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Alina Mika

Home sweet home: the home bias in trade in the European Union

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Abstract

This study examines the home bias in trade in goods and services within the European Union. Using the newest release of the World Input Output database, available for the years 2000-2014, the effect is estimated using gravity regressions. The trade-reducing effect of borders is found to be sizeable. It is greater for trade in services than for goods, though the former declined more markedly throughout the period. The paper extends current literature by demonstrating and analysing the variation in the bias across Europe. The border effect is larger in Central and Eastern Europe than in other parts of the continent. The differences in the effect can be largely explained by the depth of a country's integration with the European Union. The number of years passed since a country joined the EU has a significant impact on the bias. The longer a country has been in the EU, the lower its home bias, with the first years of membership having the largest (in absolute terms) effect.

Keywords: Trade, gravity, border effect, European Union

JEL classification: F02, F15, F14

Non-technical summary

The home bias in trade is one of the great puzzles of international economics. It is unsurprising that countries find it easier to engage in domestic trade than international trade. However, past studies have shown that the degree to which international borders hinder trade is greater than expected. By some estimates trade between Canadian provinces is as much as 20 times higher than trade between a Canadian province and a US state. This effect cannot be easily attributed to distance or trade frictions, factors commonly used to explain trade flows between countries.

The study of the home bias in Europe deserves particular attention. Over the past 70 years a divided continent became more integrated than ever before. The nations of Europe formed a number of unions and agreements aimed at bringing about peace and prosperity. The existence of the European Union, the Eurozone and the Schengen Agreement make it seem that borders between countries are no longer relevant. The impact of borders on international trade has received comparably less attention, hence motivating this analysis.

The aim of the paper is to answer the following question: do European Union countries trade domestically more than they would trade with their international clones? While this question may appear somewhat hypothetical, it is useful in understanding how much borders between countries hinder trade flows. To answer this question, data on trade between and within 28 European Union member countries were used. Thanks to the release of the World Input Output database domestic and international trade flows can be computed reliably, using only one data source.

The findings of this paper suggest that despite years of European intergration, borders still obstruct the flow of goods and services. In fact, trade in services is more biased towards the home country than trade in goods, possibly because services tend to be more localised. Trade in services may also encounter more intangible obstacles to trade. Over the period 2000 - 2014, for which the data were available, the home bias did not markedly decline for trade in goods. There is, however, evidence that the decline in the bias for trade in services was more pronounced.

At the same time, the border effect varies greatly across the continent. Central and Eastern European countries are more likely to turn towards domestic trade than international trade, when compared with Western European countries. This trend persists for both goods and services.

When seeking to understand what drives these cross-country differences, the role of European Union membership stands out. The effect of EU membership on the bias is not confined to the act of joining the union. The depth of a country's integration with the European Union, reflected in this analysis by the length of time a country has been an EU member, explains a large portion of the differences in the home bias across Europe. The longer a country has been a member of the union, the lower its home bias. In fact, the first years of membership having the largest (in absolute terms) effect on the bias.

This implies that the more closely integrated a country is with the European Union, the more likely it is to seek international trading partners, as opposed to domestic partners. The cycle appears to be self-reinforcing; a country with a more international outlook is also likely to seek further integration.

Introduction

The past decades have seen unprecedented efforts to economically and politically integrate the nations of Europe. Following two world wars the continent was transformed by various unions and agreements to bring about peace and prosperity. A diverse set of states is now a common market with freedom of movement, converging legislation, and, for some, a common currency and abolished border checks.

With European integration forces at play, national borders seem less relevant than ever in impeding the flow of goods, services, people and ideas. It is therefore worth formally testing whether trade and the international fragmentation of production are still hindered by national borders between EU members. This motivates the following study of the home bias in trade in goods and services in the European Union. The aim of the paper is to explore different dimensions of the home bias - its magnitude, how it varies over time and across the continent, and what can explain its variation. Throughout this paper, the home bias and the border effect are understood as indicators of how much more a given country trades domestically than with a comparable international trading partner.

The first part of this analysis presents estimates of the home bias in trade in intermediates, and demonstrates its variation across time and the continent. The effect is disaggregated into goods and services, and special attention is given to the bias in Central and Eastern European countries. The bias' evolution over time and its geographical differences are explored using helpful visual aids. To the best knowledge of the author, the second part of the study is the first attempt to explore a sources of variation in the home bias across the continent. The main hypothesis tested is that the bias is related to the depth of a country's integration with the EU, proxied by the length of time a country has been a member of the union. The study concludes that the bias is large and heterogenous. It is significantly larger for services than for goods, likely because services are more localised. At the same time, the decrease in the border effect is more pronounced in the services sectors. In addition, being a member of the European Union for a number of years is associated with sizeable decreases in the effect.

Literature review

The home bias is one of the six major puzzles of international macroeconomics. The phenomenon was first described by McCallum (1995) who used the gravity model to analyse trade between Canada and the United States. He famously found that trade between two Canadian provinces is over 20 times greater than trade between a Canadian province and a US state. There is a number of reasons why these estimates may be upward biased. The most notorious one is the omission of multilateral resistance variables, as reported byAnderson and Van Wincoop (2003). When laying the groundworks for the microfoundations of gravity analysis, they showed that bilateral trade is not only influenced by the physical distance between two countries, but also the economic distance in relation to other trading partners.

The gravity analysis of the home bias has since been applied to various geographical regions,[1] and extended beyond international trade to the bonds and equities markets (Fidora et al., 2007). What connects these diverse studies is evidence of a substantial border effect in trade and investment. While much of the literature on trade in the European Union focused on the effects of the common market or the single currency (Micco et al., 2003; Baldwin and Taglioni, 2006), there have been fewer studies on the home bias. The case of the bias on the old continent is particularly interesting considering efforts to bring about greater trade integration in the past decades. Reported estimates of the home bias in the EU have been smaller than corresponding estimates from other parts of the world, as confirmed by this study. Nevertheless, they remain sizeable.

The first comprehensive study of the border effect in the EU was conducted by Nitsch (2000). Using a sample of Western European countries he found that the average EU country trades domestically $e^{2.43} = 11.36$ times more than with a comparable international trading partner. Nitsch (2000) also uncovered considerable variation in the effect. Using a seemingly unrelated system of OLS regressions, he found that the bias was declining over time, from roughly 15 in the 1980s to 10 in the 1990s. This stands in contrast with the findings of this study: that the bias did not change over time for trade in goods. The reasons for this discrepancy will be considered in later parts of this study.

[1] For example by Parsley and Wei (2001) who focused on US-Japan trade, or by Gil-Pareja et al. (2005) who focused exclusively on the case of Spain.

Chen (2004) focused on another source of variation in the home bias: industry differences. She found border effects ranging from zero (for toys and games) to over 4000 (for the outlier, ready-mixed concrete), with an average of about $e^{1.87} = 6.49$. In the analysis she considered how different measures of intranational distance, distance within a country, impact the magnitude of the estimate of interest. Her preferred measure, a weight-to-value measure, accounts for the fact that different goods are subject to different freight charges, and hence are impacted differently by geographical dispersions. Chen (2004) further took advantage of her rich dataset by controlling for relative prices of goods in different industries, which reduced the border effect even more, to $e^{1.32} = 3.74$. However, due to stringent data requirements, her sample only included seven EU countries in the year 1996.

There are three published studies on the home bias which include Central and Eastern European countries.[2] Balta and Delgado (2009) only included those Central and Eastern European countries which are OECD members. Manchin and Pinna (2009) limited their sample to Cyprus, Bulgaria, Hungary, Latvia, and Poland and focused on these countries' trade with the EU 15 states. This means that while their dataset included exports from Cyprus to France, it did not include exports from France to Cyprus. They found a substantially larger border effect in goods than those found in earlier analyses, $e^{4.63} = 102.51$. In their analysis they employed both average measures of intranational distance, as well as effective distance measures recommended by Head and Mayer (2002).[3]

The most comprehensive study up to date was conducted by Cheptea (2013), who was the first to document that the study of the home bias in Europe is the study of European integration. She argued that greater integration is expected to result in a decline of the home bias.[4] Similarly to this study, her analysis incorporated average weighted measures of intranational distance and data on trade between 27 European Union countries which joined the EU before 2011.[5] Unlike this study,

[2] For the purposes of this paper this set of countries is defined as states which joined the European Union after 2004. Western European countries are defined as countries which joined the EU before 2004.

[3] The estimates of the home bias obtained using this method are substantially smaller than those obtained using average distance measures, as documented both by Manchin and Pinna (2009) and Head and Mayer (2002).

[4] Whether the home bias could ever be fully eliminated is another matter entirely. In fact, there is evidence that there are substantial border effects between US states (Crafts and Klein, 2014), even though they belong to the same cultural, legislative, economic, currency, and infrastructure framework.

[5] This study additionally includes Croatia, which joined in 2013.

she did not extract the border effect from the coefficient on a dummy variable signifying domestic trade in a gravity regression. Instead, she disaggregated the effect into a border effect within Western European nations (estimated at $e^{2.41} = 11.13$), within Central and Eastern European nations ($e^{3.12} = 22.64$), and between Western European and Central and Eastern European nations ($e^{2.94} = 18.92$). These estimates come from Poisson Pseudo Maximum Likelihood regressions, proven to combat heteroskedasticity in gravity estimations (Silva and Tenreyro, 2006), which will also be employed in this analysis.

Overall, despite the relative homogeneity in the methodology employed, there is much variation in the estimates of the border effect. Estimates range from as small as 4.2 to as large as 100. To consider these numbers in context, take the example of Latvia and Lithuania, two economies of a similar size, with close cultural and historical ties.

Importantly, it appears that some of the variation in the estimates is related to differences in sample compositions, and differences in the measures of inter- and intranational distance. These issues will be addressed in more detail in later parts of this paper. The works by Nitsch (2000) and Cheptea (2013) are most closely related to this analysis, albeit they do not cover the issue of intermediate trade. The similarities relate to the sample (Cheptea, 2013) and methodology employed (Nitsch, 2000), and the study of the time (Nitsch, 2000) and geographical variation (Cheptea, 2013) in the bias.

Figure 1: Comparison of studies

Study	Trade data source	Sample	Measure of intranational distance	Methodology	Estimate of the home bias*
Nitsch (2000)	Eurostat	10 EU countries, 1979-1990	Average distance, based on country areas	OLS and seemingly unrelated gravity OLS	$e^{2.43} = 11.36$
Head and Mayer (2002)	Eurostat	15 EU countries, 1993-1995	Effective distance, backed out from frictions in the gravity model	OLS regressions with trade frictions as the dependent variable	$e^{1.44} = 4.22$
Chen (2004)	Eurostat	7 EU countries, 78 industries, 1996	Weight-to-value measure	Gravity OLS regressions with country-industry fixed effects, and Tobit regressions	$e^{1.32} = 3.74$
Balta and Delgado (2009)	OECD	15 EU countries, 1997-2003 (goods), 2000-2003 (services)	CEPII average weighted distance	Standard gravity OLS regressions with random GLS country effects	$e^{3.43} = 30.88$ (for goods and services)
Machin and Pinna (2009)	World Bank	7 reporters from new accession countries and 15 EU partners, 1992-1998	Average and effective distance	Standard gravity OLS regressions with modified country fixed effects and Tobit regressions	$e^{4.63}=102.51$
Cheptea (2012)	Cepii, Eurostat, World Bank	27 EU countries, 1994--2007	CEPII average, weighted distance	Poisson Pseudo-Maximum Likelihood gravity regressions with country fixed effects	$e^{2.41} = 11.13$ (Western Europe) $e^{3.12} = 22.64$ (CEE)

* The estimate of the bias usually corresponds to the exponent of the coefficient on a variable indicating domestic trade. The number expresses how much more a given country trades with itself (domestic trade) when compared with trade with an international trading partner.

Methodology

Gravity in theory

The gravity model of trade was first demonstrated as an empirical curiosity by Tinbergen (1962); theoretical microfoundations for the equation were developed in subsequent decades. The current understanding of the model owes much to Anderson and Van Wincoop (2003), who derived the microfoundations of the gravity equation using a constant elasticity of substitution utility function in a world where each region specialises in the production of only one good.

Following Anderson and Van Wincoop (2003) and Anderson (2010), let us assume that consumers hold homothetic and weakly separable preferences.[6] Consumers in region j maximise the following CES utility function:

$$U = \left(\sum_i \beta_i^{1/\sigma} c_{ij}^{(\sigma-1)/\sigma}\right)^{\sigma/(\sigma-1)} \text{, subject to } E_j = \sum_i p_{ij} c_{ij} \ . \tag{1}$$

Note that β_i is a distributional parameter for each of the trading partners of region j,[7] c_{ij} is the consumption of goods produced in i by consumers in j, σ is the constant elasticity of substitution, E_j is the total nominal income of consumers in j, and p_{ij} is the price of goods produced in i faced by consumers in j. Define t_{ij} as an exogenous trade cost,[8] driving a wedge between consumer prices p_{ij} and producers' prices in i, p_i. Hence, $p_{ij} = p_i t_{ij}$ (2), assuming that exporters cover trade costs. Calculating expenditure shares by rearranging the solution to the maximisation problem (1), we obtain:

$$\frac{p_{ij} c_{ij}}{E_j} \equiv \frac{p_i t_{ij} c_{ij}}{E_j} = \left(\frac{\beta_i p_i t_{ij}}{P_j}\right)^{1-\sigma} , \tag{3}$$

where the CES price index of j equals:

$$P_j = \left[\sum_i \left(\beta_i p_i t_{ij}\right)^{1-\sigma}\right]^{1/(1-\sigma)} . \tag{4}$$

[6] These restrictions ensure that the ratios in which goods are demanded only depend on relative prices, and that expenditures on a given good are not affected by a change in prices of another good.

[7] Distributional parameters have a number of intepretations, but they can be easily thought of as taste parameters of consumers in j for goods produced in each region i.

[8] t_{ij} is best understood as 1 plus the tariff equivalent.

Imposing the market clearing condition in region j:

$$E_j = \sum_j p_{ij} c_{ij} \; \forall \, j \tag{5}$$

and in region i, where Y_i is the total nominal income of consumers in i:

$$Y_i = \sum_i p_{ji} c_{ji} \; \forall \, i, \tag{6}$$

and solving for $\beta_i p_i$, the producer price and the distribution parameter, we obtain:

$$\beta_i p_i = \left[\frac{Y_i}{\sum_j \left(\frac{t_{ij}}{P_j}\right)^{(1-\sigma)} E_j} \right]^{1/(1-\sigma)} . \tag{7}$$

Defining the denominator as the parameter $\Pi_i^{1-\sigma}$, substituting this expression back to the solved maximisation problem (3), and assuming that trade costs are symmetric, $t_{ij} = t_{ji}$ (8), we arrive at:

$$p_{ij} c_{ij} = \frac{Y_i E_j}{Y_{system}} \left(\frac{t_{ij}}{\Pi_i P_j}\right)^{1-\sigma} . \tag{9}$$

Equation (9) becomes the expression for the gravity equation, where Y_{system} is the income of all countries within a particular system, and where:

$$\Pi_i^{1-\sigma} = \sum_j \left(\frac{t_{ij}}{P_j}\right)^{1-\sigma} \frac{E_j}{Y_{system}}, \tag{10}$$

and

$$P_j^{1-\sigma} = \sum_i \left(\frac{t_{ij}}{\Pi_i}\right)^{1-\sigma} \frac{Y_i}{Y_{system}} . \tag{11}$$

Taking a closer look at (9) we see that trade flows resemble Newton's Law of Universal Gravitation. The value of exports from i to j, $X_{ij} \equiv p_{ij} c_{ij}$, is proportional to the product of the countries' nominal Gross Domestic Products (their *mass*); two larger countries will trade with each other more than two small countries, ceteris paribus. Further, if we assume $\sigma > 1$, [9] the value of exports from i to j is inversely related to the trade frictions between them. Define P_j as the inward multilateral resistance term, and Π_i as the outward multilateral resistance term. Then, trade flows are also related to the economic distance between countries i and j, relative to the economic distance

[9] As noted by Anderson (2010) this assumption is valid considering current empirical literature.

of j from all other countries in the system. Adding a further assumption of balanced trade, $E_j = Y_j$ (12), we can normalise the outward multilateral resistance term to $\Pi_i = P_i$ (12).

Taking logarithms on both sides of equation (9), and simplifying the expression, we arrive at:

$$ln(X_{ij}) = \beta\, ln(Y_i \times Y_j) + (1-\sigma)t_{ij} - (1-\sigma)P_i - (1-\sigma)P_j \tag{13}$$

This is the backbone of the regression equation estimated in this analysis, explained in more detail in section 3.2. This derivation is only one of the ways we can arrive at a gravity regression. This gravity setup can be connected to other general equilibrium trade models, as long as the models preserve the modularity assumption (Anderson, 2010).[10]

Gravity in practice

The main regression estimated in this analysis takes the following form:

$$ln(X_{ij}) = \alpha_i + \delta_j + \gamma Home_{ij} + \beta_1 ln(Y_i \times Y_j) + \beta_2 Population_i + \beta_3 Population_j + \beta_4 Distance_{ij} + \beta_5 Language_{ij} + \beta_6 Border_{ij} + \beta_7 EU_{ij} + \beta_8 Euro_{ij} + \beta_9 ln(P_i) + \beta_{10} ln(P_j) + \varepsilon_{ij}$$

where:

X_{ij} : exports from country i to country j;

$Home_{ij}$: dummy variable equal to one when i and j are the same (domestic trade);

$Y_i \times Y_j$: the product of Gross Domestic Products of countries i and j;

$Population_i$: population of country i;

$Distance_{ij}$: distance from country i to country j;

$Language_{ij}$: a dummy variable equal to one if countries i and j share a language;

$Border_{ij}$: a dummy variable equal to one if countries i and j share a border;

EU_{ij} : a dummy variable equal to one if countries i and j are both in the European Union;

$Euro_{ij}$: a dummy variable equal to one if countries i and j are both in the Eurozone;

P_i : a measure of remoteness of country i relative to other countries in the system.

[10] The assumption - in its simplest terms - can be stripped to the iceberg melting assumption (Samuelson, 1954), that trade costs are expressed in units of a good that is being traded, some of which disappear (*melt*) during transport.

The coefficient of interest in this analysis is γ, the coefficient on the variable $Home_{ij}$ (for simplicity: $Home$). The variable indicates how much more country i trades with itself, when compared to trade with an international trading partner, otherwise identical to country i.

All the regressions presented in this paper control for year fixed effects. These fixed effects capture year-specific shocks common to all countries in the sample, such as the ups and downs of the business cycle. To control for country-specific effects, this analysis also included exporter and importer fixed effects. They control for country-specific factors influencing trade, which do not vary over time, such as geography.

The use of country fixed effects has the added advantage of mitigating (though not solving) the gold medal mistake of gravity analyses, the issue of controlling for multilateral resistance (Baldwin and Taglioni, 2006). Multilateral resistance variables have often been estimated using a proxy, usually referred to as *remoteness*, $P_i = \sum_j distance_{ij} \times \frac{Yj}{Y_{system}}$ (Bacchetta et al., 2012). Remoteness reflects country i's average distance from its partners weighted by partners' GDP shares. Problematically, remoteness variables focus exclusively on the role of geography as a trade barrier, yet they do not capture other trading barriers (Anderson and Van Wincoop, 2003). They are therefore only an imperfect proxy for multilateral resistance. Nevertheless, in combination with the use of exporter and importer fixed effects they are standard practice in gravity analyses of the home bias (Chen, 2004; Manchin and Pinna, 2009; Cheptea, 2013). Their use makes the paper directly comparable with earlier studies, such as Chen (2004) and (Cheptea, 2013).

Data

This analysis incorporates data from the *World Input-Output Database* (WIOD) on 28 European Union countries from 2000 until 2014. It is therefore the first study to include post-crisis data.

The World Input-Output Database was constructed in collaboration with academics from 12 European research consortiums with funding from the European Commission. The WIOD consists of a time-series of balanced supply-use and input-output tables, consistent with accounts from national statistical institutes and with international trade data sourced from the *United Nations Commodity Trade Statistics Database*. For the purpose of this analysis a symmetric world input-output table of the industry-by-industry type was used. Data for intermediate exports between different sectors were aggregated on national levels and transformed into a three-dimensional dataset with one observation being defined by the exporter country (country i), the importer country (country j), and the year. Hence, this dataset is unique in allowing one to study the integration of the production processes in the European Union, rather than the final demand for goods and services produced abroad.

There is a number of benefits to using the WIOD, as opposed to using data from Eurostat or the OECD, like earlier studies. Firstly, the dataset contains information on national and international supply chains. This means that international and intranational trade flows come from the same source. The common alternative, introduced by Wei (1996) and used in most subsequent analyses, is the assumption that $intranational\,trade = domestic\,production - exports$. While this approach is likely to be a good approximation, there might be considerable measurement error if the sources of data for domestic production and international trade differ. Secondly, the WIOD is a complete dataset which contains no observations of zero trade. Chen (2004) and Manchin and Pinna (2009) reported censoring and corrected for missing observations of zero trade with Tobit regressions. Thirdly, WIOD contains information on trade in both goods and in services. Most analyses, with the exception of Balta and Delgado (2009), who reported both goods and services together, have focused exclusively on trade in goods. The paper by Streicher and Stehrer (2015) was used in dividing the set of industries into goods and services.[11]

Data on nominal Gross Domestic Product and population came from the *World Bank's World Development Indicators* database. Information on countries' adjacency, shared languages and distance measures came from *The Centre d'Études Prospectives et d'Informations Internationales* (CEPII). Information on dates of European Union and Eurozone accession were sourced from the website of the European Commission and can be viewed in the Appendix (Figure A1).

[11]The information was drawn from Table 1 in the paper.

Measuring intranational distance

Aside from estimating intranational trade, the most problematic measurement issue in the analysis of the home bias is intranational distance. The geographical distance between trading partners is the most straightforward of trade costs; it tends to be cheaper to trade with those who are closeby. International distances are usually approximated by the distance between capital cities or economic centres. However, in the absence of trade data disaggregated by counties or country regions, estimating intranational distances is more challenging, as one has to rely on one average measure of distance per country. So far there have been four main approaches to estimating intranational distance:

- Fraction of distance to neighbouring country. First papers on the home bias estimated intranational distance as a fraction of the distance from the capital city to the border with the nearest neighbouring country, measured in a straight line. Wei (1996) used 3/4 of the distance, whereas Wolf (2000) used 1/2 of the distance.

- Area-based average measures. Nitsch (2000), a critic of the fraction of distance measure, proposed a radius measure: $\sqrt{\frac{country\ area}{\pi}}$. This is a good approximation of intranational distance under the assumption that a country's population is uniformly distributed within a circle. Other area-based measures included $0.33 \times \sqrt{\frac{country\ area}{\pi}}$ (Redding and Venables, 2004), and $0.67 \times \sqrt{\frac{country\ area}{\pi}}$ (Head and Mayer, 2000).

- Average weighted distance. In the past these measures included arithmetic averages of inter-regional distances (Cheptea, 2013) and average inter-city distances weighted by population shares (Head and Mayer, 2002). They therefore have rather stringent data requirements.

- Effective distance. Effective distance measures are obtained by explicitly estimating trade frictions using the gravity model. Head and Mayer (2002) estimated trade frictions by comparing the ratio of country i's purchases at home to country i's purchases in country j, with the same ratio for country j. Following the notation from the previous section where X_{ij} is the trade flow, define frictions as $\Xi \equiv \sqrt{\frac{X_{ii}X_{jj}}{X_{ij}X_{ji}}} = \frac{\sqrt{\phi_{ii}}}{\phi_{ij}}$. Trade frictions can be related to trade costs with the use of a trade "freeness" indicator $\phi_{ij} = (t_{ij}\gamma_{ij})^{1-\sigma}$, where γ_{ij} signifies the rate at which iceberg trade costs melt. This then allows one to back out the distance and border components from a log linearised expression of trade frictions, which Head and Mayer (2002) assume to take the form of $\Xi = \mu\xi_{ij}\left(\frac{d_{ij}}{\sqrt{d_{ii}d_{jj}}}\right)^{-\theta}$, where μ is the border effect, ξ_{ij} is the variation around a central tendency of μ, and d_{ij} is a distance measure.

There is no one ideal measure of intranational distance when trade data are aggregated at the national level. On one hand, the strength of effective measures of distance is that they do not depend on averages. On the other hand, they rely on the assumptions regarding trade frictions. At the same time, average measures are relatively easy to compute, yet they may oversimplify the picture at hand. Weighted average measures from the CEPII database were used in this analysis. Since they can be computed both for inter- and intranational distance, they are more balanced than standard average measures. Besides their ease of use, they are helpful in comparing this study to previous papers.

The home bias over time and across Europe

Analysis of the home bias

Figure 2 shows that the home bias in the EU is still considerable. Regression (1) is an attempt to compare this study to the findings of Nitsch (2000) and Cheptea (2013); it was ran exclusively using Western European countries. For greater comparability, it was done using the first release of the World Input Output database, spanning from 1995 until 2011. The estimated coefficients bear a striking resamblance to the coefficients estimated by earlier studies, even though the time periods and methodologies are not the same. The coefficients on the variable $Home$ in their analyses are 2.43 and 2.41 respectively, compared with 2.49 in this study. This means that an average Western European country's domestic trade in goods is $e^{2.49} = 12.06$ times higher than international trade with a comparable country.

When the analysis was extended to include all 28 countries in the sample, using the new release of the data, the magnitude of the coefficient on $Home$ increased markedly. Regression (2) implies that an average EU country's domestic trade in intermediates is $e^{3.81} = 45.15$ times higher than trade with a comparable international trading partner. This considerable change was caused by extending the dataset to include Central and Eastern European nations, and by including revised and new data (2000 - 2014).[12] Hence, there is suggestive evidence that the home bias increased in recent years, or that the home bias is larger on the eastern side of the continent. Both hypotheses will be formally tested and explained in later parts of this study.

When the same regression is estimated for trade in services (3) the coefficient of interest balloons to 5.68. A considerable increase was to be expected, as trade in services encounters significantly more intangible obstacles to trade (Sampson and Snape, 1985). Additionally, many services such as education, health, or social work are highly localised. This increase is in line with the findings of Balta and Delgado (2009), who report a coefficient on $Home$ of 3.43 in a regression where both goods and services are considered together.[13] Nevertheless, this is a considerable increase, and it is difficult to precisely pinpoint its origin.

Other coefficients in regressions in Figure 2 carry the expected signs. Nominal GDP increases trade, greater distance between trading partners decreases trade. Sharing a border and sharing a language both increase bilateral trade. The coefficient on the *EU* variable was not estimated in regression (1) because all 15 Western European nations entered the European Union before 2000, which led to perfect multicollinearity. Subsequent regressions show that joining the common market boosts trade. Trade in goods (services) is around 17% (28%) higher between countries which are both members of the EU.

All observations were used in the presented regressions, with the regression in (1) focusing on trade between and within 15 Western European countries in 17 time periods ($15 \times 15 \times 17 = 3,825\, observations$), and regressions (2) - (5) on trade between and within all 28 EU members ($27 \times 27 \times 15 = 11,760\, observations$). The fit of the regression line is high; the specification explains around 90% of the variation in trade flows.

The first three regressions were estimated using Ordinary Least Squares with exporter and

[12]Because of issues relating to the comparability of sectoral classification, the new WIOD does not include the years 1995 - 2000, and data between 2000 and 2011 have been revised.

[13]Column (6) of Table 1 in Balta and Delgado (2009), estimated only for EU 15 countries. Their finding is close to the mid-point between 3.03, the coefficient on $Home$ for EU 15 from column (1) in Figure 2 of this paper, and the coefficient on $Home$ for trade in services for EU 15, estimated at 4.79: $0.5 \times 3.03 + 0.5 \times 4.79 = 3.91$. The midpoint is also likely to be larger than the coefficient in regression estimated using goods and services together, due to higher exports of goods than services for the average country.

importer fixed effects.[14] It is important to note that when heteroskedasticity is present estimates coming from OLS regressions using log-linearised values can be biased due to Jensen's inequality (Silva and Tenreyro, 2006). Poisson Pseudo Maximum Likelihood (PPML) estimation is robust to heteroskedasticity. Additionally, PPML does not omit observations of zero trade. Standard OLS analysis with natural logarithms excludes these ovservations, as $ln(0)$ is undefined. Since all countries in the sample are trading with each other at all points in time, the latter is not an issue in this analysis. The former could pose a challenge to the obtained estimates. For this reason, regressions (2) and (3) were ran using PPML, and can be found in columns (4) and (5) of Figure 2. The signs on the coefficients remain largely unaffected.[15] The coefficient of interest declines to 2.36 for goods, and to 4.63 for services, still clearly pointing to a greater border effect in services.

A crucial point to make at this point is that it is impossible to obtain one precise estimate of the home bias. The coefficient is hypothetical, and estimated using imperfect data on, for example, intranational distance. Ideally, the bias would be estimated using more granual, state or country level data for different countries. What is, however, more important than obtaining one perfect estimate is considering the variation in the effect, which consistently points to a larger effect in the bias for services than goods. This variation is therefore consistent throughout the different methodologies. The temporal and cross-sectional variation in the bias, which promise to yield more policy-relevant insights, will be explored in more detail in the next sections.

Overall, Figure 2 points to four preliminary findings. One, that the home bias in trade in the 2000 - 2014 time period is still substantial. Two, that the bias appears to be larger for Central and Eastern European states, as adding them to the sample leads to a considerable increase in the coefficient. Three, that the home bias in trade in goods is considerably lower than in services.

[14]As a robustness check, the regressions from columns (2) and (3) of Figure 2 were also ran using time-variant country dummies. Country-time dummies perform better when it comes to controlling for time-variant country-specific shocks and multilateral resistance variables (Baldwin and Taglioni, 2006). The coefficients on the variable of interest remain qualitatively the same. The effect is also larger for trade in services than for trade in goods. Regression output can be found in the Appendix (Figure A2).

[15]The most considerable change affects the coefficient on EU, which more than doubles for trade in goods and becomes insignificant for trade in services.

Figure 2: The home bias in trade in goods and services

	(1) OLS Goods Western Europe	(2) OLS Goods Full sample	(3) OLS Services Full sample	(4) PPML Goods Full sample	(5) PPML Services Full sample
Home	2.496***	3.810***	5.684***	2.356***	4.630***
	(0.080)	(0.070)	(0.075)	(0.107)	(0.115)
Nominal GDP	0.705***	1.044***	1.579***	0.369***	0.554***
	(0.107)	(0.064)	(0.072)	(0.070)	(0.035)
Reporter population	-0.529	-2.339***	-0.511	-0.287	-0.395
	(0.437)	(0.310)	(0.350)	(0.548)	(0.644)
Partner population	-0.428	-0.092	0.749**	0.020	0.397
	(0.450)	(0.284)	(0.339)	(0.578)	(0.687)
Weighted distance	-0.917***	-1.251***	-0.972***	-1.322***	-0.963***
	(0.023)	(0.019)	(0.021)	(0.074)	(0.093)
Partner resistance	2.773***	-0.273	-0.109	-0.221	-0.071
	(0.628)	(0.188)	(0.209)	(0.263)	(0.298)
Reporter resistance	0.172	0.225	0.446**	0.362	-0.073
	(0.580)	(0.171)	(0.196)	(0.249)	(0.297)
Border	0.429***	0.972***	0.979***	0.368***	0.110
	(0.028)	(0.033)	(0.036)	(0.091)	(0.105)
Official language	0.459***	0.255***	-0.148***	0.381***	0.522***
	(0.034)	(0.049)	(0.050)	(0.113)	(0.102)
Euro	0.169***	-0.058**	0.115***	0.164	0.080
	(0.029)	(0.024)	(0.031)	(0.110)	(0.088)
EU	0.891	0.169***	0.275***	0.368***	0.151*
	(11.369)	(0.036)	(0.041)	(0.085)	(0.077)
Constant		-2.562	-9.333**	4.506	-0.347
		(3.587)	(4.326)	(7.706)	(10.873)
Observations	3,825	11,760	11,760	11,760	11,760
R-squared	0.961	0.928	0.888	0.989	0.999

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Robust standard errors in parentheses. Exporter, importer, and time fixed effects were used.
Standard errors were clustered on the country-pair level in the PPML regressions.

The home bias over time

There is no compelling evidence that the home bias for trade in goods markedly changed between 2000 and 2014. For services, one can see a general decline, particularly in the years before the Great Recession.

The time dimension of the home bias was analysed by adding the interaction variables between *Home* and time dummies to regression (2) and (3) from Figure 2.[16] Figures 3 and 4 graphically represent the bias' evolution over time by plotting the confidence intervals of the coefficient on the border effect. One can notice a general decline in the coefficient for both goods and services.

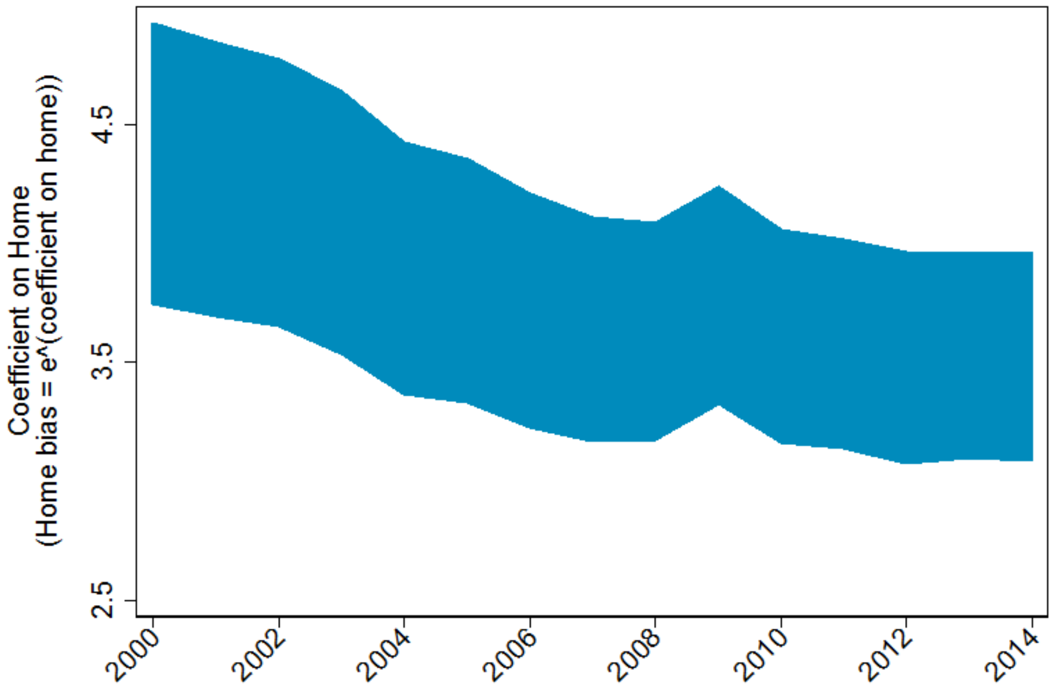
However, there is no evidence of a significant change in the bias over time for trade in goods. This can be seen in Figure 3, as it is possible to draw a horizontal line contained in the 95% confidence interval all the way from 1995 until 2011. Hence, the observed decline is not marked enough to be considered significant for trade in goods. This stands in contrast to the findings of Nitsch (2000) who found a decline in the border effect in the 1979-1990 period. One explanation for this difference is that changes in the coefficient on *Home* depending on how far the country is along the European integration process. It could be that the longer a country's tenure in the EU, the lower its home bias, hence the analysis of Nitsch (2000) captured the declines in the bias for Western European countries not reflected in this analysis due to the lack of data pre-2000. This hypothesis will be formally tested in section 5.1.

At the same time, the decline in the bias for trade in services is marked, particularly in the pre-crisis period. This is consistent with the findings of Timmer et al. (2016) who show that international product fragmentation increased before the crisis, and slowed markedly in the aftermath of the crisis. In fact, one can notice a small increase in the home bias in the aftermath of the Great Recession in both graphs. This is the case even though the regressions control for the level of economic activity.

As noted earlier, the bias is larger when the analysis is done using the new World Input Output Database, and when Central and Eastern European countries are included. This section demonstrated that the increase is not caused by an increase in the bias in recent years.

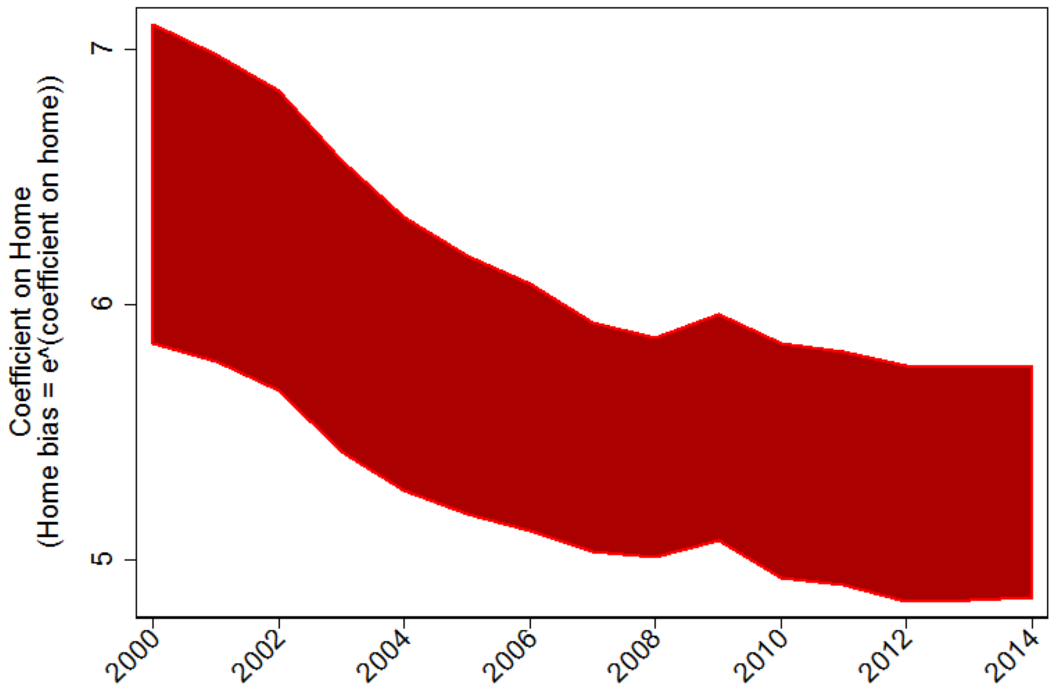
[16] Regression output can be viewed in the Appendix (Figure A3).

Figure 3: The home bias for EU members' trade in goods



The graph represents the 95% confidence interval for the coefficient on the variable Home

Figure 4: The home bias for EU members' trade in services



The graph represents the 95% confidence interval for the coefficient on the variable Home

The home bias on a map

There is considerable variation in the home bias across the continent.

In order to understand the geography of the home bias, the coefficient on $Home$ for goods and services was estimated separately for the 28 European Union countries.[17] As Figures 5 and 6 show, the bias is significantly larger for Central and Eastern European states than for Western European countries. This observation is in line with Figure 2, which demonstrated that the coefficient on $Home$ increased when these states were added to the sample. However, the story is more intricate than an East-West divide. For goods, one can also notice that the home bias is largest for countries on the outside borders of the EU, with Portugal, Ireland, and Finland exhibiting higher border effects than countries closer to the geographical centre of Europe. For trade in services the picture is similar, with the exception of France and the Netherlands, which have a larger border effect than their neighbours.

With the exception of the small EU nations[18], the bias in goods is largest for Croatia (5.63) and Bulgaria (5.35), and smallest for Germany (1.63) and the United Kingdom (1.95). The bias in services is largest for Slovakia (8.00) and Croatia (7.97), and smallest for Ireland (3.83) and the United Kingdom (3.58). While the previous section showed limited variation in the home bias over time, this section demonstrates considerable variation in the bias accross different countries. The question then arises as to what can explain the variation in the effect. The theory, more formally tested in the next section of this paper, is that the effect is related to the number of years a country has been a member of the European Union.

[17]Regression output can be viewed in the Appendix (Figure A4)
[18]Cyprus, Malta, Luxembourg.

Figure 5: The home bias in trade in goods in the European Union

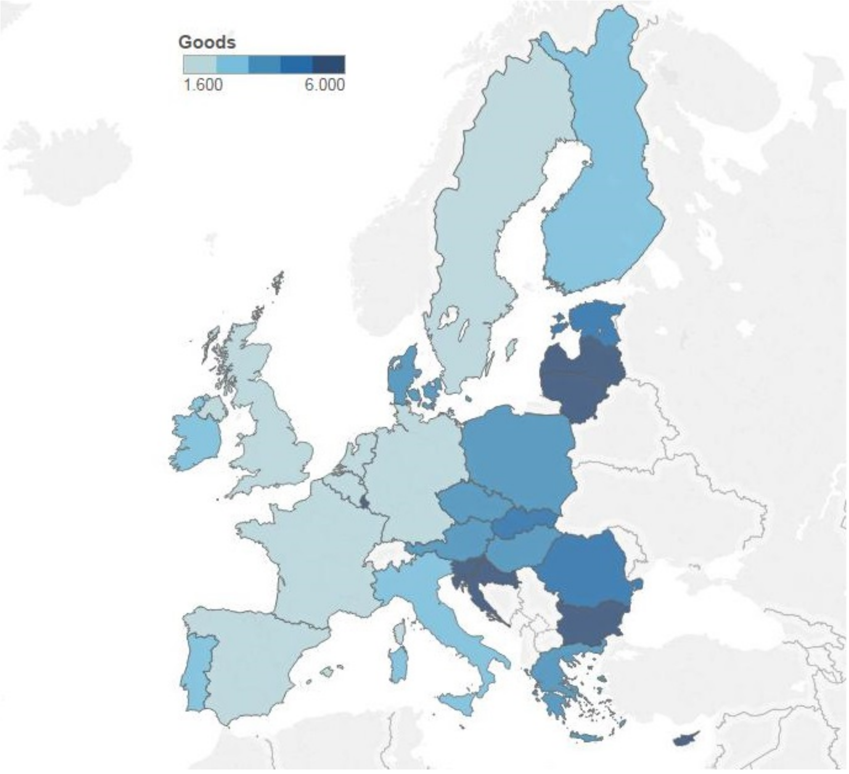
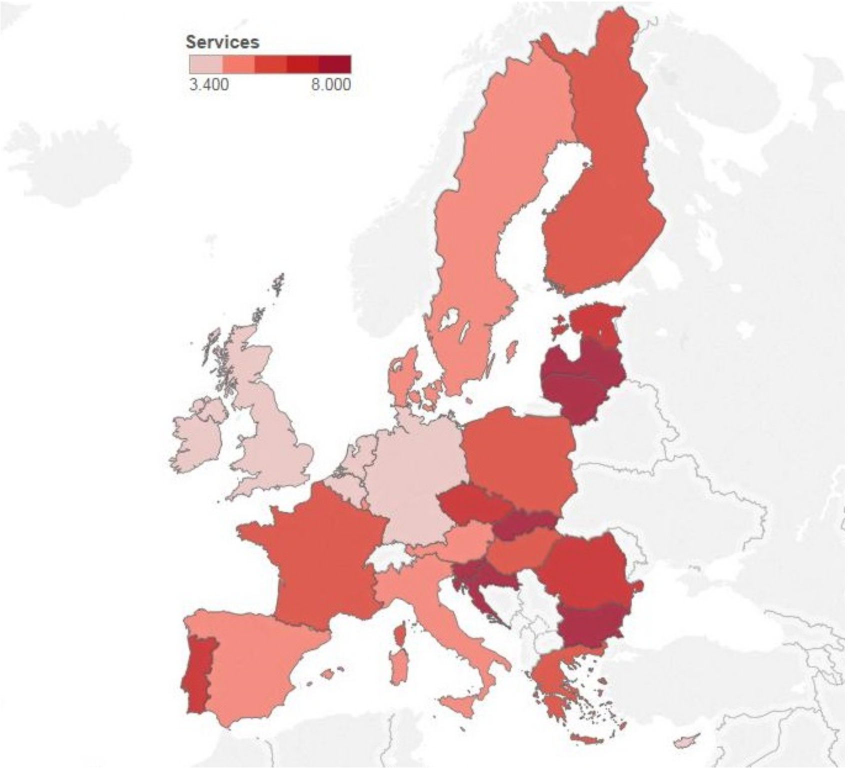


Figure 6: The home bias in trade in services in the European Union



Explaining the cross-country variation in the home bias

The large heterogeneity in the *Home* coefficient across Europe begs the question about country characteristics which could explain the differences in the effect. Literature on the home bias still struggles to find conclusive evidence of the forces underpinning the coefficient. Some of the explanations of the border effect across the world include:

- The elasticity of substitution between domestic and foreign goods is rather low, as documented by, among others, Blonigen and Wilson (1999);
- The measure of intranational distance is being consistently miscalculated, as suggested by Head and Mayer (2002);
- Multistage production is responsible for inflating the bias. Yi (2010) documented that vertical specialisation explains two-fifths of the Canada-US border puzzle;
- There are considerable intangible trade barriers to trade. For example, Parsley and Wei (2001) documented that exchange rates, shipping costs, and geography can explain a portion of the bias between the US and Japan.

In fact, the home bias is likely to arise due to a combination of these factors. Head and Ries (2001) found that even when controlling for the different elasticities of substitution between domestic and foreign goods, there are likely to be intangible trade barriers amounting to at least a tariff of 27%. At the same time, even when Head and Ries (2001) corrected the common intranational distance measure by using the effective distance measure, the home bias remained large and significant.

To the best knowledge of this author, the cross-country variation in the European home bias has so far received no academic attention, hence motivating this analysis. Importantly, this section does not answer the question why the border effect exists in the first place. Instead, it analyses the cross-country differences in the effect. There is a number of theories one could test to determine which factors contribute to the size of the border effect in the European Union. Given the maps reported in the previous section, the next subsection will consider the role of EU integration.

European integration

As suggested by Figure 2, EU membership is associated with higher volumes of trade between trading partners. It is also worth asking whether EU members have a lower home bias. It is plausible that the longer a country has been a member of the European Union, the more likely it is to turn to international trade, instead of trading domestically.

European Union membership is associated with declines in the border effect. This was tested by including an interaction variable between $Home$ and EU, reflecting how the home bias changes following a country's accession to the European Union. As Figure 9 suggests, the effect is negative and statistically significant, consistently across the different regressions.

In real life membership in the European Union is not a simple binary variable. An interaction variable $Home * EU$ picks up only one-off changes in the bias related to the the country's membership to the European community. However, it is possible that the EU's effect on the home bias varies over time, depending on the depth of a country's integration with the EU. For this reason, another set of interaction variables is tested, $Home * Time\,since$ and $Home * Time\,since^2$. $Time\,since$ is a count variable indicating the number of years since the country joined the European Union. Its square is included to control for potential non-linearities in the effect.[19]

Time since European Union accession is a crucial factor in understanding the variation in the magnitude of the home bias in both goods and services. The longer a country has been a member of the union, the lower its home bias. Regressions (3) and (4) demonstrate that the effect of EU membership on the home bias is negative and non-linear. In fact, the bias decreases at a decreasing rate: the first years of EU membership have a larger (in absolute value) impact on the home bias than later years.

The relationship is visually represented in Figures 7 and 8, which demonstrate the evolution of the coefficient over time for an average country in the sample.[20] As the graph shows, there

[19] The inclusion of interaction variables $Home * GDP$ and $Home * Population$ in all regressions in Figure 9 yields mostly negative coefficients. This implies that the wealthier the country, and the more populated the country, the smaller the border effect. Importantly, there is no clear and direct channel, grounded in economic theory, through which these factors could influence the border effect. They are included here as control variables, due to their correlation with $Time\,since$. This reflects the fact that countries which joined the European Union more recently tend to be relatively less developed and relatively less populated.

[20] A country with average Gross Domestic Product and average population size from the countries in the sample.

is a substantial decline in the coefficient on $Home$ in the year of EU accession (year 0), followed by gradual decreases in the bias over time. Both the decline in the year of EU accession and the gradual decline over time are statistically significant, as demonstrated by the upper and lower bounds of the confidence intervals in both graphs.[21] Hence, the conclusion that EU membership has had no effect on the bias over time can be comfortably rejected at the 5% significance level. The effect of EU membership is more pronounced for goods than for services, with the initial drop in the year of entry to the EU being noticeably larger for goods. Nevertheless, the effect of prolonged EU membership is evident for both goods and services. Figures 3 and 4 presented the evolution of the bias over time. Figures 7 and 8 show that the number of years in the EU matters more than simply the passing of time.

This finding is very useful in understanding the cross-country variation in the home bias. It shows that European Union membership has had great influence over the magnitude of the home bias, which points to significant European integration forces at play. The home bias in goods (services) of $e^{5.19} = 179.47$ ($e^{7.24} = 1394.09$) of a hypothetical average country declines to $e^{2.90} = 18.17$ ($e^{4.93} = 138.38$) following 25 years of European Union membership.

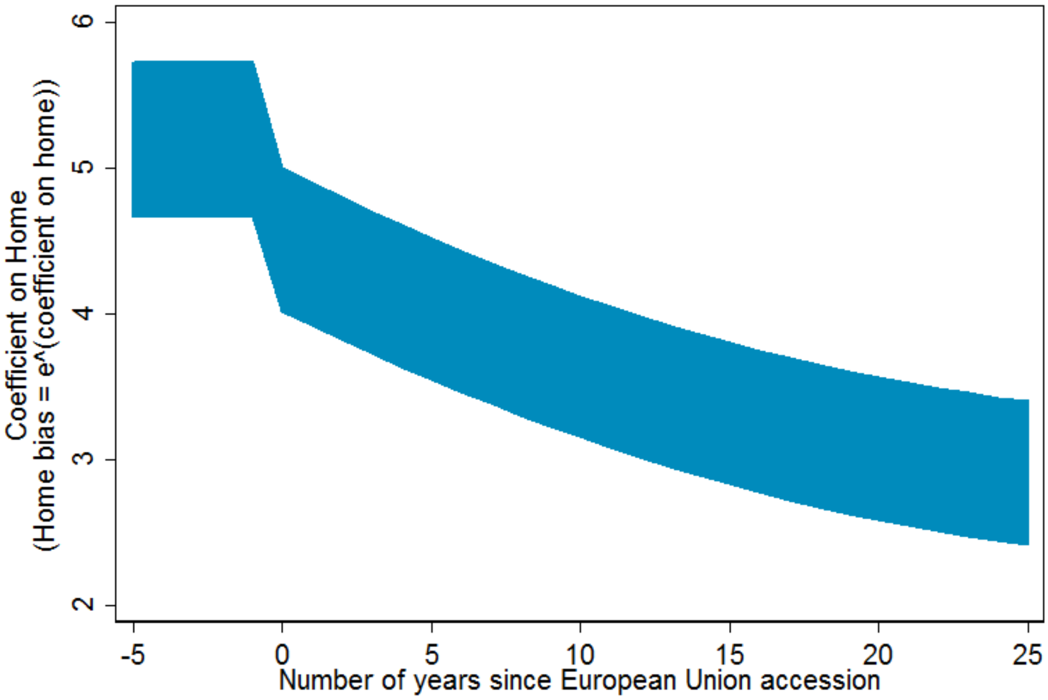
These numbers must be taken with a grain of salt. Firstly, the variation in the *EU* variable comes solely from Central and Eastern European states, as Western European states joined the EU before the start point of this dataset. Secondly, the control group for EU membership in this case are EU countries *before they joined the EU.* Thirdly, there is no way of telling whether the numbers listed here have any predictive power, as they are based on the experiences of relatively few countries over a very specific period of time.

Nonethetless, despite these limitations, it would be foolish to disregard the estimates of the EU's effect on the home bias. They are useful in demonstrating the general forces at play, which point to a considerable effect of EU membership. In fact, the findings are helpful in understanding the maps from the previous section. The most easily noticable trend in both maps is that the bias is larger on the eastern side of the continent, hence in countries which entered the European

[21] Standard errors used to calculate the confidence intervals presented in the graph were estimated using the `nlcom` STATA command for postestimation of nonlinear combinations of parameters. This is because nonlinear combinations are not necessarily distributed normally, hence the standard errors are only efficiently computed using the delta rule (Vach, 2012).

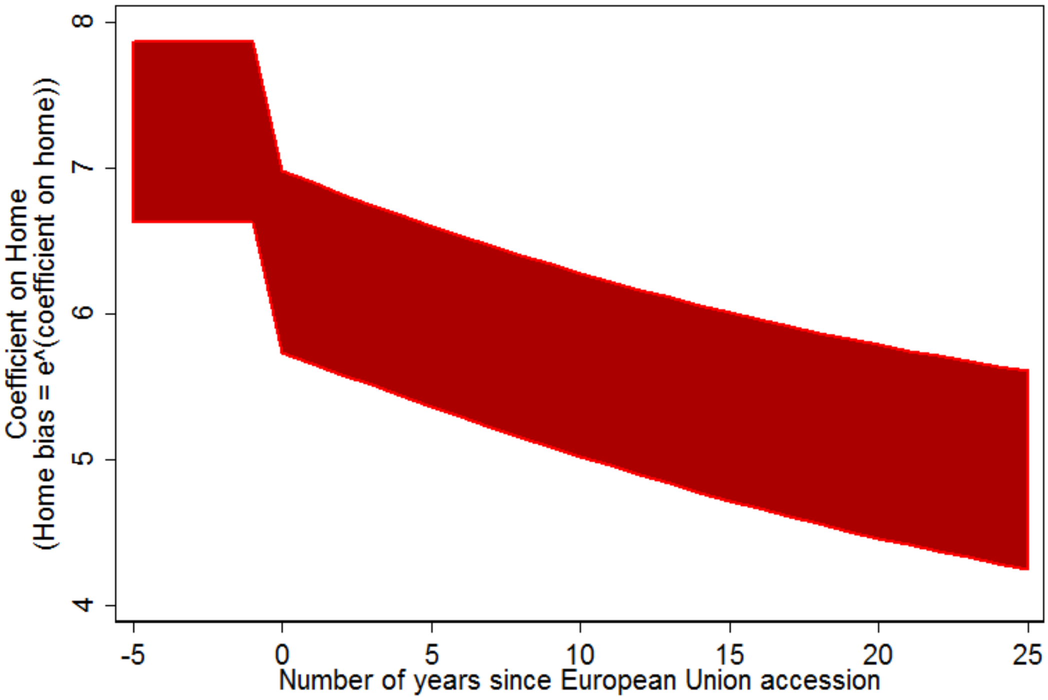
Union in the last couple of years. It is therefore the case that countries which have been in the European Union for a greater number of years, and are better integrated with other EU countries, are more prone to trading internationally. A good example are Romania, Bulgaria, and Croatia, the newest members of the EU, which have some of the highest coefficients on $Home$ out of the countries considered. Similarly, Germany, Belgium, and the Netherlands have some of the lowest coefficients, and they are the founding members of the European Economic Community. Hence, it appears that European integration is marked and noticeable in the data, and it is closely associated with the magnitude of the border effect in different countries.

Figure 7: The home bias in trade in goods and European Union accession



The graph represents the 95% confidence interval for the coefficient on the variable Home and its interactions

Figure 8: The home bias in trade in services and European Union accession



The graph represents the 95% confidence interval for the coefficient on the variable Home and its interactions

Figure 9: The home bias and European integration

	(1) Goods	(2) Goods	(3) Goods	(4) Services
Home	5.743***	5.715***	5.756***	7.511***
	(0.079)	(0.164)	(0.166)	(0.259)
Home*GDP	-0.462***	-0.136	-0.175	-0.452***
	(0.097)	(0.132)	(0.125)	(0.152)
Home*Population	-1.781***	-2.140***	-2.084***	1.249**
	(0.385)	(0.418)	(0.403)	(0.550)
Home*EU	-1.627***	-1.476***	-0.778***	-1.149***
	(0.093)	(0.131)	(0.144)	(0.196)
Home*Time since		-0.019***	-0.104***	-0.082***
		(0.005)	(0.009)	(0.012)
Home*Time since2			0.002***	0.001***
			(0.000)	(0.000)
Constant	-2.303	-2.345	-1.570	-8.538**
	(3.531)	(3.550)	(3.529)	(4.287)
Observations	11,760	11,760	11,760	11,760
R-squared	0.932	0.933	0.933	0.893

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in parentheses. Exporter, importer, and time fixed effects were used.

*Home*GDP* and *Home*Population* are interaction terms between *Home* and nominal GDP, and population size. They signify how the levels of GDP and population size are related to the coefficient on *Home*. For the purpose of this exercise, the GDP and population variables were divided by one million, so that the coefficients are displayed in the table.

*Home*EU* is the interaction term between *Home* and dummy variable *EU*. This dummy takes the value of one when the reporter country is a member of the EU. The interaction signifies how being a member of the EU is related to the coefficient on *Home.*

*Home*Time since* (and *Home*Time since2)* are interaction terms between *Home* and *Time since* (*Time since2*). *Time since* is a count variable indicating the number of years a country has been a member of the European Union, *Time since2* is its square. The interactions signify how much an extra year of EU membership is related to the coefficient on *Home.*

Conclusion

This study demonstrated that the home bias in intermediates in the European Union is present and large, pointing to much room for further integration of the production processes. Despite years of European integration, the nations of Europe remain more inclined to trade domestically than to trade with a comparable international trading partner. In particular, this seems to be the case for trade in services which remains more biased towards the home country than trade in goods. This can possibly be explained by the fact that services face higher obstacles to trade, and are more localised.

Importantly, there are considerable regional and national differences in the bias. The bias tends to be larger in Central and Eastern Europe, and on the periphery of the EU. The home bias in trade in goods did not signficantly decline in the 2002-2014 period, yet it is influenced by the number of years a given country has been a member of the European Union. There appears to be a one-off decline in the bias as a result of joining the European Union, followed by declines in the bias in the subsequent years of EU membership. The bias in trade in services declined more markedly, and is also influenced by EU membership. The first years after accession to the EU have the largest effect on the bias; after around 25 years of membership the effect levels off.

Overall, this study is a study of European integration and globalisation. It appears that the more a country integrates itself with the European Union, the more it trades internationally, as opposed to domestically. This cycle appears to be self-reinforcing. Greater integration with the rest of the world also means that a country is more likely to seek further economic, political and legislative integration.

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Appendix

Figure A1: Countries in the sample and important dates

	Date of EU accession	Date of Eurozone accession
Austria	01/01/1995	01/01/1999
Belgium	23/07/1952	01/01/1999
Bulgaria	01/01/2007	-
Cyprus	01/05/2004	01/01/2008
Croatia	01/07/2013	-
Czech Republic	01/05/2004	-
Denmark	01/01/1973	-
Estonia	01/05/2004	01/01/2011
Finland	01/01/1995	01/01/1999
France	23/07/1952	01/01/1999
Germany	23/07/1952	01/01/1999
Greece	01/01/1981	01/01/2001
Hungary	01/05/2004	-
Ireland	01/01/1973	01/01/1999
Italy	23/07/1952	01/01/1999
Latvia	01/05/2004	-
Lithuania	01/05/2004	-
Luxembourg	23/07/1952	01/01/1999
Malta	01/05/2004	-
Netherlands	23/07/1952	01/01/1999
Poland	01/05/2004	-
Portugal	01/01/1986	01/01/1999
Romania	10/01/2007	-
Slovakia	01/05/2004	01/01/2009
Slovenia	01/05/2004	01/01/2007
Spain	01/01/1986	01/01/1999
Sweden	01/01/1995	-
United Kingdom	01/01/1973	-

Dates of accession to the European Economic Community were used when appropriate. The date of entry of West Germany into the European Economic Community was used as the date for the whole of Germany. Dates of entry to the EU past June 30^{th} of a given year were assumed to only impact the next calendar year.

Figure A2 – The home bias across the EU

	(2) OLS Goods	(3) OLS Services	(4) PPML Goods	(5) PPML Services
Home	5.657***	8.654***	4.406***	4.226***
	(0.180)	(0.196)	(0.302)	(0.328)
Nominal GDP	-0.121***	-0.253***	-0.030	-0.087
	(0.022)	(0.028)	(0.065)	(0.060)
Reporter population	0.408***	0.696***	0.412***	0.579***
	(0.026)	(0.036)	(0.085)	(0.085)
Partner population	0.309***	0.703***	0.428***	0.536***
	(0.026)	(0.036)	(0.091)	(0.064)
Weighted distance	-1.256***	-1.002***	-1.260***	-0.851***
	(0.020)	(0.021)	(0.073)	(0.081)
Partner resistance	-0.664***	-0.344***	-0.160	-0.426***
	(0.047)	(0.069)	(0.130)	(0.133)
Reporter resistance	0.456***	-0.332***	0.613***	-0.335***
	(0.047)	(0.068)	(0.131)	(0.126)
Border	0.964***	0.979***	0.282***	0.182*
	(0.036)	(0.038)	(0.083)	(0.109)
Official language	0.225***	-0.264***	0.466***	0.277*
	(0.052)	(0.050)	(0.138)	(0.147)
Euro	-0.056*	0.062*	0.050	0.278**
	(0.030)	(0.033)	(0.105)	(0.114)
EU	-0.064	0.526***	-0.046	-0.150
	(0.069)	(0.077)	(0.130)	(0.164)
Constant	17.242***	14.464***	4.801***	13.675***
	(0.581)	(0.742)	(1.086)	(1.331)
Observations	11,760	11,760	11,760	11,760
R-squared	0.926	0.900	0.990	0.999

*** p<0.01, ** p<0.05, * p<0.1

Time-variant country-pair fixed effects were used.

Standard errors were clustered on the country-pair level in the PPML regressions.

Figure A3 – The home bias across time

	(1) Goods	(2) Services
Home*2000	4.333***	6.471***
	(0.301)	(0.319)
Home*2001	4.268***	6.377***
	(0.294)	(0.307)
Home*2002	4.212***	6.251***
	(0.286)	(0.299)
Home*2003	4.085***	5.994***
	(0.281)	(0.292)
Home*2004	3.896***	5.806***
	(0.270)	(0.273)
Home*2005	3.844***	5.685***
	(0.261)	(0.258)
Home*2006	3.716***	5.597***
	(0.249)	(0.247)
Home*2007	3.639***	5.482***
	(0.240)	(0.228)
Home*2008	3.628***	5.439***
	(0.232)	(0.219)
Home*2009	3.781***	5.519***
	(0.232)	(0.227)
Home*2010	3.611***	5.387***
	(0.228)	(0.234)
Home*2011	3.575***	5.358***
	(0.223)	(0.232)
Home*2012	3.519***	5.298***
	(0.225)	(0.235)
Home*2013	3.528***	5.300***
	(0.218)	(0.233)
Home*2014	3.520***	5.307***
	(0.221)	(0.230)
Nominal GDP	1.052***	1.591***
	(0.064)	(0.071)
Reporter population	-2.353***	-0.531
	(0.309)	(0.349)
Partner population	-0.105	0.730**
	(0.283)	(0.338)
	-1.252***	-0.972***

Weighted distance		
	(0.019)	(0.021)
Partner resistance	-0.277	-0.115
	(0.188)	(0.208)
Reporter resistance	0.221	0.439**
	(0.171)	(0.195)
Border	0.973***	0.980***
	(0.033)	(0.036)
Official language	0.255***	-0.148***
	(0.049)	(0.050)
Euro	-0.056**	0.118***
	(0.024)	(0.030)
EU	0.152***	0.251***
	(0.035)	(0.040)
Constant	-2.538	-9.295**
	(3.593)	(4.326)
Observations	11,760	11,760
R-squared	0.928	0.888

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Robust standard errors in parentheses.

Exporter, importer, and time fixed effects were used

Figure A4 – The home bias across the EU

	(1) Goods	(2) Services
Home*AUT	3.645***	4.991***
	(0.050)	(0.075)
Home*BEL	2.091***	4.207***
	(0.063)	(0.088)
Home*BGR	5.350***	7.406***
	(0.189)	(0.219)
Home*CYP	5.455***	3.351***
	(0.110)	(0.171)
Home*CZE	4.122***	6.523***
	(0.125)	(0.171)
Home*DEU	1.626***	4.251***
	(0.057)	(0.061)
Home*DNK	3.568***	4.843***
	(0.059)	(0.072)
Home*ESP	2.200***	4.382***
	(0.062)	(0.105)
Home*EST	4.771***	6.713***
	(0.175)	(0.250)
Home*FIN	2.724***	5.588***
	(0.072)	(0.085)
Home*FRA	2.344***	5.302***
	(0.054)	(0.068)
Home*GBR	1.951***	3.582***
	(0.071)	(0.075)
Home*GRC	4.240***	5.969***
	(0.100)	(0.117)
Home*HRV	5.626***	7.974***
	(0.117)	(0.128)
Home*HUN	3.643***	5.838***
	(0.130)	(0.136)
Home*IRL	2.692***	3.828***
	(0.102)	(0.119)
Home*ITA	2.639***	5.105***
	(0.039)	(0.063)
Home*LTU	5.228***	7.899***
	(0.205)	(0.216)
Home*LUX	5.774***	4.341***
	(0.082)	(0.117)
Home*LVA	5.549***	7.154***
	(0.179)	(0.203)
Home*MLT	5.983***	4.365***
	(0.106)	(0.135)

Home*NLD	1.956***	4.242***
	(0.073)	(0.079)
Home*POL	3.613***	5.847***
	(0.077)	(0.167)
Home*PRT	2.524***	6.373***
	(0.089)	(0.101)
Home*ROU	4.772***	6.996***
	(0.209)	(0.249)
Home*SVK	4.827***	7.999***
	(0.109)	(0.168)
Home*SVN	5.294***	7.798***
	(0.100)	(0.127)
Home*SWE	2.327***	4.421***
	(0.060)	(0.091)
Nominal GDP	1.066***	1.608***
	(0.059)	(0.067)
Reporter population	-2.391***	-0.554*
	(0.291)	(0.335)
Partner population	-0.144	0.706**
	(0.264)	(0.322)
Weighted distance	-1.253***	-1.022***
	(0.019)	(0.021)
Partner resistance	-0.275	-0.127
	(0.180)	(0.201)
Reporter resistance	0.223	0.428**
	(0.161)	(0.188)
Border	0.958***	0.982***
	(0.034)	(0.038)
Official language	0.217***	-0.282***
	(0.052)	(0.051)
Euro	-0.039*	0.119***
	(0.024)	(0.030)
EU	0.124***	0.216***
	(0.034)	(0.038)
Constant	-2.441	-9.056**
	(3.467)	(4.255)
Observations	11,760	11,760
R-squared	0.935	0.897

*** p<0.01, ** p<0.05, * p<0.1

Robust standard errors in parentheses.

Exporter, importer, and time fixed effects were used

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Alina Mika

European Central Bank, Frankfurt am Main, Germany; email: alina.mika@ecb.europa.eu

Postal address 60640 Frankfurt am Main, Germany
Telephone +49 69 1344 0
Website www.ecb.europa.eu

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