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European Union and Trade Integration: Does the Home Bias Puzzle Matter?

Unión Europea e integración comercial: ¿resulta relevante el efecto frontera?

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Abstract

This paper analyses the size of the border effect or home bias within the European Union (EU) with the aim to quantify its impact in the trade integration process which started in 1992. The gravity model serves as a general framework where the use of sectoral data allows obtaining a more accurate measure of the border effects. The econometric analysis applied to a gravity model that contains a high disaggregation in the data introduces heteroskedasticity problems together with the presence of zero values, therefore, in order to obtain consistent estimates, the use of the Poisson Pseudo-Maximum Likelihood estimation method is recommended. Our results show that the bilateral trade flows depend upon the size and proximity of the trade partners, together with other variables as adjacency or language. Evidence in favour of a positive and diminishing border effect has been found for the period 1995-2006 and it accounts for 20% to 22% within the EU-19.

Keywords: Home Bias; Border Effect; Economic Integration; PPML; European Union.

Resumen

Este artículo se centra en el estudio de la evolución de la integración comercial en la Unión Europea. Para ello se ha utilizado un enfoque basado en los efectos frontera aplicado sobre diecinueve países europeos durante el periodo 1995-2006. Hemos empleado un modelo gravitatorio como marco de análisis, en el que los flujos bilaterales de comercio dependen del tamaño económico de los países y la distancia que les separa. Además, hemos considerado otras variables como el idioma o el hecho de compartir frontera terrestre. Con el fin de obtener estimadores consistentes, evitar la posible heteroscedasticidad y tratar de una manera correcta la presencia de ceros en la muestra se ha empleado el método de estimación de pseudo-máxima verosimilitud de Poisson. Los resultados evidencian la existencia de efectos frontera en la UE, no obstante, dichos efectos frontera han disminuido a lo largo del periodo analizado alrededor de un 20-22% para la UE-19.

Palabras clave: Sesgo país; Efecto frontera; Integración económica, PPML; Unión Europea

JEL Classification: F10, F15

1. Introduction and Theoretical Background

Recent episodes in international and European economics have directed the attention of academicians, policymakers and citizens to the monetary aspects of the European Integration process, their risks, and malfunctions. The debate on the Euro being of the upmost importance, of course, we should not overlook other aspects of the European project, as trade within the member countries, which are also very relevant.

Along the history of the European Union, 1993, the year of the completion of the Single Market, stands out as an important landmark: it was the starting point for the free circulation of goods, services, people and capital among the member countries. It meant, therefore, a prominent step forward in the process of economic integration among the countries encompassing the EU, which gained remarkable momentum with the *de facto* implementation of the single currency in 2002.

Although European integration has advanced substantially in the past decades, in practice the EU does not operate as a unique goods market yet. There are some frictions that bring about segmentation in the market. One of them is the so called 'border effect' or 'home bias', in which consumers still prefer to purchase domestically produced goods in detriment of foreign ones. According to Obstfeld and Rogoff (2001) it represents one of the six major puzzles in International Economics even in highly integrated areas as the EU[1]. In their view, the reason for the segmentation in good markets is the existence of trade costs, related both to transportation outlays and to tariff and non-tariff barriers. If the elasticity of substitution between foreign and domestic goods large enough, then reasonable levels of trade costs may justify the home bias that has been assessed empirically.

[1] The other puzzles are: The Feldstein-Horioka puzzle (or high correlations between saving and investment which are observed in OECD countries over long period of times); the preference of investors towards domestic equity in their portfolios; the small correlation among national consumptions in OECD; the relatively long persistence of exchange rate innovations and the apparent disconnection of exchange rates from fundamentals.

Although the first relevant insights on home bias can be traced back to Samuelson (1954), the paper which triggered recent research in this issue was McCallum (1995). Using a gravity model, he showed that, after controlling for variables commonly employed in such models -as sizes and distances- the volume of trade between two Canadian provinces was twenty-two times larger than that between a Canadian province and an American state. Subsequent research (as Helliwell, 1998; Anderson and Wincoop, 2003; or Liu *et al*. 2010) argued that McCallum estimations were biased due to omitted variables and found a smaller size of the border effect. Santos-Silva and Tenreyro (2006) claimed that constant-elasticity models, and more specifically, the gravity equation should be estimated in their multiplicative form rather than in the log linear fashion. This approach also overcomes the heteroskedasticy problems and the presence of zero values in the dependent variable. Notwithstanding these criticisms, the McCallum finding prompted an active area of research which intended to quantify and understand the phenomenon (Helliwell, 1996; Wei, 1996; Head and Ries, 2001; Helliwell and Verdier, 2001; Hillberry, 2002; Hillberry and Hummels, 2002, Chen, 2004; among others).

Wei (1996; 1998) studied the size of the home bias in the OECD countries over the period 1982 to 1994. His results suggested that an OECD country's intra-national trade was about 10 times higher than its trade with a foreign country during that period. In addition, he suggested a potential way to circumvent the lack of data on trade of a country with itself by using the total production minus exports as a proxy.

Other studies have focused on the European Union, such as Nitsch (2000). The study computed a home bias value of 11.3 for the EU member countries, after controlling for language, common border, distance and remoteness. Chen (2004) showed that in 1996 intra-national trade among EU countries was six times higher than trade with a European trading partner. Qian (2007) suggested that the evolution over time of the home bias could be a good measure to account for advances regarding economic integration. His results show that the border effects among 12 European countries decreased around 39% between 1991 and 2001, thus implying that economic integration within the EU had experienced substantial advances during the 1990s.

Recently, interregional trade data has been used to analyse the border effect within specific countries. Combes et al. (2005) and Wolf (2009) dealt with the border effect issue for France and Germany, respectively. In the case of the Spanish economy, Gil-Pareja et al. (2005) estimated that Spanish regions trade 21 times more with themselves than with OECD countries. Requena and Llano (2010) estimated a border effect between 30 and 10, depending on the specification considered, and explored industry-specific border effects. Their results showed that highly product-differentiated industries exhibit larger border effects, and that the border effect for intermediate goods is twice as large as that for final goods. Esteban et al. (2012) obtain that the average border effect between Spanish provinces ranges from 1.6 to 1.91. Llano et al. (2011) using a Poisson Pseudo-Maximum Likelihood estimation (PPML) conclude that the border effect in Spain could be consequence of the geographical aggregation. They argued that regional aggregation will lead to an overestimation of the border effect if the relationship between distance and trade flows is non-linear. Using two different databases they noticed that when aggregating intra-national shipments as "rest of Spain", the border effect increases to a value of 40, while when considering shipments to every province separately, the Spanish border effect reduces to 5. The authors conclude that disaggregated data captures better the high concentration of shipments at low distances.

Dias (2010; 2011) has questioned the findings about the home bias effect in Canada and the USA published by McCallum (1995), supporting the thesis of Santos-Silva and Tenreyro (2006). They argued that using a gravity equation with cross-country data and a linear approach produces upward biased estimations. When a non-linear estimator is used, the magnitude of the results by McCallum's experiment shows substantial decrease, between 35% and 45%. Additionally, when trade costs do not depend on distance, the border effect no longer shows up in the interprovincial trade in the case in which the interaction term between distance and the home bias dummy is tested.

In our view, the size and evolution of the home bias is clearly still an issue which deserves further attention, since it can be employed as a direct test of the depth and dynamics of market integration. On the one hand, the latest research focused on cross-country studies applied to the US and Canada; furthermore, there is a lack of studies addressing the home bias puzzle by using panel data methodology, which could solve some of the problems with estimations.

Accordingly, this paper focus on the study of the magnitude of the border effects in the EU. We examine sectoral data for nineteen EU countries in order to compute the home bias for each year over the period 1995-2006 and thus, asses the evolution of economic integration for these countries. To carry out this analysis we employ the consistent PPML estimation technique first proposed by Santos-Silva and Tenreyro (2006).

2. Methodology and Data

The gravity model has often been used as an appropriate framework to estimate the home bias. The gravity equation, in its simplest form (Tinbergen, 1962) states that the volume of trade between any two countries is positively correlated with the economic size of these countries (as captured by the Gross Domestic Product (GDP)) and negatively correlated with the geographic distance between them.

To estimate the border effect by means of a gravity equation, data on bilateral trade for 23 sectors of activity among 19 European countries[2]

[2] Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Netherlands, Belgium-Luxembourg, Poland, Portugal, Spain, Slovakia, Sweden and the United Kingdom.

over the period 1995 to 2006 has been used. Thus the panel data-set have 89,424 observations[3] (of which 82,270 are non zero). To account for zero trade flows in our database, we estimate equation (1) using a Poisson Pseudo-Maximum Likelihood (PPML) model proposed by Santos-Silva and Tenreyro (2006). Santos-Silva and Tenreyro (2006) explained that in presence of heteroskedasticity, the parameters of log linearized models estimated by OLS lead to biased estimations of the true elasticities (due to the Jensen's inequality). As an alternative, to circumvent this problem in our specification, we have used the Pseudo-Maximum Likelihood estimator. The PPML method estimates the parameters by entering the dependent variable in levels while the explicative ones are expressed in natural logarithms. This method has been used extensively to estimate more consistently the gravity equation in the case of a large number of zeros included in the dependent variable (Recalde et al., 2008; Llano et al., 2011 and Esteban et al., 2012; among others).

Thus, the estimation model is as follows:

$$X_{ijkt} = \beta_0 + \beta_1 Ln(Y_{it}) + \beta_2 Ln(Y_{jt}) + \beta_3 Ln(Dist_{ij}) + \beta_4 (Dummy_{ij}) + \beta_5 (Home_t) + + \eta_i + \eta_j + \eta_k + \eta_t + u_{ijkt} \quad (1)$$

where: X_{ijkt} are the k-sector bilateral exports from country i to country j in year t. Y_{it} and Y_{jt} are the Gross Domestic Products of countries i and j, respectively. $Dist_{ij}$ stands for the distance between country i and country j and $Dummy_{ij}$ captures different characteristics of exporter and importer countries such as sharing a common language (Lang) or a common border (Adjacency), being an island or landlocked. $Home_t$ is a dummy variable which takes value 1 for intra-national trade and 0 otherwise. In the next section, the average, industry-specific and yearly border effects are taken into account. Finally, the model includes origin and destination (η_i, η_j) as well as industry and time (η_k, η_t) fixed effects in order to account for the unobserved price indices or "multilateral resistance" discovered by Anderson and Van Wincoop (2003)[4]. u_{ijkt} refers to the error term.

The key parameters in equation (1) are those corresponding to the dummy for $Home_t$ since we can recover the border effects from their point estimates[5].

Data on bilateral trade and GDP (in real terms and US dollars) have been extracted from the STAN and National Account Databases published by the OECD. We have worked with data disaggregated by industries to obtain more

[3] 23 (sectors) x 18 (exporting countries) x 18 (importing countries) x 12 (years).

[4] Since the multilateral resistance terms are not observable, it is common practice to use importer and exporter fixed effects to replace the resistance terms, an approach that according to Feenstra (2002) gives consistent estimates and is easy to implement.

[5] The exponential of the coefficient of Home, is the ratio of intranational trade to international trade for certain year or industry, after controlling for size of GDP, distance, language, adjacency…

accurate estimations[6]. These databases do not provide data for domestic consumption (or, in other words, countries' imports from themselves). Following Wei (1996), we have computed this variable for each country as the difference between its total production of goods and its exports to the rest of the world.

Data on bilateral and intra-national distances are provided by the *Centre d'Etudes Prospectives et d'Informations Internationals* (CEPII). Intra-national distances are calculated using the area-based formula proposed by Head and Mayer (2000)[7]. Language and adjacency dummies are also supplied by the CEPII.

3. Results

In this section, the results of the estimation of equation (1) are presented. As it has been discussed previously, a PPML procedure has been chosen in order to treat adequately the proportion of zero observations in our dataset; that supposes around 8% of the bilateral exports.

Three different approaches to the border effect are considered. Firstly, we estimate the overall average border effect, which allows us to compare the results obtained with those estimated by other authors. This comparison, however, should be taken as tentative since the magnitude of the border effect is very sensitive to the measure of intranational distance as demonstrated by Wei (1996). Secondly, an estimation of the industry-specific border effects is presented in order to account for the heterogeneity among different sectors of activity. Measuring heterogeneity in this case is relevant as different border effects among sectors might be influenced by the level of substitutability between local and foreign products, by the optimal location choices made by producers, or by the nature of the own good or service (intermediate or final), that will make the effects endogenous. Exogenous effects are derived in the case of the existence of technical and non-tariff barriers.

As an extension, the study of the evolution of the average home bias over the period considered can offer very important insights about the change in openness. If border effects decline over time, it means that intra-national trade becomes less important relative to international trade and, therefore, that preference for domestically produced goods as opposed to foreign ones declines along the period considered (other things equal). This analysis could be considered as a measure of commercial integration (Qian, 2007).

[6] Hillberry (2002) argues that the degree of preference for domestic goods may differ according to the type of commodity considered. Hence, it is preferable to work with data disaggregated by industries. Therefore, it has been used two digits according to NACE rev.1 classification; and either two or three digits following the ISIC Rev.3 classification. See appendix for detailed data classification.

[7] $D_{ii} = 0.67\sqrt{\frac{Area}{\Pi}}$

Table 1 reports the estimates using different specifications of the gravity equation (1) and considering the overall border effect. The first column exhibits the standard gravity equation where the economic size of exporter and importer countries and the distance between them are considered. Column two includes dummy variables for adjacency and language respectively to capture the transaction costs. In the last two columns other dummies are included to denote the effects on bilateral trade depending on being an island or landlocked, either for the exporter and importer countries. All estimations include industry fixed effect as well as origin-year and destination-year fixed effects to account for the multilateral resistance terms (Anderson and Van Wincoop, 2003) as proposed by Feenstra (2002). In addition, the last column includes time fixed effects.

Table 1. Gravity Equation with Border Effects

VARIABLES	(1)		(2)		(3)		(4)	
Ln (GDP_i)	0.978	* (0.078)	1.069	* (0.095)	1.159	* (0.099)	0.860	* (0.061)
Ln (GDP_j)	0.934	* (0.078)	1.019	* (0.096)	0.742	* (0.064)	0.740	* (0.063)
Ln ($Dist_{ij}$)	-1.424	* (0.017)	-1.039	* (0.024)	-1.040	* (0.024)	-1.040	* (0.024)
Adjacency			0.478	* (0.036)	0.479	* (0.036)	0.479	* (0.036)
Common Language			1.129	* (0.042)	1.126	* (0.042)	1.118	* (0.042)
$Island_i$					-0.614	* (0.235)	-1.758	* (0.172)
$Island_j$					0.269	(0.206)	-0.734	* (0.182)
$Landlocked_i$					0.137	(0.288)	-0.791	* (0.199)
$Landlocked_j$					-0.714	* (0.165)	-0.950	* (0.210)
$Home_{1995}$	1.880	* (0.031)	2.679	* (0.049)	2.676	* (0.049)	2.680	* (0.049)
# Observations	87,779		87,779		87,563		87,407	
R^2	0.903		0.904		0.904		0.903	
Estimated Border Effects (exp^[Home])	6.55		14.57		14.53		14.59	

Source: Own elaboration.
Notes: Poisson pseudo-maximum likelihood estimation. The dependent variable is the real bilateral exports from country *i* to country *j*. Clustered robust standard errors in parentheses. * denotes significant at the 1% level. Industry fixed effects and year-specific exporter and importer fixed effects are included in all the regressions. The last column also includes time fixed effects.

As displayed in Table 1, in all specifications, the basic gravity explanatory variables are highly significant and the coefficients have the expected signs. The GDP coefficients are positive, distance has a negative effect on trade flows, language and adjacency estimates are positive, this is, sharing a common language or border promote trade by reducing transaction costs. Finally, island and landlocked show different point estimates (sign) and significance levels when time fixed effects are included in addition to origin-year and destination-year fixed effects. The *a priori* expectations for these coefficients imply that being an island or landlocked reduce potential exports due to transport limitations; however, results obtained are not conclusive since coefficients vary in sign and significativity across specifications. These changes may be due to the fact that only 2 countries out of 19 (Ireland and the United Kingdom) are islands, and 4 out of 19 are landlocked (Austria, Czech Rep., Hungary and Slovakia). Moreover, except for the United Kingdom, their economic size and their relative commercial proportion are small.

The coefficient associated with the border effect ranges from 1.88 in the simplest model to 2.67. The border effect can be computed as the exponential of the point estimate of the Home dummy. That is, a European country trades around 14 times (exp^ (2.676) =14.5) more with itself than with another European partner according to the last two columns of table 1. Nitsch (2000) using SUR methodology found out that for the case of twelve EU countries during 1979-1990 the average border effect was close to 10. Chen (2004) quantified the home bias effect around a value of 6 when studying seven European countries in 1996 in a cross-country framework. The differences in previous studies with respect to our findings are due to the way in which internal distance is measured, to the use of non-disaggregated data and to estimation methods that may yield biased estimators.

Table 2 shows the results of estimating a gravity equation with industry specific border effects[8]. The estimated coefficients of the standard gravity variables display the expected signs and are statistically significant. All the coefficients for the industry border effects are positive and significant except for the one corresponding to "office, accounting and computing machinery" that shows a negative and non-significant value. Industry-specific border effects ranges from 2.67 (aircraft and spacecraft equipment) to 84 (Agriculture, forestry and fishing).

Our results confirm that the home bias effect varies substantially across industries. As can be seen in table 2, "chemical and pharmaceuticals", "machinery" and "transport equipment" obtain the lowest coefficients while "agriculture, forestry and fishing", "food, beverages and tobacco" and "coke, refined petroleum and nuclear fuel" are among the highest. The degree of substitution between domestic and imported goods, the optimal localization of production, the nature of the goods and industry characteristics may explain these diverse results.

[8] As previously discussed the home bias effect may vary across industries.

TABLE 2. GRAVITY EQUATION WITH INDUSTRY- SPECIFIC BORDER EFFECTS

VARIABLES	(1)		(2)		(3)		
Ln (Y_i)	0.793	* (0.150)	0.713	* (0.068)	1.085	* (0.062)	
Ln (Y_j)	1.263	* (0.072)	0.723	* (0.057)	0.732	* (0.058)	
Ln ($Dist_{ij}$)	-1.039	* (0.020)	-1.039	* (0.020)	-1.040	* (0.020)	
Adjacency	0.479	* (0.031)	0.478	* (0.030)	0.478	* (0.030)	
Common Language	1.129	* (0.034)	1.127	* (0.034)	1.118	* (0.034)	
$Island_i$			0.185	(0.153)	-0.788	* (0.182)	
$Island_j$			-0.803	* (0.169)	-0.834	* (0.171)	
$Landlocked_i$			1.883	* (1.883)	0.013	(0.200)	
$Landlocked_j$			-1.016	* (0.193)	-1.054	* (0.195)	
	Industry-specific Home Coefficient						Estimated Fixed Effect
Home Agriculture, forestry & fishing	4.439	* (0.078)	4.439	* (0.078)	4.438	* (0.078)	84.61
Home Mining & quarrying	2.773	* (0.115)	2.771	* (0.115)	2.775	* (0.115)	16.04
Home Food, beverages & tobacco	3.616	* (0.056)	3.615	* (0.056)	3.614	* (0.056)	37.11
Home Textile leather & footwear	1.805	* (0.097)	1.805	* (0.097)	1.808	* (0.097)	6.10
Home Wood & cork	3.386	* (0.073)	3.385	* (0.073)	3.384	* (0.073)	29.49
Home Pulp paper, printing & publishing	3.275	* (0.052)	3.274	* (0.052)	3.274	* (0.052)	26.42
Home Coke, Ref. petroleum & nuclear fuel	3.645	* (0.106)	3.643	* (0.106)	3.643	* (0.106)	38.21
Home Chemicals (exc. Pharmaceuticals)	1.496	* (0.080)	1.497	* (0.080)	1.497	* (0.080)	4.47
Home Pharmaceuticals	1.947	* (0.079)	1.947	* (0.079)	1.942	* (0.054)	6.97
Home Rubber & plastics	2.661	* (0.054)	2.660	* (0.054)	2.660	* (0.058)	14.30
Home Non-metallic products	3.519	* (0.058)	3.519	* (0.058)	3.518	* (0.062)	33.72
Home Basic metals	2.368	* (0.062)	2.367	* (0.062)	2.369	* (0.062)	10.69
Home Fabricated metal products	3.463	* (0.056)	3.462	* (0.056)	3.461	* (0.056)	31.85
Home Machinery & equipment n.e.c.	1.687	* (0.115)	1.687	* (0.115)	1.687	* (0.115)	5.40
Home Office, accounting & computer machinery	-0.269	(0.336)	-0.281	(0.336)	-0.272	(0.336)	0.762
Home Electrical machinery & apparatus n.e.c.	2.573	* (0.145)	2.573	* (0.145)	2.574	* (0.145)	13.12
Home Radio, TV & communication equipment	1.977	* (0.161)	1.975	* (0.161)	1.962	* (0.162)	7.11
Home Medical, precision & optical instrument	1.647	* (0.138)	1.647	* (0.138)	1.648	* (0.138)	5.20
Home Motor vehicles, trailers & semi-trailers	1.699	* (0.103)	1.698	* (0.103)	1.702	* (0.103)	5.48
Home Shipbuilding	2.481	* (0.180)	2.481	* (0.180)	2.480	* (0.180)	11.94
Home Aircraft and spacecraft	0.981	* (0.162)	0.966	* (0.162)	0.976	* (0.163)	2.65
Home Railroad & transport equipment n.e.c.	2.071	* (0.112)	2.078	* (0.112)	2.086	* (0.112)	8.05
Home Manufacturing n.e.c. & recycling	2.183	* (0.150)	2.183	* (0.150)	2.183	* (0.150)	8.87
# Observations	87,780		87,604		87,248		
R^2	0.927		0.927		0.927		

Source: Own elaboration.
Notes: Poisson Pseudo-Maximum Likelihood estimation. The dependent variable is the real bilateral exports from country *i* to country *j*. Clustered robust standard errors in parentheses. * denotes significant at the 1% level. Industry fixed effects and year-specific exporter and importer fixed effects are included in all the regressions. Column three also includes time fixed effects.

To compare the results obtained in this paper with previous studies, it is necessary to establish that there are substantial differences arising from the level of aggregation, sample of countries and periods. In the case of Chen (2004) the disaggregation includes 78 industries for EU countries (according to 4-digit NACE Rev. 1) and Requena and Llano (2010) use the gravity model for Spain using a disaggregation of 15 industries according to 2-Digit ISIC Rev.3. However, the results presented here using a 23 industries disaggregation (according to 2-Digit NACE Rev.1 and 2/3-Digit ISIC Rev. 3) maintain certain similarities with those previous studies. This is the case for "pharmaceuticals" where we compute a border effect of 6.97 while Chen's ranges from 5.4 to 10 depending on the distance measure used. Similar point estimates to Chen's are also those for "Medical equipment", "TV and radio", "printing and publishing", "machinery and equipment" and "other manufactures". On the other hand our results for "agricultural, forestry and fishing" and "food, beverages and tobacco" vary notably from Chen's. With respect to Requena and Llano (2010), similar values are observed in the case of "food, beverages and tobacco", "textiles, leather and footwear", "pulp paper, printing and publishing", "electrical, radio and TV", and "medical machinery" and "transport equipment".

One objective of this paper is to measure the evolution of the border effects rather than just come up with an average value. In this section we analyse yearly border effects in order to examine whether or not there has been a commercial integration in the EU-19 during the period 1995-2006. We estimate a gravity equation where home bias dummies are calculated for each year (table 3) and show graphically the evolution of the border effect (figure 1). The structure of table 3 is similar to table 1; the first column displays the standard gravity equation where the economic size of exporter and importer countries and the distance between them are considered. Column two includes dummy variables for adjacency and language respectively. And finally, the last two columns include an island and landlocked dummies, either for the exporter and importer countries. All estimations include industry fixed effects as well as origin-year and destination-year fixed effects to account for the multilateral resistance terms. In addition, the last column includes time fixed effects.

As in the previous tables, the basic gravity explanatory variables are highly significant and the coefficients have the expected signs. The GDP coefficients are positive, distance has a negative effect on trade flows, language and adjacency estimates are positive and island and landlocked show different point estimates and significance levels when time fixed effects are included in addition to origin-year and destination-year fixed effects.

The average overall border effect has declined about 21% from 1995 to 2006 for the EU-19 countries.

The point estimates for the border effects in column 1 show lower values than in the rest of columns; however, since this is a very basic model where some relevant variables are omitted, those coefficients may be biased. Once dummy variables are included, and different fixed effects are considered, the border effects rise but show similar values across specifications. In order to analyse the evolution of the home bias we have considered results obtained from the last column of table 3.

Table 3. Gravity Equation with Yearly Border Effects

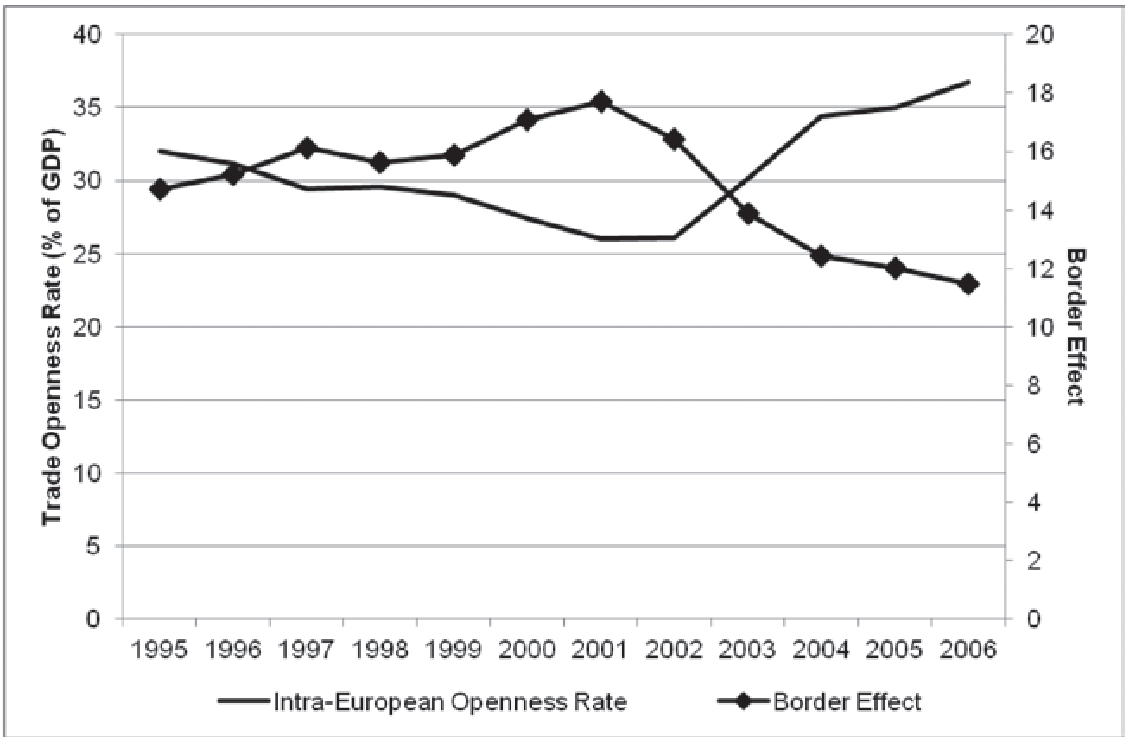
VARIABLES	(1)		(2)		(3)		(4)	
Ln (GDP_i)	0.800	* (0.017)	0.839	* (0.155)	0.725	* (0.071)	1.071	* (0.067)
Ln (GDP_j)	1.139	* (0.064)	1.251	* (0.078)	0.712	* (0.062)	0.724	* (0.062)
Ln ($Dist_{ij}$)	-1.424	* (0.017)	-1.039	* (0.024)	-1.040	* (0.024)	-1.041	* (0.024)
Adjacency			0.478	* (0.036)	0.478	* (0.036)	0.479	* (0.036)
Common Language			1.123	* (0.041)	1.121	* (0.041)	1.110	* (0.041)
$Island_i$					0.225	(0.165)	-0.738	* (0.200)
$Island_j$					-0.774	* (0.183)	-0.250	(0.157)
$Landlocked_i$					1.960	* (0.479)	0.073	(0.216)
$Landlocked_j$					-0.950	* (0.211)	-2.569	* (0.385)
$Home_{1995}$	1.890	* (0.058)	2.689	* (0.069)	2.676	* (0.069)	2.677	* (0.069)
$Home_{1996}$	1.927	* (0.059)	2.721	* (0.069)	2.726	* (0.069)	2.760	* (0.069)
$Home_{1997}$	1.982	* (0.058)	2.780	* (0.070)	2.779	* (0.070)	2.777	* (0.070)
$Home_{1998}$	1.953	* (0.060)	2.748	* (0.071)	2.752	* (0.071)	2.744	* (0.071)
$Home_{1999}$	1.972	* (0.060)	2.766	* (0.071)	2.765	* (0.071)	2.763	* (0.071)
$Home_{2000}$	2.042	* (0.060)	2.838	* (0.071)	2.837	* (0.071)	2.837	* (0.071)
$Home_{2001}$	2.075	* (0.062)	2.873	* (0.071)	2.867	* (0.072)	2.874	* (0.073)
$Home_{2002}$	1.999	* (0.062)	2.798	* (0.073)	2.797	* (0.073)	2.790	* (0.072)
$Home_{2003}$	1.831	* (0.061)	2.631	* (0.072)	2.630	* (0.071)	2.628	* (0.071)
$Home_{2004}$	1.720	* (0.063)	2.521	* (0.073)	2.521	* (0.073)	2.514	* (0.073)
$Home_{2005}$	1.684	* (0.063)	2.487	* (0.073)	2.488	* (0.073)	2.486	* (0.073)
$Home_{2006}$	1.635	* (0.065)	2.438	* (0.075)	2.437	* (0.075)	2.429	* (0.075)
# Observations	87,798		87,798		87,604		87,292	
R^2	0.904		0.904		0.904		0.903	

Source: Own elaboration.
Notes: Poisson Pseudo-Maximum Likelihood estimation. The dependent variable is the real bilateral exports from country *i* to country *j*. Clustered robust standard errors in parentheses. * denotes significant at the 1% level. Industry fixed effects and year-specific exporter and importer fixed effects are included in all the regressions. The last column also includes time fixed effects.

In all the specifications a very similar pattern arises for the border effect estimates. They show increasingly higher values until 2001 and a decline from 2002. For the first half of the period, border effects increase around 20 to 21 per cent in the EU while there seems to be a commercial integration for the second half, when the decline is about 35%.

Results obtained from the evolution of the border effects are in line with the evolution of the intra-European trade openness rate (figure 1). We have calculated the intra-European trade openness rate as the average of the countries openness rate with the rest of countries in the sample. In other words, we have calculated the exports and imports of a country to/from the rest of countries in the sample relative to the country's GDP and we have constructed the weighted average for the 19 countries considered, using countries' GDP participation as weight.

Figure 1. Yearly Border Effects and Intra-European Trade Openness



Source: Own elaboration. Data on exports, imports and GDP are from the OECD.

For the first half of the period we observe a decline in the openness rate. This decline is due to the fact that although exports and imports grew in those years they evolved at a slower pace than GDP. This period corresponds to greater border effects. From 2001 to 2006 the situation turned around, intra-European trade grew faster than GDPs and the openness rate experienced a large growth from 26% of GDP to more than 35%. The border effect, meanwhile, faced a decline of around 35% from 17.5 to 11.4.

4. Conclusions

The Single Market is one of the basic key features of the EU. It contributes to the welfare of European citizens and to the competitiveness of firms by suppressing barriers to trade, enhancing competition and effectively raising the potential number of consumers that can be served by suppliers. However, one particular friction that hinders the integration of good markets rests on the existence of the home bias effect.

We have analysed the pattern and evolution of the border effects for 19 European countries over the period 1995-2006 in order to measure the size of this friction for one of the most integrated worldwide markets. The gravity model has been used as a framework for the estimation of these effects. Our results suggest that border effects have declined between 1995 and 2006 about 21%. However, results show increasingly higher border effects from 1995 to 2001 (22% growth), and a sharp decline between 2001 and 2006 (35%).

Border effects present different values across industries. Specifically machinery and transport equipment sectors exhibit the lowest border effects while agriculture products and food & drinks have the highest border effects.

These results suggest that integration is indeed occurring among the EU members, although some degree of preference for domestic goods can still be detected. In other words, the European consumer is not totally indifferent between goods of similar characteristics but of different origin, and he favours goods produced domestically with respect to those imported from other countries.

Some implications for EU policymakers and firms can be drawn from these ideas. According to our results, there is still some progress to make in the effective consolidation of the Single Market. All measures that increase the consumers' confidence in foreign goods and services, by means of, for example, warranting the exercise of their rights or providing quick responses to potential disputes with suppliers (European Commission, 2011) can encourage the purchase of foreign products and help reduce the home bias, thus favouring advancements in this direction. Firms, in turn, could benefit of more thorough market analyses and studies of the consumer habits, together with an effort to adapt their output to the consumers' tastes. In effect, they may increase their market's share if they succeed in adapting, to a further extent, the commodities they supply to the consumers' preferences.

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APPENDIX

TABLE 3. SECTORS OF ACTIVITY

1	Agriculture, forestry and fishing	13	Fabricated metal products
2	Mining and quarrying	14	Machinery and equipment n.e.c
3	Food, beverages and tobacco	15	Office, accounting and computing machinery
4	Textiles, leather and footwear	16	Electrical machinery and apparatus n.e.c
5	Wood and cork	17	Radio TV communication equipment
6	Pulp paper, printing and publishing	18	Medical precision and optical instrument
7	Coke, refined petroleum and nuclear fuel	19	Motor vehicles, trailers and semi-trailers
8	Chemical excluding pharmaceuticals	20	Shipbuilding
9	Pharmaceuticals	21	Aircraft and spacecraft
10	Rubber and plastics	22	Railroad and transport equipment n.e.c
11	Non-metallic products	23	Manufacturing n.e.c and recycling
12	Basic metals		