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INTRA-NATIONAL VERSUS INTERNATIONAL TRADE: HOW STUBBORN ARE NATIONS IN GLOBAL INTEGRATION?

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ABSTRACT

This paper examines the home country bias in the goods market among OECD countries. An average country imports about two and a half times as much from itself as from an otherwise identical foreign country, after controlling for sizes of exporter and importer, their direct distance, geographic positions relative to the rest of the world and a possible linguistic tie. If one believes that the substitutability among goods produced in OECD countries is high, as it seems reasonable, the observed bias implies relatively small non-tariff barriers. Over 1982-94, the home bias of OECD countries as a whole exhibited a slow but steady decline. The bias in a typical member country of the European Community relative to its imports from other member countries showed a fifty percent decline during the period.

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1. Introduction

There is a sizable literature on the lack of international diversification in portfolio investment (for recent papers, see French and Poterba, 1991; Tesar and Werner, 1992; Baxter and Jermann, 1993; van Wincoop, 1996; Lewis, 1995, 1996 and the papers cited therein). One may think that the goods market is even less integrated since man-made barriers to trade and market imperfection of various kinds may be more severe[1].

Empirical studies on the size of overall home country bias in the goods market are rare. An exception is a paper by McCallum, in an recent issue of the American Economic Review (1995). Using Canadian province-level data in 1988, he showed that trade between two Canadian provinces are about twenty times as large as their trade with American states, after one controls for sizes and direct distances. Extending the same sample to cover 1988-94, Helliwell (1996) confirms the McCallum's basic finding. This estimate, if robust and generalizable to other countries, suggests an alarmingly large degree of home bias among developed countries, since Canada and the U.S. have more in common than most pairs of countries.

In this paper, I study the size of overall home bias in the goods market among OECD countries over 1982-1994. I have several objectives in mind. First, aside from the obvious point of checking the robustness of the McCallum-Helliwell estimate in a broader set of countries over a longer time period, I would like to provide a welfare interpretation of estimates of home country bias

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[1] There are also counter arguments: International negotiations in reducing barriers to goods trade may have a more established and institutionalized process under the auspices of the GATT.

within the framework of a simple model. Second, I would like to check out the importance of some possible contributors to the home country bias, such as exchange rate volatility, which cannot be examined in the McCallum-Helliwell sample. Third, I would like investigate the evolution of the home bias both for the OECD as whole and for member countries of regional trade blocs.

The approach to estimating home bias in this paper is in the same spirit of using the "Solow residuals" as a measure of total factor productivity: I define home bias as a country's import from itself in excess of its import from other countries after taking into account exporter and importer's sizes, bilateral distance, locations relative to the rest of the world and whether or not sharing a common border or language. This measure of bias reflects contributions by tariffs and non-tariff barriers to trade, but also include anything else that is not in the list of the control variables that distinguishes intra-national trade from international one. In short, it is an all-inclusive summary of "barriers" to trade.

The main difficulty in empirically estimating home country bias is the lack of direct data on a country's trade with itself. I construct such a measure based on the assumption that a country's imports from itself is just the difference between its total production and its total exports to foreign countries. This measure is NOT GDP minus total exports. First of all, GDP includes production in the service and transport sectors, which are not covered by any bilateral trade data set that I know of. So I have to take out these two sectors (and call the remaining sectors "goods part of GDP", or GGDP for short). Second, GDP are in value-added, whereas international trade volumes are shipment (or gross) values. To get the shipment counterpart of GGDP, I use OECD's Industrial Structure Statistics, which provides such data for a majority of countries in my sample. Construction of GGDP for the remaining countries and of other variables are discussed in a data appendix.

To preview the main results, I find first of all that an average OECD country during 1982-94 imported two and half times as much from itself as from an otherwise identical foreign country. The home bias is unequivocally present in the data, but is of an order of magnitude smaller than the McCallum estimate. Second, within the framework of a theoretical model, this estimate is translated to a relatively low tariff-equivalent if the degree of substitution among OECD countries' goods bundles is sufficiently high, as it seems likely. Hence, the welfare consequence of the observed home bias in the goods market is likely to be small. Third, for OECD countries as a group, there has been a slow but steady decline in home bias during the period. The decline was more pronounced within some regional trade blocs. For a typical member country of the European Community, the ratio of its import from itself to that from other member countries in 1994 was only about half as much as in 1982.

The organization of the paper is the following. Section 2 provides a foundation for gravity model that also facilitates later interpretation of estimated home bias. Section 3 focuses on estimating average size of home bias during the sample. Section 4 turns to examine evolution of the bias using a fixed effects specification. Section 5 concludes.

2. Theoretical discussions

The most commonly used framework to account for volume of bilateral trade is the gravity model. Typically, a log-linear form is postulated to connect country k's exports to country j to their economic sizes (their GDPs or GNPs) and their direct distance.

This simple form can be justified by a differentiated product framework with increasing returns to scale (Helpmen and Krugman, 1985). More recently, Deardorff (1995) demonstrates that the gravity model can also be reconciled with the classic framework as long as one makes the assumption that different countries produce different (bundles of) goods. This basic framework has been applied in many studies including some recent ones[2]. More importantly for the purpose at hand, it is the foundation of the McCallum paper (1995).

This basic form requires some important modifications when one thinks about its microfoundation. In Deardorff (1995), it is found that what matters for bilateral export volume is not just the absolute distance between the two countries, but their geographic positions relative to all other countries[3]. For example, even though the distance between Australia and New Zealand is about the

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[2]For example, Frankel, Stein and Wei (1995) and papers surveyed in Deardorff (1984). Hummels and Levinsohn (1995) used a different version derived from a monopolistic competition model.

[3] Also see the notes by Stein (1995).

same as that between Spain and Sweden, we may expect the first pair to trade more with each other, partly because it is further away from other markets (e.g., Europe and North America).

To place some discipline on the subsequent empirical estimations, I provide a minimalist theoretical framework in this section. As a deliberate choice, there is no preference for home-made goods in the utility function. All bias in consumption has to come from some sort of barriers to trade. The discussion follows the last model in Deardorff (1995), with an extension to allow for barriers to trade other than transport costs.

Let C_{ij} be the consumption of good i by the representative agent in country j, p_{ij} the price of good i in country j. Let Y_j be her income. She maximizes the following utility function.

$$\max U_j = \sum_i \beta_i c_{ij}^{\theta}$$

$$s.t. \sum_i p_{ij} c_{ij} = Y_j$$

where $\theta = (\sigma-1)/\sigma$, and σ, a real number in $[1, \infty)$, is the elasticity of substitution between any two consumption goods. A key assumption for gravity model is that every country produces a different good.

It is straightforward to solve this problem. For any good k, the optimal consumption plan is given by

$$c_{kj} = \frac{Y_j \beta_k^{\sigma}}{p_{kj}^{\sigma} \sum_i p_{ij}^{1-\sigma} \beta_i^{\sigma}} \tag{1}$$

In order to obtain a gravity-type equation, we need to relate β_k with country k's income. Country k's income is given by

$$Y_k = p_k \sum_h c_{kh}$$

where $p_k = p_{kk}$ is the price of good k in country k. To simplify the notations, let

$$Q_h \equiv \sum_i p_{ih}^{1-\sigma} \beta_i^{\sigma}$$

Q_h is basically a CES index of all prices in country h.

$$Y_k = p_k \sum_h \frac{Y_h \beta_k^{\sigma}}{p_{kh}^{\sigma} Q_h}$$

Define s_k as country k's share in the world income.

$$s_k \equiv \frac{Y_k}{Y_w} = \beta_k^{\sigma} p_k \sum_h \frac{Y_h}{p_{kh}^{\sigma} Q_h}$$

Then,

$$\beta_k^{\sigma} = \frac{s_k}{p_k \sum_h \frac{s_h}{p_{kh}^{\sigma} Q_h}}$$

And, substituting the last expression into Equation (1), we get

$$C_{kj} = \frac{Y_j Y_k / Y_w}{p_{kj}^{\sigma} Q_j p_k \sum_h \frac{s_h}{p_{kh}^{\sigma} Q_h}} \qquad (2)$$

For simplicity, we assume that transport costs take the "iceberg" form, and all other barriers to trade can be summarized by an *ad valorem* tariff rate. This way, the price of good k in country j can be decomposed into a product of three terms.

$$p_{kj} = p_k D_{kj} t_{kj}$$

Without loss of generality, normalize the prices of all goods in the countries of production to be one. That is, p_i=1, for all i.

To consider home bias, let us assume that

$$t_{kj} = \begin{cases} t_j & if\ k \neq j \\ 1 & if\ k = j \end{cases}$$

Combining all of these assumptions, we arrive at our central equation that describes export from country k to j (after taking logarithm on both sides).

$$logC_{kj} = logY_k + logY_j - \sigma\ logD_{kj} - logY_w$$

$$+ \sigma\ (H_{k=j} - 1)\ \log(t_j) + \log(R_k) + \log(R_j) \qquad (3)$$

where $H_{k=j}$ is an indicator variable that takes the value of one when k=j and zero otherwise.

$$R_k = [\sum_i D_{ki}^{-\sigma} \frac{s_i}{t_{ki}^{\sigma} Q_i}]^{-1}$$

which is some weighted average of exporting country k's distances from all of its trading partners.

$$R_j = [\sum_i D_{ij}^{1-\sigma} (t_{ij}^{1-\sigma} \beta_i^{\sigma})]^{-1}$$

which is some weighted average of importing country j's distances from all of its trading partners. In the subsequent discussions, we refer to R_k and R_j as exporter's and importer's remoteness measures, respectively.

The traditional gravity model refers only to the first three terms of Equation (3) (plus a constant term). For this reason, Equation (3) can be thought of a microfoundation of an extended gravity model. It serves as the basis of subsequent empirical estimations.

With the aid of this equation, we can make precise the meaning of home country bias in the goods market. We define a country's home bias as its imports from itself in excess of what it would have imported from an otherwise identical foreign country (with same size, distance and remoteness measure).

Home bias of country j

$$\equiv \log(C_{jj}) - [\log(C_{kj}) \mid k \neq j,\ Y_k = Y_j,\ D_{kj} = D_{jj},\ R_k = R_j] = \sigma \log(t_j)$$

which depends on both the degree of substitutability and barriers to trade.

3. How large is the home country bias?

In the empirical work, I augment the basic specification in (3) by including two other variables that have been found related to bilateral trade volume in other work (e.g., Frankel, Stein and Wei, 1995). These are a dummy for country pairs that speak a common language and one for those sharing a common land border. Our final specification is given by

$$\log(Export_{kj}) = \alpha+\gamma Home_{kj}+\beta_1\log(GDP_k)+\beta_2\log(GDP_j)+\beta_3\log(Distance_{kj})$$

$$+\beta_4\log(Remote_k)+\beta_5\log(Remote_j)+\beta_6 Language_{kj}+\beta_7 Adjacency_{kj}+u_{kj}$$

where "Home" is a dummy that takes the value of one if i=j and zero otherwise. Language and Adjacency are dummies for country pairs that share a common language or a common land border, respectively.

We estimate a system of four equations, with observations in different years in separate equations. We allow for year-specific intercepts in the system, but impose constancy restriction on the remaining parameters across the years in order to improve efficiency of the estimation. In this section, we do not allow for country specific intercepts because doing so would deprive us of the opportunity to estimate the degree of intra-national bias in goods trade. Fixed effects models are estimated in the next section when we examine evolution of the bias. On the other hand, we do allow for correlation across the years by employing the method of seemingly unrelated regression (SUR).

The basic regressions are reported in Table 1. Column 1 presents the result of the traditional "simple" gravity model, as used by McCallum (1995) and Helliwell (1996). One first notes that the usual gravity variables all have coefficients that are of the expected sign and statistically significant. For example, a one percent rise in exporter's (or importer's) GDP is associated with a 0.7-0.8 percent rise in exports. The coefficient on distance is negative and significant. A one percent increase in distance is associated with a 0.8 percent decrease in trade. The key parameter of interest is the measure of intra-national trade bias. That parameter is 2.27 and significant at the one per cent level. This suggests that, a country's trade with itself is about 9.7 [=exp(2.27)] times as high as its trade with a foreign country, holding constant sizes of and direct distance between exporters and importers. While this estimate of home bias is numerically large, it is half as high as that of McCallum and Helliwell.

As argued in the last section, the basic specification misses some potentially important regressors. In Columns 2 and 3, we add a measure of remoteness (proxies by log(GDP)-weighted average distances) for exporters and importers, as well as dummies for a common language and a common land border. The new regressors all have the correct signs and are almost always statistically significant. For example, according to Column 3, a one percent increase in the remoteness (average distance) of an importer would increase the bilateral export by 0.6 percent. Two countries speaking the same language tend to trade 80% [=exp(.61)-1] more with each other than otherwise. Two countries sharing a land border tend to trade 30% [=exp(.26)-1] more than otherwise. With this augmentation, the estimated home bias (ratio of import from self to import from an otherwise identical foreign country) falls sharply to a factor of 2.6 [=exp(.94)], which is lower than the McCallum-Helliwell estimate by an order of magnitude[4].

Robustness Checks

One may worry about endogeneity of the GDP variables as regressors in the equation. In particular, the export-led growth hypothesis suggests that more exports may contribute to larger GDPs[5]. If the hypothesis is correct, then GDPs will be correlated with the error term. As an attempt to deal with this, we use log of population size[6] as an instrument for log of GDP. We also reconstruct measures of relative remoteness accordingly using fitted values of log GDPs. The second stage IV versions of the SUR estimation are reported in Columns 4-6 of Table 1. According to Column 6, the home country bias is about 2.3 [=exp(.84)]. In all subsequent regressions, log(GDP) will always be instrumented by log(population) unless otherwise noted.

So far, all observations are equally weighted. As a robustness check, we also implement a weighted SUR method, by which all observations are weighted according to the product of the

[4] According to a survey reported by Helliwell (1996), most people expect the ratio of intra-Canada to Canada-US trade after adjusting for size and geography to be between 0.6 and 1.4, with a few reaching 3.

[5] See Frankel and Romer (1995) for a recent reference.

[6] In the results reported, A mexico dummy is added in the first stage regression as it would otherwise be a big outlier in the GDP-population association. However, the estimated home bias is little affected if we exclude Mexico from the sample.

exporter's and importer's GDPs (in logarithm). The result is reported in the last column of Table 1. The point estimates for all variables are broadly similar to the equally-weighted regressions. In particularly, the estimated coefficient for home bias is 0.92, between those from the straight SUR and IV-SUR.

The size of the estimated home bias is proportional to the value of intra-national distance. Since one may debate about its "correct" measure, it may be useful to get some numerical idea of how the home bias estimate could be affected by the error in the intra-national distance. Appendix Table A1 reports such an experiment. In the first two columns, I let the intra-national distance be 25% larger than I have used, leaving international distance unchanged, the resulting home bias coefficient is about 25% larger (1.05 as opposed to 0.84). In the last two columns, I let the intra-national distance to be 25% shorter, the home bias coefficient is now 33% smaller (0.56 against 0.84). In Appendix Table A2, I have experimented with alternative ways to measure remoteness. They tend to raise the size of estimated home bias. On the other hand, the resulting remoteness measures tend to produce negative signs that are inconsistent with the model. I have also restricted the sample to those for whom the ratio of GGDP to GDP can be observed directly. The results (not reported here) are basically unchanged. Finally, squared terms of log(GDP) and log(Distance) are added to the specification to capture possible non-linear effects (not reported). Those additional terms are not statistically significant and do not alter the estimated home bias coefficient.

Trade blocs and home bias

Thus far, our focus has been on estimating an average degree of home bias for all OECD countries. The biases need not be the same for all countries. In particular, we might think that member countries of a regional trade bloc may have a different degree of bias from non-members.

There are two trade blocs in the sample whose memberships are large enough to permit estimation of their effects: the European Community (eight in this sample) and the European Free Trade Area (four in this sample). Because the formation of trade blocs involves trade diversion from non-member countries, we will estimate their relative degree of home bias: the degree of bias by a member country of EC (or EFTA) to import from itself relative to its import from other members of the same regional bloc[7].

The estimation results are in Table 1b. To be more precise, we replace OECD average home bias dummy in Table 1a by five dummies. The first dummy takes the value of one if export from one EC member country to another (including to itself), and zero otherwise. This measures the extent to which intra-EC trade is different from other OECD countries. The second one represents import by any EC member from itself. This measures the degree of EC members' home bias relative to the pattern of intra-EC trade.

The third and forth dummies are analogous variables for EFTA. The last one represents the average degree of home bias for non-

[7]Two other regional blocs, the U.S.-Canada free trade area since 1989, and the Australia and New Zealand Closer Economic Relations pair since 1983, are also in the sample. However, measures of their relative home bias would only involve one observation each, and are not likely to be meaningfully estimated.

EC/non-EFTA countries in the sample.

The first two columns in Table 1b are two SUR regressions that impose same coefficients across the four years. The last four columns are the result of an SUR regression that allows the coefficients for home bias measures to vary over time. According to Column 2, the negative coefficient for the intra-EC trade dummy (-.25) implies that trade among EC countries were actually lower than a random pair of OECD countries, once one takes into account their proximity and economic size. This apparently surprising result is also noted in Frankel, Stein and Wei (1995) who used a different sample of countries and did not include intra-national trade observations. On the other hand, looking at the last four columns, we may conclude that the intra-EC trade had been steadily intensified during the sample period as the degree of undertrading declined steadily.

Once we control for the intra-EC trade pattern, EC member countries still exhibit some degree of home bias, although much smaller than the OECD average. According to Column 2, the ratio of an EC member's imports from itself to that from other member countries was about 1.7 [=exp(.52)] compared with about 2.5 for OECD average.

The story for EFTA is quite different. The average intra-EFTA trade bias is positive (0.27 in Column 2) but not statistically significantly different from zero. On the other hand, EFTA member countries' relative degree of home bias was substantial: a member imported from itself 4.3 times as much as from other member countries.

For the remaining non-EC/EFTA countries, the degree of home bias is very close to the average of all countries.

Exchange rate volatility and home bias

A possible candidate for the existence of home bias is exchange rate uncertainty for cross-country trade. This subsection examines this issue explicitly.

For country pair i and j, I define their direct exchange rate volatility as the standard deviation of the first difference in the log of the monthly exchange rate in the current and past years (twenty four months). In addition to the volatility of direct exchange rate, I also entertain the possibility of the cross currency volatility causing substitution among trading partners. For both exporter and importer, I define their average exchange rate volatility as the average of volatility of all of its bilateral exchange rate, weighted by the partners' log GDP.

If exchange rate volatility is partially responsible the home bias, we might think that a rise in the volatility of the direct exchange rate between the exporter-importer pair, other things equal, may depress trade volume. On the other hand, a rise in either exporter's or importer's average volatility, holding the volatility of the direct exchange rate constant, may increase the pair's trade. Since the volatility of a currency to itself is zero, both effects could contribute to the home bias.

Table 1c puts the hypothesis to test. The first two columns implement an SUR regression on the full sample. Unfortunately for the hypothesis, the three exchange rate volatility measures actually show "incorrect" signs. This of course is consistent with a large body of empirical work that fail to find a trade depressing effect of exchange rate volatility. Most importantly for this paper, the estimated home bias coefficients are little affected (compared to Columns 4 and 6 in Table 1a).

Home bias as an index of openness

I also augment the basic specification in Table 1a by including country specific home bias measures (see Appendix Table A3). Figure 1 plots the average home bias over 1982-94 for all countries in the sample, sorted in ascending order of the bias. According to this method, the U.S. is the most open economy in the sample. In fact, its home bias coefficient is not significantly different from zero[8]. On the other extreme, two least open economies in the sample are Portugal and Mexico.

It should be made explicit that the estimates of country-specific home biases are more noisy than that of the OECD average. On the hand, it provides an additional cross-country openness index that has certain advantages over other commonly used measures (trade/GDP ratio, trade weighted tariff rates, the frequency or coverage ratios of non-tariff barriers) as it is a summary statistic of every kind of barriers to trade.

[8] One may be surprised by the result that Japan is among the more open economies in the sample, as it seems different from many studies as well as from popular press accounts. In fact, it is not a finding unique to this paper. Saxonhouse (1989) and Davis and Weinstein (1996), using methods and data sets very different from this paper and from each other, also conclude that Japan is as open as the U.S., or as the prediction of the Heckscher-Ohlin theorem without trade barriers.

Are non-tariff barriers big or small?

We care about home bias in the goods market presumably because we think that it may have welfare cost. The McCallum (1995) paper may lead some to believe that a sizable welfare loss is associated with the current degree of home bias. To get an handle on the issue, let us ask what would be the tariff equivalence of the estimated home bias (say 0.91 according to Column 7 of Table 1a). From the Section 2, we observe that the home bias coefficient is a product of two things: degree of substitutability of goods produced by different countries and log of the tariff equivalent. For illustration, suppose σ=20 (an arbitrary choice), the observed home bias coefficient (0.91) can be translated into a tariff equivalent of about 5%[9]. Given that the average tariff level among OECD countries is 3-4%[10], the implied all-inclusive non-tariff barriers would be equivalent to 1-2% tariff.

The welfare consequence is inversely proportional to the degree of substitutability. Intuitively, if the goods are perfect substitutes, then any minor inconvenience (such as transport cost) may generate infinite amount of home bias even though no welfare loss is associated with this trade pattern. Therefore, we could of course obtain different welfare interpretation of the observed home bias by choosing different σ.

There is no good guidance on the "correct" value of σ. But since a big chunk of goods trade among OECD country is of intra-

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[9] $\exp(0.91/20)-1 = 4.7\%$

[10] See Laird and Yeats (1990), Table A3.1 on p240.

industry type, we may regard the degree of substitution to be reasonably high. Since the feasible range of σ is $[0, \infty)$, σ=20 may not be too high after all. In this case, the implied all-inclusive trade barriers are not much higher than the observed (low) tariff levels[11] [12].

So far, I have forced myself to interpret the observed home bias as a result of some barriers to trade. If one is willing to allow for extra preference for home-made goods in the utility function, as Trefler (1995) suggests, then the implied non-tariff barriers would be even smaller.

4. Is the world increasingly integrated?

The last section estimates the degree of intra-national trade bias averaged over 1982-1994. Was the world increasingly integrated during this period? In other words, did the home bias decline over time?

For the dynamic question, we take into account the country-specific or country-pair-specific fixed effects. To ease the estimation, we take a first difference of the gravity model, which drops out all the fixed effects. In the resulting specification, the changes in the log of export over a four year period is the

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[11] Using direct (but noisy) observations on NTB coverage ratios in 1983 from the UNCTAD, Harrigan (1993) found that non-tariff barriers in that year discouraged OECD countries' imports to a far smaller magnitude than tariffs. This is consistent with the finding here. It is also worth noting that the UNCTAD's NTB data are only available for one year, whereas the method of this paper allows one to estimate NTB for other years.

[12] Of course, trade in service may have a much larger home bias so it could have larger welfare consequence. Service trade is entirely outside the scope of the this paper.

dependent variable. Similarly, regressors are changes in the logarithm of the gravity variables. Naturally, all the gravity variables that are time-invariant, such as direct distance, dummies for adjacency and linguistic ties, are dropped out in the first differenced version. In other words, the specification is

$$dlog(Export_{kj}) = \alpha + \gamma Home_{kj} + \beta_1 dlog(GDP_k) + \beta_2 dlog(GDP_j)$$

$$+ \beta_3 dlog(Remote_k) + \beta_4 dlog(Remote_j) + u_{kj}$$

where d() denotes first difference. The parameter Γ now measures changes in the home bias over a four-year period.

The statistical results are in Table 2a. The first three columns are the result of an SUR regression that allow for period-specific coefficients. The fourth column is the result of an SUR regression that imposes constant parameters across time (but with period-specific intercepts). The coefficient on the "Home" dummy is negative during 1986-90 and 1990-94 and for the whole sample, consistent with the notion of a declining home bias in the sample. However, only the estimate for 1986-90 is statistically different from zero at the ten percent level. When the basic specification is augmented by the inclusion of the remoteness measures as reported in the last four columns of Table 2a, the estimates on the trend of home bias are unaffected. Table 2b is like Table 2a, except that changes in log(GDP) are now instrumented by changes in log(Population). The estimates on the trend of home bias are again unchanged.

Trade Blocs and Evolution of Home Bias

We now turn to examining evolution of home bias by member countries of two trade blocs (EC and EFTA).

The regression results are reported in Table 3. We focus our discussion on the last four columns of the Table that use IV-SUR method. Analogous to Table 1b, the dummy for average home bias for all OECD countries is replaced by five dummies. The first dummy now measures changes in the intra-EC trade. As one can see, the coefficients are positive for all three periods and significant during 1986-90 and 1990-94, indicating an intensification of intra-EC trade since mid-1980's relative to a random group of OECD countries.

During the same period, an average EC member's relative home bias (how much it imports from itself relative to its import from other EC members) had declined dramatically at the rate of about 5% per year over the sample (19%/4 according to the last column). Much of the shrinkage of the bias happened during the second half of 1980's. If we accumulate the point estimates in all subperiods, the EC member's relative home bias in 1994 was reduced to about half as much as in 1982. This is an affirmative testimony of the success of the drive for a "single European market." Of course, we should note that the decline of the EC member's home bias relative to non-EC members was far less dramatic since the regional integration also entailed a diversion of trade from non-member countries.

We can apply the same analysis to EFTA, but the resulting story is quite different from the EC. EFTA appears to be far less effective as a regional trade bloc. The intra-EFTA trade intensity did not increase at all. Furthermore, the tendency for an EFTA member to import from itself as opposed to from other members of the same bloc actually increased in every subperiod. The coefficients for increased home bias are statistically insignificant, though this could be partly due to the smaller number of observations relative to the EC.

Home bias for the remaining OECD countries exhibited a decline over the entire period (according to the last column), particularly since mid-1980's.

Figure 2 provides a visual summary of some of the main results. The plot normalizes the home biases in 1982 as 100, and traces out the evolution of the biases for the OECD as a whole as well as some major subsets, using the point estimates in Table 2b (columns 5-7) and Table 3 (Columns 5-7). Over 1982-1994, home bias for the OECD countries as whole declined by about ten percent. If integration among all OECD countries had replicated the process within the EC, the bias could have declined by fifty percent. One can also augment the basic regression with inclusion of country-specific measures of home bias evolution. An example is provided in Appendix Table A3.

Finally, I note in passing that when changes in exchange rate volatility (volatility of direct exchange rate and exporter's and importer's average exchange rates) are added to the first diifferenced version of the fixed effects specification (not reported), they continue to have little effect on the measured size or evolution of the home bias.

5. Concluding remarks

This paper reaches several conclusions. First, an average OECD country imports about two and half as much from itself as from an otherwise identical foreign country, after controlling for economic sizes of exporter and importer, their direct distance, geographic locations relative to the world and a possible linguistic tie. Just as "Solow residual" as a measure of total factor productivity, the measure of home bias in this paper reflects all factors that contribute to the deviation of a country's internal trade volume from the prediction of an augmented gravity model. In particular, the cause of the bias includes but is not limited to tariffs and non-tariff barriers to goods trade.

Second, conceptually, the size of the bias depends both on the degree of substitutability among goods produced in different countries as well as on some notion of barriers to trade. If the substitutability is high, as it seems likely for OECD countries, the estimate of home bias in this paper translates the implied all-inclusive trade barriers into a relatively low tariff-equivalence. Hence, the welfare consequence of the observed home bias in the goods market is not likely to be huge. Of course, the size of home bias in the service sector and its welfare consequence is not in the scope of this paper.

Third, over 1982-1994, home bias among OECD countries exhibited a slow but steady decline. Home bias in the member countries of the European Community during the period relative to their trade with other countries in the same bloc showed a dramatic decline. The bias in 1994 was only half as much as in 1982.

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Appendix A: Data

Bilateral Trade Between Distinct Country Pairs Our data set covers nineteen OECD countries for four years, 1982, 1986, 1990 and 1994. The data on bilateral trade (between two distinct countries) are from the IMF's Direction of Trade.

Countries' Imports from Themselves. Conceptually, this quantity is just the difference between total domestic shipment and total exports to the rest of the world. Total goods production is directly available from OECD's Industrial Structure Statistics for countries/years that are labled by (a) below. For others, a three-step procedure is used to construct the measure.

(1) Compute the goods part of GDP (or GGDP): GGDP=GDP-service-transport.

(2) Compute shipment-to-value added ratios using data from Industrial Structure Statistics

(3) Total goods production = (shipment/value added)*GGDP

Shipment-to-Value added Ratios

	82	86	90	"94"	proxy year for 1994	proxy year for 1982
Canada	2.47(b)	2.47(b)	2.44(b)	2.49(b)	92	
France	2.71(a)	2.53(a)	2.55(a)	2.52(a)	93	
Germany	2.12(b)	2.06(b)	2.05(c)	2.00(c)	92	
Italy	2.97(b)	3.15(b)	3.29(b)	3.23(b)	91	avg of 82 & 83
Japan	2.82(b)	2.60(b)	2.52(b)	2.48(b)	92	
UK	2.43(b)	2.33(b)	2.36(b)	2.32(b)	91	
US	2.37(c)	2.17(c)	2.16(c)	2.11(c)	92	
Austria	3.05(b)	2.90(b)	2.88(b)	2.86(b)	92	
Denmark	2.49(c)	2.37(c)	2.29(c)	2.22(c)	91	
Finland	2.82(a)	2.67(a)	2.58(a)	2.71(a)	91	

Netherlands	3.49(c)	3.34(c)	3.41(c)	3.35(c)	92	
Norway	2.28(a)	2.56(a)	2.43(a)	2.41(a)	91	
Sweden	2.81(a)	2.76(a)	2.87(a)	2.78(a)	93	
Switzerland	2.52(d)	2.55(d)	2.55(d)	2.52(d)	93	
Australia	2.38(b)	2.56(c)	2.38(c)	2.39(c)	90	83
New Zealand	3.12(c)	3.25(a)	3.10(a)	3.06(a)	91	
Portugal	3.73(c)	3.44(c)	3.36(b)	3.43(b)	91	84
Spain	2.91(b)	2.76(b)	2.91(b)	2.86(b)	91	
Mexico	2.55(c)	2.53(c)	2.62(c)	2.63(c)	91	84

Notes:

(1). Ratio = shipment / value added

(2). Shipment (production) and value added data are from OECD's "Industrial Structure Statistics" 1989 and 1993 issues (published in 1991 and 1995, respectively).

(3). Depending on availability, the ratios are computed with data on different sectors.

(a) data on agriculture, mining and manufacture.

(b) manufactures + mining

(c) manufactures only

(d) manufactures + agricultures

(4). 1994 data are not available at the time of the computation. Data on most recently availabl year are used as indicated in the second to the last column. Occasionally, 1982 data are not available. In that case, data in the closest year are used as indicated in the last column.

GDP, Population and Exchange Rates: IMF's *International Financial Statistics*.

Distance I adopt the "greater circle distance" between the economic centers (typically the capitals) of the country pair in question as is commonly done in the literature. Within a country, the average distance is assumed to be half of the distance from the economic center to the border. In actual implementation, when a country has at least one neighbor sharing a land border, then it is a quarter of the distance to that nearest neighbor. For an island country, I attempt to find a topographicallly similar country to determine its internal distance. Details of the distance calculation can be found in a separate appendix. Sensitivity to alternative measures is discussed in the text.

Remoteness The measures of remoteness according to Equation (3) are complicated: The weights are geometic, involving trading partners' shares in the world income and some other parameters. To simplify, I approximate exporter's remoteness, R_k, by an arithmetic weighted average of its distances from all trading partners, with trading partners' incomes as the weights.

$$Remote_i = \sum_h w_h Distance_{hi}$$

where w_h is country h's share in OECD's total GDP.

An importing country's remoteness measure is approximated analogously. Senstivity to alternative measures of remoteness is discussed in Appendix Table A2.

Data Appendix: Distance

Distance = Great Circle Distance between major cities
Source: "Direct-Line Distances" (International Edition)
by Gary L. Fitzpatrick and Marilyn J. Modlin,
The Scarecow Press, Inc. Metuchen, N.J., and London, 1986

Notes:
(1) For latitude, "-" denotes S and "+" N;
(2) For lontitude, "-" denotes W and "+" E;
(3) Intra-national distance = 0.25*distance between 2 cities indicated unless otherwise noted.
For Switzerland and Austria, intra-national distance = 0.125*distance between cities indicated.

Code City	Country	Latitude	Longitude	Intra-national Distance
1 Ottawa	Canada	45.4167	-75.7000	1 7
2 Paris	France	48.8667	2.3333	2 3
3 Bonn	W.Germany	50.7333	7.1000	3 2
4 Rome	Italy	41.9000	12.4833	4 15
5 Tokyo	Japan	35.7000	139.7667	4 15
6 London	UK	51.5000	-0.1167	6 2
7 Chicago	US	41.8833	-87.6333	7 1
8 Vienna	Austria	48.2000	16.3667	(8 3)*0.125
10 Copenhagen	Denmark	55.6667	12.5833	10 3
11 Helsinki	Finland	60.1667	24.9667	11 14
12 Amsterdam	Netherlands	52.3500	4.9167	12 3
13 Oslo	Norway	59.9167	10.7500	13 14
14 Stockholm	Sweden	59.3333	18.0500	14 13
15 Geneva	Switzerland	46.2000	6.1667	(15 2)*0.125
16 Sydney	Australia	-33.8833	151.2000	1 7
20 Wellintion	New Zealand	-41.3000	174.7833	4 15
21 Lisbon	Portugal	38.7167	-9.1333	21 22
22 Madrid	Spain	40.4000	-3.6833	22 2
33 Mexico City	Mexico	19.4000	-99.1500	33 7

Table 1a: Intra-national vs. International Trade , 1982-94

	Straight SUR			IV-SUR			Weighted-IV-SUR
Home Bias	2.27*	1.42*	.94*	2.01*	1.33*	.84*	.91*
	(.21)	(.24)	(.25)	(.23)	(.26)	(.27)	(.27)
log (GDP_i)	.69*	.71*	.70*	.70*	.71*	.71*	.68*
	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)
log (GDP_j)	.75*	.77*	.75*	.80*	.81*	.80*	.79*
	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)
log($Distance_{ij}$)	-.82*	-1.07*	-.98*	-.89*	-1.08*	-.96*	-1.00*
	(.03)	(.05)	(.06)	(.04)	(.05)	(.06)	(.06)
log ($Remote_i$)		.44*	.28*		.25*	.08	.01
		(.12)	(.12)		(.13)	(.13)	(.12)
log ($Remote_j$)		.76*	.60*		.69*	.50*	.49*
		(.12)	(.12)		(.13)	(.13)	(.12)
linguistic tie			.61*			.57*	.63*
			(.13)			(.14)	(.15)
Adjacency			.26#			.44*	.45*
			(.15)			(.16)	(.16)
log likelihood	-799.157	-799.041	-765.16	-852.120	-839.057	-825.428	2580.21
obs.	361 x 4	361 x 4	361 x 4	361 x 4	361 x 4	361 x 4	361 x 4
S.E.R.	.84 .78 .79 .80	.81 .74 .75 .75	.78 .72 .73 .73	.98 .89 .83 .84	.96 .87 .81 .80	.92 .83 .78 .77	.09 .08 .07 .07
(R^2)	.85 .88 .87 .87	.86 .89 .88 .89	.87 .89 .89 .89	.80 .84 .85 .86	.81 .84 .86 .87	.82 .86 .87 .88	.77 .80 .81 .83

Notes: (1) In IV-SUR, log (GDP) is instrumented by log (POP) plus a Mexico dummy. Remoteness is weighted by trading partners' log (POP).
(2) Year-specific intercepts are included in all regressions but not reported here.

Table 1b: Trade Blocs & Home Bias

	IV-SUR		82	86	90	94
Intra-EC Trade	-.37*	.25#	-.54*	-.49*	-.32*	-.17
	(.14)	(.13)	(.15)	(.14)	(.13)	(.13)
EC-members' relative Home Bias	1.55*	.52*	.97*	.90*	.59#	.45
	(.31)	(.33)	(.38)	(.35)	(.34)	(.33)
Intra-EFTA Trade	.31	.27	.26	.33	.22	.29
	(.24)	(.23)	(.27)	(.25)	(.23)	(.24)
EFTA-members' relative Home Bias	2.34*	1.45*	1.12*	1.30*	1.39*	1.48*
	(.46)	(.45)	(.54)	(.49)	(.47)	(.47)
Other Countries' Home Bias	2.06*	.73#	.86*	.85*	.77*	.70#
	(.33)	(.39)	(.46)	(.41)	(.39)	(.39)
log(GDP_i)	.74*	.74*	.74*			
	(.03)	(.03)	(.03)			
log(GDP_j)	.83*	.82*	.83*			
	(.03)	(.03)	(.03)			
log($DIST_{ij}$)	-.93*	-1.01*	-1.00*			
	(.04)	(.07)	(.07)			
log($Remote_i$)		.12	.12			
		(.13)	(.13)			
log($Remote_j$)		.53*	.53*			
		(.13)	(.13)			
Linguistic tie		.51*	.51*			
		(.14)	(.14)			
Adjacency		.39*	.39*			
		(.16)	(.16)			
log likelihood	-842.75	-818.15	-801.01			
#obs	361 x 4	361 x 4	361 x 4			
SER	.95 .85 .80 .82	.90 .81 .76 .76	.89 .81 .76 .76			
R^2	.81 .85 .86 .86	.83 .86 .88 .88	.84 .86 .88 .88			

Table 1c: Exchange Rate Volatility and Home Bias (IV-SUR, 82-94)

	Full Sample		Excluding Mexico	
Home Bias	2.04* (.23)	.83* (.27)	2.07* (.21)	1.06* (.25)
$\log(GDP_i)$	.72* (.03)	.72* (.03)	.71* (.03)	.72* (.03)
$\log(GDP_j)$	.79* (.04)	.79 (.06)	.75* (.03)	.75* (.06)
$\log(DIST_{ij})$	-89* (.04)	-.97* (.06)	-.80* (.03)	-.86* (.06)
$\log(Remote_i)$		.13 (.13)		.09 (.13)
$\log(Remote_j)$		.51* (.13)		.42* (.13)
linguistic tie		.58*		.51*
Adjacency		.44* (.16)		.42* (.15)
Volatility of bilateral exchange rate	1.70# (.99)	1.84# (.99)	-1.00 (1.53)	-.33 (1.54)
Average Volatility of i's exchange rates	-3.34 (1.14)	-3.70 (1.14)	-2.13 (1.91)	-2.82 (1.95)
Average Volatility of j's exchange rates	-.82 (1.14)	-1.23 (1.14)	.61 (1.91)	-1.06 (1.95)
log likelihood	-846.04	-818.60	-586.88	-526.558
#obs	361 x 4	361 x 4	361 x 4	361 x 4
SER	.98 .88 .82 .84	.92 .83 .77 .77	.88 .81 .72 .78	.81 .76 .67 .72
R^2	.80 .84 .86 .86	.83 .86 .87 .88	.83 .85 .88 .87	.85 .87 .89 .89

Table 2a. Evolution of Home Bias (SUR, 82-94)

	82-86	86-90	90-94	Imposing Same Coeff.	82-86	86-90	90-94	Imposing Same Coeff.
ΔHome bias	.03 (.08)	-.12# (.08)	-.01 (.08)	-.04 (.04)	.03 (.08)	-.12# (.07)	-.01 (.08)	-.04 (.04)
Δlog (GDP_i)	.42* (.10)	.26* (.12)	-.01 (.12)	.21* (.06)	.23* (.11)	-.05 (.14)	.17# (.11)	.15* (.07)
Δlog (GDP_j)	.60* (.10)	1.18* (.12)	.62* (.10)	.73* (.06)	.68* (.11)	1.62* (.14)	.61* (.11)	.82* (.07)
Δlog ($Remote_i$)					-6.60* (2.26)	-19.70* (5.85)	10.84* (3.28)	-4.00* (1.74)
Δlog ($Remote_j$)					1.90 (2.26)	30.08* (5.14)	.72 (3.28)	4.32* (1.74)
log likelihood	-348.273			-361.744	-314.13			
obs.	361 x 3			361 x 3	361 x 3			
S.E.R.	.35	.32	.35	.35 .33 .35	.34	.30	.35	.35 .32 .36
R^2	.12	.20	.06	.11 .19 .06	.14	.27	.09	.13 .23 .05

Note: (1) Year-specific intercepts are in all regressions but not reported here.

Table 2b. Evolution of Home Bias (IV-SUR. 82-94)

	82-86	86-90	90-94	Imposing Same Coeff.	82-86	86-90	90-94	Imposing Same Coeff.
ΔAverage Home bias	.03 (.08)	-.11 (.08)	-.01 (.08)	-.04 (.04)	.03 (.08)	-.12## (.08)	-.01 (.04)	-.04
Δlog (GDP_i)	.41* (.13)	-2.15* (.68)	.46* (.23)	.34* (.11)	.39* (.15)	-1.44* (.70)	.75* (.24)	.34* (.12)
Δlog (GDP_j)	.91* (.13)	3.52* (.68)	1.28* (.23)	1.10* (.11)	1.06* (.15)	4.09* (.70)	1.16* (.24)	1.13* (.12)
Δlog ($Remote_i$)					-.76 (2.68)	-17.27* (5.42)	11.16* (3.04)	1.21 (1.90)
Δlog ($Remote_j$)					5.45* (2.680	-15.17* (5.42)	-4.21 (3.05)	1.26 (1.90)
log likelihood	-363.240			-380.217	-343.23			-379.80
#obs	361 x 3			361 x 3	361 x 3			361 x 3
S.E.R.	.35	.34	.35	.35 .35 .38	.35	.34	.34	.35 .35 .35
R^2	.13	.10	.09	.13 .05 .08	.13	.13	.11	.13 .03 .09

Notes: (1) Δlog(POP) used to instrument log GDP, Δlog(POP) to instrument log(GNP) which in turn is used to contruct remoteness measures.
(2) Year-specific intercepts are in all regressions but not reported here.

Table 3. Trade Blocs & Evolution of Home Bias

	(SUR, 82-94)				(IV-SUR, 82-94)			
	82-86	86-90	90-94	Imposing Same Coefficients NR	82-86	86-90	90-94	Imposing Same Coefficients NR
ΔIntra-EC trade	.06 (.05)	.06 (.05)	.12* (.05)	.10* (.02)	.02 (.05)	.18* (.05)	.15* (.05)	.12* (.03)
ΔEC-members' relative Home Bias	-.07 (.13)	-.32* (.12)	-.14 (.13)	-.19* (.06)	-.07 (.13)	-.32* (.13)	-.14 (.13)	-.19* (.07)
ΔIntra-EFTA trade	.01 (.10)	-.06 (.09)	-.004 (.10)	-.02 (.05)	-.02 (.10)	-.08 (.10)	.01 (.10)	-.04 (.05)
ΔEFTA-members' relative Home Bias	.18 (.20)	.09 (.18)	.08 (.20)	.11 (.10)	.18 (.20)	.09 (.19)	.08 (.20)	.11 (.10)
ΔNon-EC/EFTA's Home Bias	.01 (.13)	-.03 (.12)	-.01 (.13)	-.02 (.06)	.05 (.13)	-.09 (.13)	-.03 (.13)	-.03 (.07)
$\Delta\log(GDP_i)$	.41* (.10)	.23* (.13)	-.01 (.10)	.19* (.06)	.41* (.13)	-1.90* (.67)	.57* (.23)	.32* (.11)
$\Delta\log(GDP_j)$	.58* (.10)	1.13* (.13)	.62* (.10)	.72* (.06)	.91* (.14)	3.77* (.67)	1.34* (.23)	1.09* (.11)
log likelihood	-339.41			-352.56	-345.988			-368.094
#obs	361 x 3			361 x 3	361 x 3			361 x 3
S.E.R.	.35	.32	.35	.35 .32 .35	.35	.33	.34	.35 .35 .34
R^2	.13	.21	.08	.12 .19 .08	.13	.13	.11	.13 .08 .11

Notes: (1) In IV-SUR, Δlog(GDP) is instrumented by Δlog(POP) plus a Mexico dummy.
(2) Included in all regressions are year-specific intercepts that are reported here.

Appendix Table A1: Sensitivity to Measures of Intra-national Distance and Remoteness (IV-SUR, 82-94)

	Longer Intra-national Distance		Shorter Intra-national Distance	
Home Bias	2.21*	1.05*	1.74*	.56*
	(.22)	(.27)	(.23)	(.28)
$\log(GDP_i)$	.70*	.71*	.70*	.71*
	(.03)	(.03)	(.03)	(.03)
$\log(GDP_j)$	.80*	.80*	.80*	.80*
	(.03)	(.03)	(.03)	(.03)
$\log(Distance_{ij})$	-.89*	-.96*	-.89*	-.96
	(.04)	(.06)	(.04)	(.06)
$\log(Remote_i)$		.08		.08
		(.13)		(.13)
$\log(Remote_j)$		.50*		.50*
		(.13)		(.13)
lingustic tie		.57*		.57*
		(.14)		(.14)
adjacency		.44*		.44*
		(.16)		(.13)
log likelihood	-852.12	-825.44	-852.12	-825.44
	361 x 4	361 x 4	361 x 4	361 x 4
SER	.98 .89 .83 .84	.92 .84 .78 .77	.98 .89 .83 .84	.92 .83 .78 .77
R^2	.80 .84 .85 .86	.82 .86 .87 .88	.80 .84 .85 .86	.83 .86 .87 .88

Notes: (1) All regressions have year-specific intercepts that are not reported here.
(2) log(GDP) is instrumented by log(Population) and Mexico dummies. The instrumented log (GDP) is used to compute the remoteness measures.
(3) Longer intra-national distance = 1.25 x benchmark; shorter intra-national distance = 0.75 x benchmark.

Appendix Table A2: Sensitivity to Remoteness Measures

	$\sigma = 2$		$\sigma = 10$		$\sigma = 20$	
Home Bias	2.02*	1.23*	2.12*	1.25*	2.12*	1.25*
	(.23)	(.25)	(.23)	(.25)	(.23)	(.25)
log(GDP_i)	.70*	.69*	.71*	.71*	.71*	.71*
	(.03)	(.23)	(.03)	(.03)	(.03)	(.03)
log(GDP_j)	.81*	.79*	.80*	.79*	.80*	.79*
	(.03)	(.03)	(.03)	(.03)	(.03)	(.03)
log($Distance_{ij}$)	-.88*	-.79*	-.85*	-.78*	-.85*	-.78*
	(.04)	(.04)	(.04)	(.04)	(.04)	(.04)
log($Remote_i$)	-.14*	-.15*	-.03*	-.03*	-.013*	-.015*
	(.03)	(.03)	(.01)	(.01)	(.003)	(.003)
log($Remote_j$)	.12#	.04	.001	-.004	.001	-.002
	(.07)	(.07)	(.007)	(.007)	(.003)	(.003)
lingustic tie		.67*		.68*		.68*
		(.14)		(.14)		(.14)
adjacency		.58*		.59*		.59*
		(.16)		(.16)		(.16)
log likelihood	-841.41	-819.60	-843.15	-820.39	-843.15	-820.39
	361 x 4	361 x 4	361 x 4	361 x 4	361 x 4	361 x 4
SER	.97 .88 .81 .82	.91 .82 .76 .77	.97 .87 .81 .82	.90 .81 .76 .77	.97 .87 .81 .82	.90 .81 .76 .77
R^2	.80 .84 .86 .87	.83 .86 .88 .88	.81 .84 .86 .86	.83 .86 .88 .88	.81 .84 .86 .86	.83 .86 .88 .88

$$Remote_i = [\sum_j w_j (Dist_{ij}^{-\sigma}]^{-1} \quad Remote_j = [\sum_i w_i (Dist_{ij}^{1-\sigma}]^{-1}$$

where w_h, $h=i,j$, is country h's share in OECD total GDP.

Appendix Table A3: Country-specific Home Biases
(Home country biases or their changes
= negative of the coefficients)

Country Code	Average Home Bias 1982-1994	Evolution of Home Bias 1982-86	1986-90	1990-94
1 Canada	-1.022*	.231#	.134	-.078
2 France	-1.111*	-.102	.183#	-.110
3 Germany	-.770*	-.134	.203*	-.015
4 Italy	-1.206*	-.104	.159	-.168##
5 Japan	-.785#	.126	.290*	-.042
6 UK	-.775*	-.137	.114	-.066
7 US	-.358	.230##	-.173#	.179#
8 Austria	-1.594*	-.047	.157#	-.064
10 Denmark	-1.149*	.073	-.153##	.035
11 Finland	-1.348*	-.034	.182#	-.197#
12 Netherlands	-.797*	-.051	.037	.240*
13 Norway	-1.084*	.038	-.332*	.024
14 Sweden	-1.005*	-.160	.109	-.167##
15 Switzerland	-1.098*	.051	.109	.115
16 Australia	-.726	-.002	.114	.080
20 N.Zealand	-1.272*	.034	.149##	-.180#
21 Portugal	-1.746*	-.103	.508*	-.142
22 Spain	-1.508*	.057	.491*	-.060
33 Mexico	-1.673*	.455	.333	-.195
log(GDP_i)	.733*	.324*		
log(GDP_j)	.655*	1.747		
log(Distance_ij)	-.978*			
log(Remote_i)	.226#			
log(Remote_j)	.454			
Linguistic tie	.486*			
Adjacency	.447*			
s.e.r.	.83, .74, .74, .73	.33	.29	.33
R-squared	.86, .89, .88, .90	.19	.34	.18
Log Likelihood	= -801.417	-276.794		
# of Observations	= 361*4	361*4		

Notes:

(1) Average biases over 1982-94 are estimated from a fixed effects regression with a specification similar to Table 1, Column 6. They are the basis for Figure 1.

(2) Evolution of the biases are estimated from a first differenced version of a fixed effects model similar to Table 3, Columns 5-7.

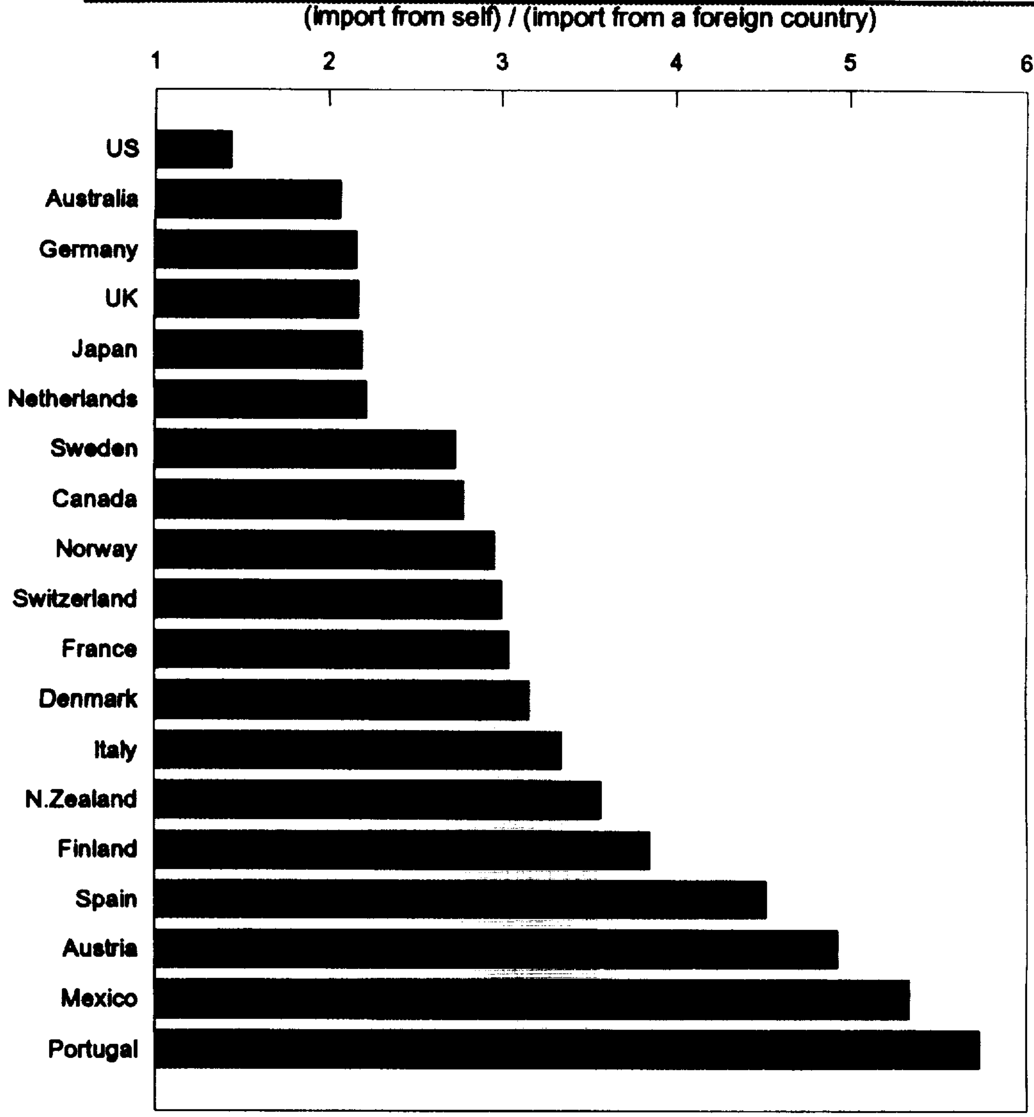
(3) Both regressions are IV-SUR. Both have period-specific intercepts that are not reported here.

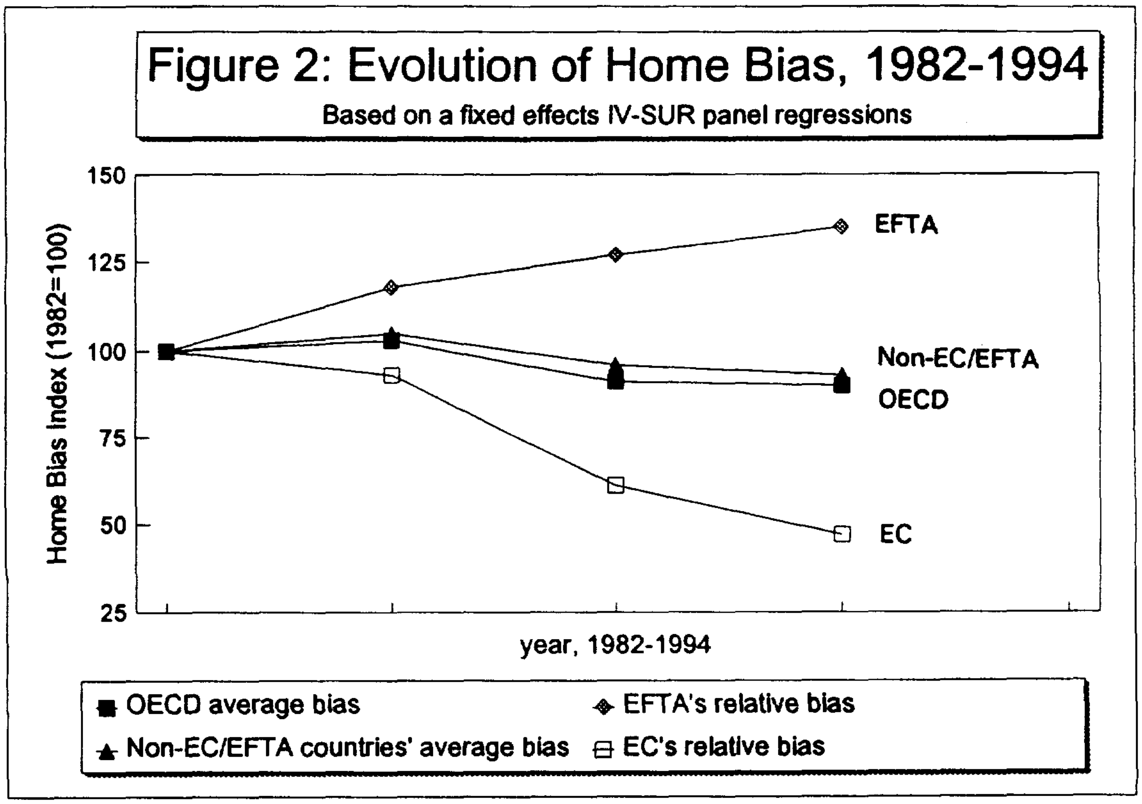
(4) The point estimate associated with a country dummy describes how much less a country imports from an identical foreign country than from itself.

(5) *, # and ## denote significantly different from zero at the five, ten and fifteen percent levels, respectively.

Figure 1: Home Bias Averaged Over 1982-1994

Based on an IV-SUR regression, reported in Appendix Table A3





Source: Table 3. Columns 5-7