390, X410, and X430. To save space in Table 7 these sectors are labeled as "X..CRS-PC".

CRS-PC versus IRS-MC. Table 7 can be used to assess the relative importance of the two paradigms. The second column of the Table shows the size of industrial sector as share of the total. The nine sectors unambiguously associated with the CRS-PC paradigm account for 30.15% the value added of the industrial activity while the six sectors unambiguously associated with the IRS-MC paradigm account for 43.85% it. The total at the bottom of each of the last four columns indicates the percentage of industrial activity accounted for by the sectors market by a star (*) in the column.

The Magnification effect and home biased demand. In all the runs, none of the estimated $\$_1$ is statistically larger than one. Had we taken the magnification effect as a discriminating hypothesis, then we would have concluded that none of the sectors could be associated with the IRS-MC paradigm. More interestingly, in most of the sectors associated with IRS-MC the value of $\$_1$ is less than 1 with 95% probability (see sixth column of Tables 2-5). According to the magnification effect, this would have led us to associate these sectors with the CRS-PC paradigm. This reveals that interpreting the results according to the magnification effect may be very misleading. Davis and Weinstein (1996, page 42 and Tables 7) find that only two out of 42 4-digit sectors exhibit the magnification effect. They repeat the estimation runs at 3-digit level (their Table 8) and find that none of the sixteen 3-digit sectors exhibits the magnification effect. Even the third paper (1998b) shows little evidence of the magnification effect in the individual sector runs.[7] In the light of the theoretical model of the present paper, this absence of the magnification effect is not surprising. Indeed the empirical evidence of this investigation confirms that of Davis and Weinstein (1996, and 1998b), namely, that there is no evidence of the magnification effect. Yet, the conclusion is different. Indeed the theoretical part of this paper has shown that absence of the magnification effect does not imply absence of IRS-MC.

9. Pooling Sectors

The results of the regression runs obtained in the previous section can be used to pool sectors belonging to the same paradigm. Thus, all sectors associated with CRS-PC can be pooled as if they belonged to one single sector. Similarly, all sectors associated with IRS-MC can be pooled. Pooling data in this way is consistent with the statistical findings of the previous section. The estimates of $\$_2$, while they are statistically different across paradigms, are not statistically different across sectors in the same paradigm. Naturally, running pooled regression does not serve the purpose of associating sectors with paradigms. The purpose is to run regressions with a larger number of degree of freedom and, therefore, to acquire more confidence in the statistical validity of the regressions. If the association of sectors with paradigms according to the individual sector runs were not robust, probably the results would not be confirmed by the pooled regressions.

The following equation has been estimated using OLS.

$$\frac{n_{si}}{N_S} = b_0 + b_1 \frac{E_{Si}}{\sum_i E_{Si}} + b_2 \frac{E_{Si}^h}{\sum_i E_{Si}^h} + u_i \qquad i=1,..8;$$

for all S associated with IRS-MC and, separately, for all S associated with CRS-PC.

The sectors to be included in the IRS-MC set and CRS-PC set are taken from the previous section. Table 7 lists five possible sets of association of sectors with paradigms.

[7] The industries they associate with IRS-MC are Food Products, Beverages, Textile, and Wood Products Except Furniture (see Davis and Weinstein 1998b, Table 5).

Consequently, I have run five sets of pooled estimations. One of them I call “minimalist”, and correspond to the grouping X..CRS-PC and X..IRS-MC. The other four correspond to the last four columns of Table 7. The results are shown in Table 8 that is composed of five sub-tables reflecting the structure of Table 7. The results confirm what already found in the previous section. The parameter $\$_2$ is statistically insignificant in the CRS-PC sectors (l-h-s of Table 8) but statistically significant in the IRS-MC sectors (r-h-s of Table 8). None of the estimates of $\$_1$ is statistically larger than one and, in the IRS-MC sectors, all estimates of $\$_1$ are statistically smaller than one. Once more, this shows that the test based on the magnification effect fails to capture the presence of increasing returns and monopolistic competition. All estimates of $\$_2$ are statistically positive in the IRS-MC as expected. Standard errors are very small (small P) for all significant parameters.

Conclusion

This paper addresses the question of how to distinguish between the CRS-PC paradigm and the IRS-MC paradigm.

The theoretical part of the paper develops a discriminating hypothesis that uses the observed fact that different sources of demand have different import shares. The discriminating hypothesis posits a positive relationship between a country share of world output (in any particular sector) and the country share of world home biased expenditure in IRS-MC sector and no relationship in CRS-PC sectors. This discriminating hypothesis seems theoretically more robust than the one based on the magnification effect. Indeed, differences in import shares are well documented and their theoretical consequences are that the magnification effect looses its validity as criterion to distinguish between paradigms. In addition, the fact that the discriminating hypothesis does not rest on the presence or absence of trade costs gives it a wider scope. This is because idiosyncratic home biased demand can be used to distinguish between IRS-MC, and CRS-PC, while the magnification effect can be used to distinguish only between economic geography and “everything else”.

On the empirical side, the major limitation seems to be micronumerosity. The individual sector regressions relay on eight observations and six degrees of freedom. However, the pooled regressions, whose results are consistent with the individual sector runs, rely on a number of observations that range from 48 to 88. The results of the four sets of individual sector estimations and the two sets of pooled estimation seem substantially robust to the criteria of identification of home biased demand. The causality problem seems to affect, at most, one sector.

Overall, the investigation associated six sectors (covering 43.85% of industrial activity) with the IRS-MC paradigm and nine sectors (30.15% of industrial activity) with the CRS-PC paradigm. The results were not conclusive for three sectors.

Table 1
Sources of demand and corresponding import shares

I151	I153	I155	I170	I230	I330	I350	I450	I510	I690	I710	I810
1	0	0.67	0.29	0.54	0	0.1	0	0	0.40	0.26	0.16

Table 2
Association of parameters value with paradigms

$\$_1$	Trade costs	$\$_2$	Paradigm
+	J < 1	+	IRS-MC
+	J < 1	0	CRS-PC
0	J = 1	+	IRS-MC
0	J = 1	0	CRS-PC

Table 3
Full Matrix, HB

Sectors	$\$_1$	St. error	t-stat	P	$\$_1 < 1$ (5%)	$\$_2$	St. error	t-stat	P	Adj. R^2	F	Paradigm
170 Chem. Prod.	0.86 0.98	0.176 0.057	4.878 16.88	0.0028 0.000…		0.10	0.11	0.92	0.39	0.96 0.96	155	CRS-PC
190 Metal Prod.	0.92	0.027	34.75	0.000…	Yes	0.09	0.01	5.16	0.002	0.99	1205	IRS-MC
210 Agr & Ind. M.	0.89	0.031	28.26	0.000…	Yes	0.12	0.03	4.00	0.007	0.99	1495	IRS-MC
230 Office Mach.	1.10 1.02	0.150 0.057	7.317 17.99	0.0003 0.000…		-0.06	0.097	-0.673	0.52	0.94 0.95	127	
250 Electrical goods	0.71	0.029	24.13	0.000…	Yes	0.30	0.018	15.87	0.000…	0.99	5155	IRS-MC
270 Motor veicl.	0.70	0.093	7.474	0.0003	Yes	0.34	0.036	9.329	0.0001	0.98	522	IRS-MC
290 Other transp. Equip	1.16 0.99	0.188 0.117	6.209 8.471	0.0008 0.0001		-0.14	0.085	-1.646	0.151	0.91 0.88	78.77	CRS-PC
310 Meat	1.25 1.01	0.160 0.164	7.843 6.181	0.0002 0.0005		-0.27	0.126	-2.119	0.078	0.87 0.81	52.14	CRS-PC
330 Milk, dairy pr.	1.47 0.94	0.378 0.184	3.893 5.128	0.008 0.001		-0.50	0.447	-1.11	0.30	0.62 0.65	12.43	CRS-PC
350 Other food Pr.	0.93 0.98	0.058 0.037	16.00 26.30	0.000…		0.05	0.056	0.823	0.44	0.96 0.96	189	CRS-PC
370 Beverages	1.02 0.92	0.152 0.081	6.736 11.28	0.005 0.000…		-0.08	0.084	-1.022	0.34	0.84 0.84	38.80	CRS-PC
390 Tobacco prod.	0.78 0.82	0.134 0.124	5.848 6.596	0.001 0.0003		0.10	0.089	1.116	0.31	0.13 0.23	2.165	CRS-PC
410 Textile, clothing	1.01 0.99	0.016 0.010	62.26 95.09	0.000… 0.000…		-0.02	0.033	-0.737	0.49	0.99 0.99	1204	CRS-PC
430 Leather, footwear.	1.33 1.11	0.203 0.260	6.59 4.27	0.0006 0.0037		-0.24	0.151	1.617	0.16	0.81 0.77	32.18	CRS-PC
450 Timber, furnit.	0.87	0.081	10.66	0.000…	No	0.14	0.054	2.649	0.038	0.96	172	IRS-MC
470 Pulp, Pap, Print.	0.90	0.026	34.36	0.000…	Yes	0.09	0.027	3.516	0.0126	0.99	2511	IRS-MC
490 Rub., plast. pr.	0.75	0.048	15.51	0.000…	Yes	0.25	0.038	6.671	0.0005	0.99	2666	IRS-MC
510 Other manuf.	0.80	0.077	10.33	0.000…	Yes	0.21	0.032	6.439	0.0007	0.95	174	IRS-MC

Table 4
Full Matrix, SHB

Sectors	$\$_1$	St. error	t-stat	P	$\$_1 < 1$ (5%)	$\$_2$	St. error	t-stat	P	Adj. R^2	F	Paradigm
170 Chem. Prod.	0.89 0.98	0.130 0.057	6.828 16.88	0.0005 0.000…		0.07	0.069	1.014	0.34	0.95 0.96	160	CRS-PC
190 Metal Prod.	0.93	0.022	41.98	0.000…	Yes	0.07	0.013	5.142	0.002	0.99	1648	IRS-MC
210 Agr & Ind. M.	0.84	0.101	8.324	0.0002	No	0.19	0.045	4.169	0.006	0.98	368	IRS-MC
230 Office Mach.	1.07 1.02	0.069 0.057	15.49 17.99	0.000… 0.000…		-0.09	0.063	-1.361	0.222	0.95 0.95	140	CRS-PC
250 Electrical goods	0.86	0.080	10.73	0.000…	Yes	0.14	0.030	4.664	0.003	0.98	530	IRS-MC
270 Motor veicl.	0.78	0.046	16.98	0.000…	Yes	0.23	0.023	10.15	0.0001	0.99	1829	IRS-MC
290 Other transp. Equip	1.09 0.99	0.232 0.117	4.728 8.471	0.003 0.0001		-0.11	0.172	-0.665	0.53	0.87 0.88	51.34	CRS-PC
310 Meat	1.01 1.01	0.196 0.164	5.164 6.181	0.002 0.0005		-1.04E-5	0.040	-0.002	0.99	0.78 0.81	25.95	CRS-PC
330 Milk, dairy pr.	1.20 0.94	0.169 0.184	7.084 5.129	0.0004 0.001		-0.25	0.114	-2.203	0.069	0.80 0.65	29.61	CRS-PC
350 Other food Pr.	0.98 0.98	0.041 0.037	23.95 26.30	0.000… 0.000…		-0.010	0.012	-0.847	0.43	0.96 0.87	178	CRS-PC
370 Beverages	1.05 0.92	0.161 0.081	6.544 11.28	0.0006 0.000…		-0.104	0.075	-1.382	0.21	0.86 0.84	47.51	CRS-PC
390 Tobacco prod.	0.81 0.82	0.136 0.124	5.949 6.596	0.001 0.0003		0.02	0.028	0.821	0.44	0.11 0.23	1.83	CRS-PC
410 Textile, clothing	0.98 0.99	0.018 0010	53.40 95.08	0.000… 0.000…		0.01	0.001	1.540	0.17	0.99 0.99	1100	CRS-PC
430 Leather, footwear.	0.99 1.11	0.307 0.260	3.250 4.272	0.017 0.004		0.13	0.269	0.486	0.64	0.74 0.77	21.81	CRS-PC
450 Timber, furnit.	1.15 1.02	0.094 0.058	12.09 17.68	0.000… 0.000…		-0.13	0.089	-1.500	0.18	0.96 0.96	213	CRS-PC
470 Pulp, paper	0.91	0.021	43.57	0.000…	Yes	0.08	0.014	5.230	0.002	0.99	2484	IRS-MC
490 Rubber, plastic	0.81	0.031	26.27	0.000…	Yes	0.16	0.030	5.354	0.002	0.98	671	IRS-MC
510 Other manuf.	0.86	0.092	9.278	0.0001	No	0.14	0.035	4.017	0.007	0.95	143	IRS-MC

Table 5
No-Diagonal, HB

Sectors	$\$_1$	St. error	t-stat	P	$\$_1 < 1$ (5%)	$\$_2$	St. error	t-stat	P	Adj. R^2	F	Paradigm
170 Chem. Prod.	0.19	0.328	0.576	0.58		0.75	0.266	2.821	0.03	0.89	59.04	IRS-MC
190 Metal Prod.	0.85	0.019	43.76	0.000…	Yes	0.16	0.013	11.93	0.000…	0.99	2240	IRS-MC
210 Agr & Ind. M.	0.82 1.12	0.163 0.205	5.043 5.437	0.002 0.001		0.25	0.247	1.001	0.355	0.83 0.82	36.24	CRS-PC
230 Office Mach.	1.17 0.88	0.188 0.091	6.213 9.709	0.008 0.000…		-0.27	0.155	-1.715	0.137	0.92 0.90	87.97	CRS-PC
250 Electrical goods	0.72	0.063	11.417	0.000…	Yes	0.28	0.037	7.586	0.0003	0.99	784	IRS-MC
270 Motor vehicle	0.60	0.095	6.336	0.0007	Yes	0.43	0.033	13.091	0.000…	0.98	386	IRS-MC
290 Other transp. Equip	1.08 1.02	0.121 0.074	8.976 13.74	0.0001 0.000…		-0.06	0.049	-1.187	0.280	0.95 0.95	155	CRS-PC
310 Meat	1.06 0.94	0.055 0073	19.21 12.72	0.000… 0.000…		-0.13	0.074	-1.753	0.13	0.88 0.87	56.79	CRS-PC
330 Milk, dairy pr.	1.43 0.96	0.196 0.149	7.288 6.420	0.0003 0.0004		-0.45	0.234	-1.927	0.10	0.73 0.75	20.20	CRS-PC
350 Other food Pr.	0.87 0.96	0.040 0.043	21.57 22.22	0.000… 0.000….		0.09	0.042	2.188	0.07	0.96 0.95	205	CRS-PC
370 Beverages	1.08 0.93	0.129 0.084	8.364 11.18	0.0002 0.000…		-0.11	0.072	-1.579	0.16	0.89 0.87	59.18	CRS-PC
390 Tobacco prod.	0.76 0.80	0.131 0.125	5.810 6.471	0.001 0.0003		0.12	0.090	1.337	0.23	0.13 0.22	2.07	CRS-PC
410 Textile, clothing	0.98 0.98	0.279 0.197	3.510 5.013	0.012 0.001		0.01	0.112	0.090	0.93	0.66 0.71	15.00	CRS-PC
430 Leather, footwear.	1.26 1.04	0.419 0.291	2.999 3.591	0.024 0.008		-0.215	0.197	-1.092	0.32	0.65 0.64	14.32	CRS-PC
450 Timber, furnit.	0.61	0.120	5.078	0.002	Yes	0.37	0.145	2.570	0.042	0.92	86.55	IRS-MC
470 Pulp, paper	0.60	0.026	22.76	0.000…	Yes	0.38	0.029	12.68	0.000…	0.99	1053	IRS-MC
490 Rubber, plastic	0.63	0.147	4.303	0.005	Yes	0.38	0.127	3.009	0.023	0.99	802	IRS-MC
510 Other manuf.	0.78	0.077	10.12	0.0001	Yes	0.22	0.034	6.604	0.0006	0.95	168.07	IRS-MC

Table 6
No-Diagonal, SHB

Sectors	**$\$_1$**	**St. error**	**t-stat**	**P**	**$\$_1 < 1$ (5%)**	**$\$_2$**	**St. error**	**t-stat**	**P**	**Adj. R^2**	**F**	**Paradigm**
170 Chem. Prod.	0.71	0.141	5.061	0.002	Yes	0.221	0.061	3.612	0.01	0.91	74.48	IRS-MC
190 Metal Prod.	0.89	0.024	36.36	0.000…	Yes	0.11	0.014	7.231	0.0004	0.99	1977	IRS-MC
210 Agr & Ind. M.	1.62 1.12	0.492 0.205	3.283 5.437	0.017 0.001		-0.49	0.383	-1.291	0.24	0.83 0.82	36.86	CRS-PC
230 Office Mach.	0.87 0.88	0.101 0.091	8.628 9.709	0.0001 0.000…						0.88 0.90	56.86	CRS-PC
250 Electrical goods	0.86	0.023	37.50	0.000…	Yes	0.15	0.009	17.25	0.000…	0.99	4825	IRS-MC
270 Motor vehicle	0.65	0.066	9.787	0.0001	Yes	0.36	0.029	12.35	0.000	0.98	668	IRS-MC
290 Other transp. Equip	1.05 1.02	0.154 0.074	6.893 13.74	0.0005 0.000…		-0.04	0.098	-0.438	0.94	128 0.95		CRS-PC
310 Meat	0.935 0.937	0.088 0.073	10.54 12.72	0.000… 0.000…		0.002	0.020	0.138	0.89	0.85 0.87	42.44	CRS-PC
330 Milk, dairy pr.	1.16 0.96	0.170 0.149	6.800 6.420	0.0005 0.0004		0.22	0.17	-1.303	0.24	0.81 0.75	31.14	CRS-PC
350 Other food Pr.	0.97 0.96	0.050 0.043	19,49 22.22	0.000… 0.000….		-0.0006	0.010	-0.061	0.95	0.95 0.95	141	CRS-PC
370 Beverages	1.08 0.93	0.122 0.084	8.903 11.18	0.0001 0.000…		-0.107	0.053	-1.995	0.093	0.91 0.87	74.00	CRS-PC
390 Tobacco prod.	0.79 0.80	0.135 0.125	5.872 6.471	0.001 0.0003		0.038	0.028	1.357	0.22	0.09 0.22	1.756	CRS-PC
410 Textile, clothing	1.00 0.98	0.303 0.197	3.307 5.013	0.016 0.001		-0.016	0.104	-0.158	0.87	0.66 0.71	15.01	CRS-PC
430 Leather, footwear.	0.74 1.04	0.250 0.291	2.946 3.591	0.026 0.008		0.30	0.332	0.897	0.40	0.67 0.64	15.24	CRS-PC
450 Timber, furnit.	1.08 1.00	0.276 0.109	3.920 9.214	0.007 0.000..		-0.079	0.183	-0.43	0.68	0.85 0.86	41.09	CRS-PC
470 Pulp, paper	0.90	0.026	34.36	0.000…	Yes	0.09	0.026	3.516	0.01	0.99	2511	IRS-MC
490 Rubber, plastic	0.75	0.056	13.48	0.000…	Yes	0.26	0.050	5.126	0.002	0.99	2666	IRS-MC
510 Other manuf.	0.85	0.087	9.704	0.0001	No	0.15	0.031	4.751	0.003	0.95	155	IRS-MC

Table 7
Summary

Industrial Sectors	**Share of Industrial Output**	**Full Matrix**		**No Diagonal**	
	%	HB	SHB	HB	SHB
X170 Chem Prod.	10.98			*	*
X190 Metal Prod	10.00	*	*	*	*
X210 Agric. And Industrial Mach.	11.02	*	*		
X250 Electrical Goods	11.67	*	*	*	*
X270 Motor Vehicles	07.77	*	*	*	*
X450 Timber and Furniture	03.99	*		*	
X470 Pulp, Paper, Printing Prod.	08.44	*	*	*	*
X490 Rubber and Plastic Products	04.32	*	*	*	*
X510 Other Manufactures	01.64	*	*	*	*
X..CRS-PC	**30.15**				
All 18 Industrial Sectors	100.0				
	Totals →	**58.86**	**54.87**	**58.82**	**54.83**
X..IRS-MC	**43.85**				

Table 8
Pooled regressions*

Full Matrix									
HB									
CRS-PC. Obs = 80, R^2 = 0.74					IRS-MC. Obs = 64. R^2 = 0.98. F = 3196				
Coeff.	Estim.	St.Err.	t-Stat.	Prob.	Coeff.	Estim.	St.Err.	t-Stat.	Prob.
$\$_1$	1.02 0.97	0.085 0.048	12.05 20.16	0.000 0.000	$\$_1$	0.75	0.044	17.08	0.000
$\$_2$	-0.054	0.051	-1.075	0.29	$\$_2$	0.26	0.042	6.140	0.000
SHB									
CRS-PC. Obs = 88, R^2 = 0.79					IRS-MC. Obs = 56. R^2 = 0.98. F = 3606				
Coeff.	Estim.	St.Err.	t-Stat.	Prob.	Coeff.	Estim.	St.Err.	t-Stat.	Prob.
$\$_1$	0.99 0.98	0.046 0.038	21.58 25.45	0.000 0.000	$\$_1$	0.85	0.025	34.50	0.000
$\$_2$	-0.02	0.024	-0.656	0.513	$\$_2$	0.16	0.018	8.881	0.000
No Diagonal									
HB									
CRS-PC. Obs = 80, R^2 = 0.71					IRS-MC. Obs = 64. R^2 = 0.96. F = 1658				
Coeff.	Estim.	St.Err.	t-Stat.	Prob.	Coeff.	Estim.	St.Err.	t-Stat.	Prob.
$\$_1$	0.97 0.96	0.078 0.051	12.45 18.74	0.000 0.000	$\$_1$	0.63	0.050	12.66	0.000
$\$_2$	-0.01	0.053	-0.119	0.905	$\$_2$	0.36	0.044	8.254	0.000
SHB									
CRS-PC. Obs = 88, R^2 = 0.73					IRS-MC. Obs = 56. R^2 = 0.97. F = 1834				
Coeff.	Estim.	St.Err.	t-Stat.	Prob.	Coeff.	Estim.	St.Err.	t-Stat.	Prob.
$\$_1$	0.95 0.96	0.052 0.047	18.19 20.12	0.000 0.000	$\$_1$	0.80	0.035	23.03	0.000
$\$_2$	0.02	0.031	0.506	0.613	$\$_2$	0.20	0.032	6.279	0.000
Minimalist									
X..CRS-PC. Obs = 72, R^2 = 0.71					X..IRS-MC. Obs.=48, R^2 =0.97, F = 2047				
Coeff.	Estim.	St.Err.	t-Stat.	Prob.	Coeff.	Estim.	St.Err.	t-Stat.	Prob.
$\$_1$	1.03 0.97	0.089 0.053	11.56 18.15	0.000 0.000	$\$_1$	0.81	0.029	27.83	0.000
$\$_2$	-0.06	0.051	-1.193	0.236	$\$_2$	0.19	0.035	5.509	0.000

* In the rows "$\$_1$" on the l-h-s of the table the second line represents the estimation using only the significant variable, the R^2 on the heading refer to this estimation.

Appendix

This Appendix is in three parts: Tables, Mathematical Postscript, Trade Costs Differing Across Sources of Demand.

A.1 Tables

Table A1
Sources of demand and manufacturing sectors

Manufacturing Sectors	Sources of Demand	Description
	I010	Agric. Forest. Fising
	I031	Coal and briquettes
	I033	Lignite, briquettes
	I050	Product of coking
	I071	Crude petroleum
	I073	Refined petroleum
	I075	Natural gas
	I095	Water
	I097	Electric power
	I098	Manufactured gases
	I099	Steam, hot water
	I110	Nuclear fuels
	I135	Iron ore, ECSC prod.
	I136	Non ECSC products
	I137	Non-ferrous
	I151	Cement, lime, plast.
	I153	Glass
	I155	Earthenware, ceramic
	I157	Other minerals
X170	I170	Chemical products
X190	I190	Metal products
X210	I210	Agr. & Ind. Machines
X230	I230	Office Machines
X250	I250	Electrical goods
X270	I270	Motor vehicles
X290	I290	Other transp. equip.
X310	I310	Meat, meat products
X330	I330	Milk, dairy products
X350	I350	Other food products
X370	I370	Beverages
X390	I390	Tobacco products
X410	I410	Textile, clothing
X430	I430	Leathers, footwear
X450	I450	Timber, furniture
X470	I470	Pulp, paper, printing
X490	I490	Rubber, plastic
X510	I510	Other manufactures
	I530	Building, constructions
	I550	Recovery, repair
	I570	Wholesale, retail trade
	I590	Lodging, catering
	I610	Railway transport
	I613	Road transport

	I617	Inland waterways
	I631	Maritime transport
	I633	Air transport
	I650	Auxiliary transport
	I670	Communications
	I690	Credit, insurance
	I710	Business Services
	I730	Renting immovable Goods
	I750	Market education
	I770	Market health
	I790	Market n.e.c.
	I810	General public services
	I850	Non-market education
	I890	Non-market health
	I930	Non-market n.e.c.
	F01	Final consumption. Households
	F02	Final consumption Governm.
	F03	Final consumption Private sector
	F19	Gross Fix Cap. Formation

Table A2
Average, St-Deviation, Minimum, and Maximum of import shares by sectors and countries

Nace	X170	X190	X210	X230	X250	X270	X290	X310	X330	X350	X370	X390	X410	X430	X450	X470	X490	X510
DE																		
Av	0.33	0.13	0.25	0.31	0.24	0.24	0.22	0.07	0.16	0.17	0.27	0.03	0.37	0.49	0.17	0.11	0.21	0.19
St-D.	0.2	0.09	0.11	0.19	0.09	0.22	0.23	0.05	0.08	0.26	0.24	0.13	0.13	0.24	0.13	0.11	0.11	0.2
min	0	0	0	0	0	0.12	0	0	0.06	0	0	0	0	0	0	0	0	0
max	1	0.48	0.67	1	0.51	0.85	0.76	0.16	0.33	0.91	1	0.79	0.67	1	0.5	0.63	0.5	0.55
DN																		
Av	0.59	0.39	0.31	0.67	0.37	1	0.24	0.25	0.15	0.34	0.3	0.01	0.57	0.77	0.36	0.21	0.43	0.39
St-D.	0.15	0.16	0.16	0.28	0.19	0	0.25	0.25	0.16	0.31	0.17	0.02	0.24	0.31	0.25	0.12	0.14	0.21
min	0.17	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0.06	0	0
max	0.85	0.78	0.82	1	0.83	1	0.87	0.78	0.69	1	0.63	0.08	1	1	1	0.71	0.75	0.71
ES																		
Av	0.13	0.08	0.18	0.49	0.16	0.18	0.13	0.19	0.09	0.05	0.03	0.51	0.08	0.04	0.06	0.09	0.07	0.09
St-D.	0.13	0.06	0.15	0.15	0.12	0.09	0.23	0.25	0.24	0.04	0.03	0.69	0.07	0.05	0.07	0.08	0.05	0.11
min	0	0	0	0	0	0.08	0	0	0	0	0	0.03	0	0	0	0	0	0
max	0.81	0.33	0.8	0.79	0.82	0.38	0.87	1	1	0.15	0.1	1	0.38	0.18	0.41	0.57	0.29	0.85
FR																		
Av	0.23	0.04	0.41	0.22	0.2	0.16	0.16	0.27	0.05	0.12	0.02	0.32	0.13	0.14	0.06	0.05	0.22	0.12
St-D.	0.24	0.07	0.27	0.32	0.27	0.2	0.2	0.38	0.08	0.13	0.05	0	0.2	0.23	0.12	0.1	0.3	0.21
min	0	0	0	0	0	0	0	0	0	0	0	0.32	0	0	0	0	0	0
max	0.81	0.34	1	1	1	0.61	0.62	0.98	0.23	0.38	0.19	0.32	0.93	0.93	0.58	0.5	1	0.68
IR																		
Av	0.61	0.5	0.84	0.75	0.46	0.8	0.27	0.07	0.01	0.19	0.04	0.55	0.58	0.81	0.25	0.42	0.59	0.97
St-D.	0.31	0.36	0.19	0.28	0.38	0.3	0.4	0.13	0.02	0.28	0.07	0.63	0.3	0.15	0.23	0.32	0.41	0.06
min	0	0	0.5	0	0	0	0	0	0	0	0	0.11	0	0.67	0	0	0	0.8
max	1	1	1	1	1	1	1	0.38	0.04	0.9	0.18	1	1	1	0.63	1	1	1
IT																		
Av	0.18	0.06	0.11	0.13	0.09	0.09	0.1	0.28	0.2	0.11	0.13	0.04	0.06	0.05	0.05	0.04	0.07	0.2
St-D.	0.2	0.1	0.21	0.23	0.16	0.22	0.23	0.36	0.29	0.19	0.23	0.07	0.09	0.11	0.09	0.13	0.11	0.2
min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
max	0.69	0.62	1	0.95	0.58	1	0.98	1	1	0.67	0.81	0.13	0.48	0.47	0.45	0.95	0.46	0.74
NL																		
Av	0.53	0.4	0.43	0.2	0.39	0.3	0.2	0.24	0.11	0.13	0.23	0.15	0.53	0.52	0.26	0.21	0.59	0.1
St-D.	0.17	0.23	0.25	0.31	0.29	0.45	0.34	0.28	0.16	0.21	0.22	0.34	0.26	0.38	0.26	0.15	0.19	0.2
min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
max	0.81	1	0.95	0.67	0.9	1.85	0.9	1	0.63	1	0.71	0.98	1	1	0.92	0.93	1	0.79
UK																		
Av	0.34	0.09	0.19	0.41	0.29	0.18	0.38	0.13	0.16	0.22	0.06	0.12	0.21	0.21	0.36	0.13	0.23	0.25
St-D.	0.2	0.08	0.16	0.3	0.21	0.27	0.34	0.14	0.19	0.18	0.13	0.22	0.26	0.3	0.23	0.15	0.17	0.29
Min	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Max	0.71	0.38	0.72	1	0.78	1	1	0.43	0.47	0.5	0.5	0.58	0.71	0.83	0.75	0.65	0.71	1
Nace	X170	X190	X210	X230	X250	X270	X290	X310	X330	X350	X370	X390	X410	X430	X450	X470	X490	X510

A.2 Mathematical Postscript

When trade costs are not zero and some sources of demand are home biased, system (4) gives the following cubic equation.

$$qDh^3 + \left[q^2 A + B + (1+q)D - (A+B+C)q\right]h^2 + \left[(A+B+D)q - A - q^2 B - (1+q)C\right]h - qC = 0$$
(A.1.)

Where:

$$h \equiv n_1 / n_2$$

$$A \equiv E_{Xo1} + (1-d)E_{Xh1}$$

$$B \equiv E_{Xo2} + (1-d)E_{Xh2}$$

$$C \equiv dE_{Xh1}$$

$$D \equiv dE_{Xh2}$$

Total differentiation gives the expressions, (8b) and (8d) in the text, where

$$H \equiv 3qD + (1-q)^2 A + (2q+1)C > 0$$

A.3 Trade Costs Differing Across Sources Of Demand

Suppose that consumer-type "h" face trade costs J_{Xhi} and consumers-type "o" face trade costs J_{Xoi} for sector X in *i*. Asume that J_{Xoi} > J_{Xhi} and that, for simplicitly, J_{Xoi} =1. Consequently, import shares differ. This set up gives

$$n_i / N = t_{Xhi} E_{Xhi} / \sum_i t_{Xhi} E_{Xhi}$$

as the solution to sub-system (4a)-(4b). This solution is analogous to equation (6) and would again give the rationale for the empirical test in this paper.

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