

Jienwatcharamongkhol, Viroj

Working Paper

Distance Sensitivity of Export: A Firm-Product Level Approach

Working Paper, No. 2012:33

Provided in Cooperation with:

Department of Economics, School of Economics and Management, Lund University

Suggested Citation: Jienwatcharamongkhol, Viroj (2012) : Distance Sensitivity of Export: A Firm-Product Level Approach, Working Paper, No. 2012:33, Lund University, School of Economics and Management, Department of Economics, Lund

This Version is available at:

<https://hdl.handle.net/10419/260058>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Working Paper 2012:33

Department of Economics
School of Economics and Management

Distance Sensitivity of Export: A Firm-Product Level Approach

Viroj Jienwatcharamongkhon

December 2012



LUND
UNIVERSITY

Distance Sensitivity of Export: A Firm-Product Level Approach

Viroj JIENWATCHARAMONGKHOL

Department of Economics
Lund University

Abstract

Recent literature suggests that product characteristics assert different distance sensitivity on trade flows. But the empirical evidences still find conflicting results. Previous studies have examined the effect of distance on the export decisions across different product groups at the aggregate level. In this paper the analyses are executed at a disaggregated firm-product level to examine the issue based on individual firm's decisions. Empirically, I employ a gravity model on Swedish micro-level export data in the manufacturing sector. The results suggest that homogeneous products are more sensitive to distance than differentiated products for the export selection and are insignificant for the export intensity.

Keywords: distance sensitivity, export decisions, gravity model, micro-data

JEL Classification: F12, F14, F41

Introduction

The negative relationship between distance and trade has been quoted as one of the most robust empirical findings in international trade literature (Leamer & Levinsohn, 1995). Countries situated close to each other trade more intensively than countries that are farther apart. Such effect can be caused by the exporter's transportation costs of shipping from home to the destination, so that the greater distance also incurs greater transportation costs. Moreover, exporters can face greater transaction costs of having to deal with culturally or institutionally unfamiliar markets. These costs can arise from procedural differences, communication misalignment, or legal compliance. The more unfamiliar the market, the higher the transaction costs.

When we decompose the effect of distance further, we can see that distance affects both of the firm's export decisions. Firstly, distance affects the *selection* decision and

decreases the extensive margin of exports by reducing the number of firms present and the number of available products in a particular market abroad. This is because distance increases the transaction costs, i.e. the fixed and sunk entry costs of setting up contacts and distribution network at host countries abroad. Such increase in costs lessens, in general, the number of firms that can afford these high entry costs (in other words, cross the productivity threshold) to become exporters (Melitz, 2003); and, similarly, the number of products to be exported for each individual firm.

Secondly, distance also affects the *intensity* decision and decreases the intensive margin of export by reducing the size of export per firm. M. Lawless (2010) considers distance to mainly capture the variable costs. But there might also be some fixed cost element in the distance. This is because after entry, each firm has to incur some unknown per-period fixed costs of maintaining the presence in the market (Segura-Cayuela & Vilarrubia, 2008) and also some market penetration costs of advertising to capture the market share (Arkolakis, 2008). The greater dissimilarity between sellers and buyers tends to increase the uncertainty that leads to the increase of these per-period fixed costs and hence reduces the intensive margin of each firm. Similarly for the marketing costs, producers from far away are less likely to be known to the consumers in the market and a firm has to invest a considerable amount to publicise its products.

However, the impact of distance is not uniform across products but varies in magnitude due to the product characteristics. It is still uncertain whether homogeneous products are more sensitive to distance than differentiated products or the other way around. On one hand, we have the pioneering work by Rauch (1999) that introduces the theoretical network/search view and concludes that differentiated products assert greater sensitivity than homogeneous products. On the other hand, we can still find the conflicting empirical results. This paper is an extension of Rauch by disentangling the distance effect at the disaggregated firm-product level and include other dimensions of distance, i.e. cultural and institutional similarities to provide an empirical evidence to the unresolved question.

In the case of homogeneous products, which are categorised as the products on an organised exchange and the products with referenced price in Rauch (1999), the products are standardised and can be compared by their prices without having to identify the producers trademark. The trader can obtain the price information through trade publications (or internet portals nowadays). This makes the search costs lower in comparison to the differentiated products, in which their characteristics vary in many dimensions, e.g. colour or technical features. Matching product characteristics across various markets would also include the identification of the producers¹. But it can be argued that homogeneous products assert greater distance sensitivity due to the competition of similarly-produced homogeneous products from other competing countries nearby the destination market. Whereas the monopolistic nature of differentiated products enables a trade across great distances.

If we take a look from the firm's perspective, we can see that each individual firm faces the following decisions: (i) whether to export or not, (ii) where to export, (iii) which products to export, and (iv) how much to export each of these products. The first two questions are dealt with elsewhere (see for example Bernard and Jensen (2004), K. Lawless

¹Take, for example, a case of price comparison for personal notebooks. You would need to gather information on many things, including the screen size, processor speed, RAM capacity, hard-drive capacity and reading technology, graphics card and memory, operating system version, and manufacturer.

Martina; Whelan (2008). Whereas the last two questions will be the main focus of this paper, in which it examines the aforementioned selection and intensity decisions of firm's export.

The literature that studies the distance effect on product export chiefly looks at the aggregate national level but not how each individual firm behaves. Rauch (1999) classifies products into three categories, organised exchange, reference priced, and differentiated, and estimates a gravity equation of aggregate bilateral trade of selected 63 countries in 1970, 1980, and 1990. The result of higher distance effect for differentiated products is in support of his hypothesis that differentiated products assert higher trade costs besides transportation. Similar result from a different model specification is also obtained in G.-J. M. Linders (2006); Huang (2007). Möhlmann, Ederveen, de Groot, and Linders (2010), on the other hand, find the opposite results when using alternative estimation method on the 55 countries for the study, i.e. Heckman selection model with country dummies instead of standard OLS. Their given explanations are that differentiated products are produced in fewer places and preferably traded over a larger distance, and that the intangible costs are relatively less important for the products on organised exchange. Lankhuizen, de Graaff, and de Groot (2012) extend on these papers by using finite mixture model in order to endogenously group the products into homogeneous segments that are sensitive to geographic distance in various dimensions. The data is from 72 countries in 2000. Among the findings for the eight segments, for example, machinery and transport products are sensitive to high geographic distance, while bulk goods and crude materials are sensitive to low geographic distance.

The novelty in this paper is that I attempt to bridge the gap between the literature regarding the distance effect on firm export and the empirical evidence. This is done by examining the distance sensitivity across product groups based on export decisions at the disaggregated firm-product level, which has never been done in the previous studies. Studying the export decisions from a firm's perspective yields an insight into the mechanism of the distance effect on exporting firms. I also take into account the various dimensions of distance, not only as a geographical unit, but also cultural and institutional similarities.

The rest of the paper is organised as follows. The next section explains the theoretical framework in more detail. The methodology section specifies the empirical strategy and how some of the econometric estimation issues are resolved. Then the data descriptives follow. The results section presents and discusses the findings. The last section concludes the paper.

Theoretical Framework

Firm's Decisions

Each firm has several ways to do business. It can either produce and sell within the domestic market only or engage some parts abroad. On the production side, a firm can produce domestically or engage in offshoring activities by having some or all of its production that involves the intermediate inputs abroad. On the distribution side, a firm can sell at home or export its finished products internationally. Furthermore, it can do foreign direct investment (FDI) by setting up a subsidiary to produce and sell abroad, or even license the product to other firms to produce and sell under the agreement that bypasses the subsidiary altogether.

So an individual firm has to choose among these paths by ensuring that the benefits from expanding into the market across borders have to outweigh the costs. These costs consist of (i) the fixed and sunk transaction costs, i.e. from obtaining a permit and establishing network contacts at the host country; and (ii) the costs that vary with the total export, i.e. transport costs and tariffs. The so-called proximity-concentration trade-off means that a firm will export when the gains from maintaining the capacity in multiple markets outweigh the transport costs, and the opposite is true for FDI (Helpman, Melitz, & Yeaple, 2004).

A firm decides to export, when it can afford the sunk entry costs on top of the variable transportation costs. Among all firms, exporters are found to be more productive (Wagner, 2007). In other words, these self-selected firms have crossed the productivity threshold and become exporters (Melitz, 2003).

When a firm exports, where does it go to? A model and an empirical evidence by Eaton and Kortum (2002) and Eaton, Kortum, and Kramarz (2004) provide an insight on the geography of exports. The model attributes the effect of distance and barriers on trade to the technology. Trade occurs when buyers can search and match the lowest price among those offered by different producers abroad. If the goods are easily substitutable across producers from different countries, export is more sensitive to distance and trade barriers. When distance is great and costs are higher, firms can then export only a small range of goods. So we can see that most firms do export to a few destinations, which are likely to be located close to home.

Distance Sensitivity

As recognised by many scholars, distance plays an important role in trade decisions (Tinbergen (1962), Krugman (1995) as prominent examples). The effect is twofold. Firstly, distance directly affects the transportation costs, so that a greater distance yields higher shipping costs. Secondly, it indirectly affects the transaction costs of trade. When the countries are situated far apart from each other, the cultural and institutional similarity becomes weaker, which makes it more difficult for exporters to establish the necessary network of distributors abroad.

The role of distance on transaction costs has been discovered in recent decades and quickly gained a place in the trade literature. A meta-study by Disdier and Head (2008) confirms the persistence of distance effect and G. M. Grossman (1998) shows that the distance effect is of a greater magnitude than could be accounted to transportation costs alone. Recent studies on the so-called intangible barriers also shed light on this unresolved mystery (Anderson & Marcouiller, 2002; Lankhuizen et al., 2012; G.-J. Linders & De Groot, 2006).

Distance turns out not to be only a geographical unit dimension, it appears. Institution and cultural similarities are the additional dimensions that have a role in affecting a firm's decision to engage in export. The institutional differences between home and destination market can involve the protection of property rights and contract enforcement (Anderson & Marcouiller, 2002). The imperfect alignment would eventually impose additional transaction costs on the exporters due to informational frictions from the uncertainty (Huang, 2007). Accordingly, cultural similarities in terms of language, religion, colonial ties are found to be facilitating export because the trading partners easier communicate and share common understanding with each other (Rauch, 1999).

All these various dimensions of distance affect the firm's decisions to export in two directions. Firstly, it affects the selection of firms. As the distance increases the export costs, both transportation and transaction, also increase. Only the productive firms can afford these costs to enter a market, each of which is affixed with a certain productivity threshold (Melitz, 2003). Andersson (2007) argues that the familiarity between home and the destination market reduces this productivity threshold and allows more firms to self-select into that market, and vice versa. So if great distances are associated with less similarity, they would reduce the extensive margin of export, i.e. the number of firms and available products at a particular market.

Secondly, it affects the intensity of export. Because the variable costs (transportation costs) are greater for countries that are further away, the exporter's capacity is then limited. However, M. Lawless (2010) formally shows that the variable costs ambiguously affect the intensive margin of each firm. Besides the transportation costs, there are also the fixed costs after entry. These are per-period costs of maintaining presence in the market (Segura-Cayuela & Vilarrubia, 2008) and market penetration costs of reaching the target consumers (Arkolakis, 2008). Dissimilarities between sellers and buyers are most likely to increase these fixed costs, and will result in the reduction of the export per firm.

Different product types are also expected to assert different distance sensitivity due to their inherent characteristics. Rauch (1999) proposes the network/search view that becomes common in trade studies. For homogeneous products, either products on organised exchange or products with referenced price, the products are standardised and no identification of producers is a prerequisite of price comparison. Traders can scan and match the buyers and sellers more easily. Compared to differentiated products, the same connection has to arise from a search process instead, so buyers and sellers need to establish network ties in order to match orders. This increases the transaction costs, which in turn are also associated with distance and cultural similarities. Therefore, it is expected that differentiated products would assert greater sensitivity towards distance and other intangible barriers.

Export Experience

So far the analysis of distance sensitivity mainly looks at a static picture. But we know that export is a dynamic process and should be treated as such. Once the exporters gain access to the foreign markets, the upfront fixed costs have already paid, so it is reasonable that the costs associated with export to the same market should be lower in succeeding years. This is because (i) the institutions are rigid and any procedural changes tend to be slow (ii) as a result, a firm learns to adapt to the market better, e.g. know which forms to submit or whom to contact for tax refund, and be more efficient in later years.

The idea that a firm learns from its past export experience is shared among many scholars. However, it is Helpman (1984), G. Grossman and Helpman (1993), and Clerides, Lach, Tybout, and of Economic Research (1996) who formally explain that learning by exporting leads to higher productivity. The technical or management expertise and the best practices of international buyers lead the exporting firms to increase their stock of knowledge. The increased knowledge then helps them to be more productive later. Besides, the productivity gain is channelled through higher competition in the foreign markets (Verhoogen, 2008).

Methodology

Estimation

In order to explain the decisions to export, many empirical studies in international trade usually employ the gravity equation. Throughout the years it has been tested and the general concensus is that the gravity equation is robust at exhibiting the negative effect of distance. Since the pioneering work by Tinbergen (1962) some scholars have provided the theoretical foundation for it, including Andersson and van Wincoop (Anderson, 1979; Anderson & Wincoop, 2003), Bergstrand (Bergstrand, 1985), and recently an extension of the model in Egger and Pfaffermayr (Egger & Pfaffermayr, 2011).

The basic equation used in this paper is formulated as the following:

$$X_{ijkt} = \beta_0 Y_{jt}^{\beta_1} \Gamma_j^{\beta_2} \Theta_{i,t-1}^{\beta_3} \delta_{ijk,t-1}^{\beta_4} \varepsilon_{ijkt}, \quad (1)$$

where the dependent variable X_{ijkt} is the export from firm i to country j product k at time t and the independent variables are the vectors of destination country variables, distance variables, lagged firm-specific control variables; lagged import variable, and error term, respectively. A list of all the variables used and their description is in the Appendix.

This paper uses Heckman selection model in order to estimate the above equation. The benefit of this method is that (i) it considers both firm's decisions, whether to export a product or not and how much to export, at the same time, and (ii) it better deals with the dataset suffering from many zeros in the dependent (continuous) variable, which is typical in trade data, including this one. There are several alternative estimation methods that deal with data with frequent zeros, for example Zero-Inflated Poisson (ZIP), Zero-Inflated Negative Binomial (ZINB), Pseudo Poisson Maximum Likelihood (PPML) (Santos Silva & Tenreyro, 2006) but such models are mainly appropriate for count data and an evidence of superiority over Heckman is still debatable (Martínez-Zarzoso, 2013; Martin & Pham, 2008). Although Heckman selection model is sensitive to the model specification, given the above benefits this paper will adhere to this method.

The chosen Heckman method contains the outcome and the selection equations. The outcome equation is simply a log-linearised formulation of the model in equation 1.

$$\ln X_{ijkt}^* = \beta_0 + \beta_1 \ln Y_{jt} + \beta_2 \ln \gamma_{1j} + \beta_3 \ln \theta_{1i,t-1} + \beta_4 \delta_{1ijk,t-1} + \varepsilon_{1ijkt} \quad (2)$$

Here the dependent variable is the continuous variable of export value, indicating how much firm i exports to country j product k at time t .

In the selection equation, the dependent variable is a binary choice variable, with 1 being the firm exports at time t and 0 otherwise, and is formulated as,

$$Z_{ijkt}^* = \beta_0 + \beta_1 \ln Y_{2jt} + \beta_2 \ln \gamma_{2j} + \beta_3 \ln \theta_{2i,t-1} + \beta_4 \delta_{2ijk,t-1} + \varepsilon_{2ijkt}. \quad (3)$$

Also, it follows that

$$\ln X_{ijkt} = \ln X_{ijkt}^*, Z_{ijkt} = 1 \text{ if } Z_{ijkt}^* > 0 \quad (4)$$

$$\ln X_{ijkt} \text{ not observed, } Z_{ijkt} = 0 \text{ if } Z_{ijkt}^* \leq 0 \quad (5)$$

Lastly, the assumptions on the error terms are:

$$\begin{aligned}\varepsilon_{1ijkt} &\sim N(0, \sigma^2) \\ \varepsilon_{2ijkt} &\sim N(0, 1) \\ \text{corr}(\varepsilon_{1ijkt}, \varepsilon_{2ijkt}) &= \rho\end{aligned}\tag{6}$$

Both outcome and selection equations can be either jointly estimated with maximum likelihood or as a two-step approach, with maximum likelihood in the first stage and normal OLS in the second. I rely on the first approach to follow Verbeek (2008) as he points out that the OLS standard errors from the two-step estimator are incorrect, whereas the maximum likelihood provides a consistent and asymptotically efficient estimator.

Normally, in order to employ a Heckman selection estimator, at least one independent variable should be excluded in the outcome equation. Here I choose to exclude Human Capital variable since it affects more on the propensity but less, if at all, on the intensity of export.

Empirical strategy

As mentioned in the introduction, this paper focuses on the firm's decisions whether to export a product to a given market or not and how much to export. Therefore, each individual firm encounters the following choice problem:

i) **Selection:** each individual firm chooses to export a certain product, out of its product portfolio, to a certain country, out of its established networks, in each year. Hence, the set of possible products and countries is constructed from each respective firm's possibility set of products and countries, defined from its experience throughout the period of study. Instead of constructing the possibility set for each firm from all manufactured products and all countries, this approach means that a shoes company, for example, would not consider to export automobile spare parts to foreign countries where it never has any past or future contacts. This way reduces the possibility set tremendously and allow me to make the analyses manageable².

ii) **Intensity:** at any given year, each individual firm that decides to export a particular product to a particular country also has another decision to make, that is how much to export.

In preparation for the dataset, I follow the approach from a paper on local export spillovers in France by Koenig, Mayneris, and Poncet (2010). The main advantage is the focus on the within transformation of each of firm's decision possibility set in order to not exhaust the analyses with explosively large dataset.

To begin with, I include only the active firms that appear throughout the ten-year period of study and with at least one export start. This means that firms with zero or negative sales and value-added are excluded from the dataset. The reason not to include temporary exporters is due to computational constraint. Furthermore, I also exclude product export observations in a particular country that persist for the ten-year period. So the possibility set of a triad (firm-country-product) will include at least one start during the

²Alternatively, the possibility set will explode as we add more dimensions into the consideration. Consider a set of only 500 firms with 100 possible products shipping to 165 countries in a 10-year period. The total number of observations in the dataset to work with is 82.5 million.

entire period. The justification is that firms that persistently export the same product to the same country are already paying the upfront fixed entry costs so the comparison to new entrants would be incorrect. To control for any experience a firm has in the country, regardless of products, I also include a dummy with 1 if a firm has been exporting to that country before and 0 if it is a new export country.

Next, I exclude self-employed firms - firms with zero employee, due to the log-linearised model. The firms with extreme-valued exports at the top and bottom 1% are deleted, as is suggested in Wagner (2011), to avoid a biasedness from the outliers. The distribution

From the basic equation to estimate in the previous subsection, there are sets of country, distance, firm-specific, and previous import variables. The country variables include the nominal Gross Domestic Products (GDP) and the GDP per capita of only the destination countries. Usually in the gravity equation, the model also include these variables from the home country. But since the analysis is executed for exporters registered in Sweden only, there is no variation across firms in the dataset. The gravity equation here is therefore one-sided.

There are several distance variables included in the estimation. These variables constitute both the tangible and intangible barriers to trade. Firstly, the main variable of interest, i.e. the geographical distance, measured in kilometres away from Sweden. The measurement is a weighted great-circle distance that takes into account the main trading and financial cities of each country. Secondly, the contiguity or common border dummy. This variable takes a value of 1 if a destination country shares a border with Sweden, and 0 otherwise. It controls for neighbor trades, which tend to be disproportionately high and potentially bias the result. Thirdly, I include the landlocked dummy due to the fact that transportation costs are higher for countries without direct access to sea. Fourthly, a dummy indicating countries with English as the official language is included. Since there is no other countries sharing Swedish as the official language, the traders have to use English as the main *lingua franca*. Lastly, I control for the regional trade agreement. This is because the streamlined institutional system and the abandon of tariffs within the common trade area will induce gross trade creation through integration, as evidenced by Aitken (1973) and Carrère (2006) among others ³.

The firm-specific set of variables is to control for firm's heterogeneity. I include value-added at year's end, human capital in the estimation equation. Human capital is calculated as the share of highly-educated, i.e. graduated above secondary education level, workforce within a firm. In order to avoid endogeneity problem, I lag these variables by one year. To control for corporate affiliation, I also include dummies denoting a firm's affiliation to domestic or multinational corporation. Non-affiliation is used as a reference group to avoid the dummy trap problem.

Although the original dataset contains all firms in Sweden, the manufacturing sector is chosen while leaving away the service sector. This is because I want to focus only on firms that export what they are producing. Many firms within the service sector are intermediaries

³I also considered including a dummy indicating EU membership states to take into account the reporting policy that excludes any firms with annual imports from or exports to EU members below 1 million euros from the database. But due to a high collinearity between the EU dummy and the regional trade agreement dummy, I decide to drop the EU dummy.

or trading firms. The manufacturing sector includes the industries indicated by the two-digit NACE⁴ revision 1.1 codes 15 to 36. The distribution of exporters per total producers and the share of export per total sales for each industry is presented in the Appendix.

Data

The data for this analysis is a merge from three datasets. First, the firm-level export-import data contains the export value and weight of products defined at 8-digit Swedish equivalent of Harmonised System (HS) for each individual firm. Second, the firm characteristics variables, including value-added, affiliation and several other variables. Both datasets are linked by a unique firm identification, encoded by Statistics Sweden. These two data are complemented by country and distance variables, available from *Centre d'Étude Prospectives et d'Information Internationales* (CEPII). A list of the variables is in the Appendix. The period of analysis is ten years from 1997 to 2006 and includes in total 2,151 manufacturing firms and 2,553 unique products. The descriptive statistics of all the variables in use are listed in Table 1.

The product classification used in this paper refers to Rauch (1999). Homogeneous products have reference prices and differentiated products do not. He further divide homogeneous products into products on organised exchange and products with reference prices on trade publications⁵. The share of both products in my sample over time is presented in Table 2. Similar to Rauch (1999), most of the exported products are differentiated and its share is increasing over the years.

Results

First I present the baseline regressions, using standard probit for the selection decision (columns 1-3 in Table 3) and OLS for export intensity (columns 4-6). The overall result is presented first and followed by separate regressions for homogeneous and differentiated products. Here I control for neither annual shocks nor industry heterogeneity. Throughout this and later regressions, the distance coefficients are negative, confirming its robust relationship to firm's export. Also, we can see that homogeneous products have greater distance sensitivity than differentiated products⁶. This contradicts those by Rauch (1999) and G.-J. M. Linders (2006). For GDP and GDP per capita variables, they all show up positive and significant, meaning that the market size and income positively affect the export decisions. Interestingly, contiguity affects positively on the selection but negatively on export intensity, and more pronounced for differentiated products. This suggests that a firm is more likely to start export to a neighbour but due to market familiarity, it implies the stronger competition and affects negatively the firm's capacity. On the contrary, Regional Trade Agreement dummy negatively affect the firm's decision to start export but once it exports, the effective trade agreement will help enhance its capacity to trade more. Other

⁴NACE is abbreviated for *Nomenclature des Activités Économiques dans la Communauté Européenne* or Classification of Economic Activities in the European Union.

⁵For this division, there are conservative and liberal classifications, based on the aggregation ambiguities. This does not affect my results because I mainly look at homogeneous products as a whole.

⁶Throughout the results the differences of the coefficients between homogeneous and differentiated products are tested and statistically significant.

Table 1: Descriptive statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
Export	395,900	0.05*	0.22	0	1
Value	20,814	675,424.80	2,479,948	1	125,036,227
GDP	395,361	910,098.90	2,149,115	367.2	13,201,819
GDP per capita	395,202	24,864.0	17,153.82	84.56	89,563.63
Distance	395,900	2,531.94	3,196.99	450.08	17,389.62
Contiguity	395,900	0.25*	0.43	0	1
Landlocked	395,900	0.09*	0.28	0	1
English Dummy	395,900	0.15*	0.36	0	1
RTA Dummy	395,900	0.73*	0.45	0	1
Value-Added	395,900	30,120.62	151,299.30	3	5,593,307
Human Capital	395,900	0.06	0.11	0	1
Domestic Corp.	395,900	0.31*	0.46	0	1
Multinational Corp.	0.32*	0.47	0	1	
Import Dummy	395,900	0.63*	0.48	0	1
Country Experience	395,900	0.56*	0.50	0	1

* The percentage of the total observations that takes the value of 1.

impediment variables, landlockedness and English as an official language, show expected signs.

The value-added variable confirms Melitz's model on firm's productivity and export. The positive coefficient implies that higher productivity leads to more probability to export and more export size. Human capital is negative and significant for differentiated products but insignificant for homogeneous products in the selection equation. Affiliation When a firm has imported a product from the destination a year before, it has a substitute effect for differentiated products, both reducing the propensity and intensity to export, whereas it is insignificant for homogeneous products. On the contrary, if a firm has been presented (via export) in the destination before, it is more likely that a firm will continue to profiteer from the fixed entry costs, although the value of export in succeeding years is unaffected.

When we turn to Table 4 using the same estimators but this time controlling for annual shocks and industry heterogeneity, GDP has greater coefficients in the export intensity and interestingly GDP per capita turns insignificant for homogeneous products. Other impediment variables, contiguity, English dummy, regional trade agreement show weaker effects. For firm characteristics variables, value-added effect lessens but the effect is now stronger for human capital once adding year and industry dummies. The effect of affiliation lessens for domestic corporation but increases for multinationals. Import experience now has a positive impact on export decisions but past export experience is almost insignificant.

Once we change the methodology to Heckman selection in order to properly deal with the presence of zero export (Table 5⁷) homogeneous products have a greater distance

⁷The regression results employing Heckman selection with three product groups - organised exchange,

Table 2: Share of Swedish exported products in value

Year	Homogeneous Products	Differentiated Products
1997	12.51	87.49
1998	12.05	87.95
1999	10.26	89.74
2000	7.46	92.54
2001	12.69	87.31
2002	11.90	88.10
2003	12.42	87.58
2004	13.25	86.75
2005	9.60	90.40
2006	9.37	90.63

sensitivity in the selection decision (the coefficient is greater by 34%). This is similar to Möhlmann (Möhlmann et al., 2010), once they change to Heckman estimator and add country dummies, homogeneous products show up having greater distance sensitivity. But distance is positive and insignificant for homogeneous products in the intensity decision. The reason could be that homogeneous products are more standardised and competition from rivals close to destination market is fiercer than the more unique differentiated products. Once entered, producers of homogeneous products are more likely to ship in large quantity, so distance has insignificant impact in determining how much to export. Having a look at my dataset, the average unit price, simply taken as value divided by weight, of differentiated products is 255.86% more expensive than those of homogeneous products but the weight of homogeneous products are heavier by 136.39%. This means that for homogeneous products, they are more bulky and producers are more likely to compete in price, whereas differentiated products are charged with a monopolistic price. Comparing the results from OLS in Table 4 and Heckman in Table 5, the differences are minimal.

For robustness check, I run several specifications of the gravity model on full and sub-samples. The distance coefficients from all regressions are summarised in Table 10 in the Appendix. The conclusions hold for the model specification with no cultural and institutional variables and for sub-samples containing SMEs and non-affiliated firms using the main Heckman specification.

Conclusion

Although distance plays an important role in firm's export decisions, we still have not yet fully understood the mechanism behind its impact. In this paper I look at the distance sensitivity on firm's export selection and export intensity by different product groups, namely homogeneous versus differentiated products. The findings contradict the

reference priced, and differentiated are presented in Table 9 in the Appendix. Reference priced products are most sensitive to distance and differentiated products the least. Moreover, I present all regressions using the liberal classification. The regressions using the conservative classification can be obtained upon requested. This does not change the findings.

network/search view. After controlling for annual shocks and industry heterogeneity, homogeneous products are more sensitive to distance than differentiated products in the selection but turn out insignificant in the intensity decision. This can be due to competition of standardised products from different producers nearby the destination market.

Table 3: Baseline regression results

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Probit (Export Selection)			OLS (Export Intensity)		
	All	Homog.	Diff.	All	Homog.	Diff.
GDP	0.040***	0.011	0.047***	0.194***	0.085***	0.210***
<i>(log)</i>	(0.003)	(0.008)	(0.004)	(0.013)	(0.029)	(0.015)
GDP Per Capita	0.024***	0.033**	0.021***	0.177***	0.113**	0.192***
<i>(log)</i>	(0.006)	(0.014)	(0.006)	(0.023)	(0.053)	(0.026)
Distance	-0.238***	-0.294***	-0.227***	-0.270***	-0.348***	-0.265***
<i>(log)</i>	(0.008)	(0.019)	(0.009)	(0.031)	(0.076)	(0.034)
Contiguity	0.245***	0.309***	0.226***	-1.024***	-0.730***	-1.075***
	(0.010)	(0.022)	(0.012)	(0.042)	(0.103)	(0.046)
Landlocked	-0.121***	-0.081**	-0.133***	-0.482***	-0.800***	-0.411***
	(0.017)	(0.039)	(0.018)	(0.068)	(0.181)	(0.072)
English Dummy	0.059***	-0.013	0.067***	0.362***	0.639***	0.299***
	(0.014)	(0.036)	(0.016)	(0.060)	(0.172)	(0.063)
Regional Trade Agreement	-0.170***	-0.204***	-0.156***	0.127**	0.050	0.167**
	(0.015)	(0.034)	(0.017)	(0.060)	(0.139)	(0.066)
Value Added	0.053***	0.043**	0.059***	0.152***	0.156**	0.159***
<i>(log)(lag)</i>	(0.008)	(0.018)	(0.009)	(0.031)	(0.074)	(0.034)
Human Capital	-0.084**	-0.143	-0.098***			
<i>(lag)</i>	(0.034)	(0.101)	(0.036)			
Domestic Corporation	-0.110***	-0.067***	-0.111***	-0.036	0.276***	-0.079**
	(0.009)	(0.020)	(0.010)	(0.031)	(0.069)	(0.035)
Multinationals	-0.149***	-0.114***	-0.144***	0.462***	0.699***	0.438***
	(0.010)	(0.021)	(0.011)	(0.038)	(0.089)	(0.042)
Import Dummy	-0.026***	0.023	-0.030***	0.176***	0.097	0.229***
<i>(lag)</i>	(0.008)	(0.017)	(0.009)	(0.028)	(0.066)	(0.030)
Country Experience	0.041***	0.126***	0.021**	-0.020	0.066	-0.014
	(0.007)	(0.017)	(0.008)	(0.027)	(0.065)	(0.030)
Constant	-0.876***	-0.361*	-1.003***	8.504***	10.413***	8.145***
	(0.087)	(0.202)	(0.097)	(0.326)	(0.772)	(0.357)
Observations	355,612	85,284	270,328	19,021	3,688	15,333
R-squared				0.106	0.070	0.120
Year dummies	NO	NO	NO	NO	NO	NO
Industry dummies	NO	NO	NO	NO	NO	NO

Robust standard errors in parentheses; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Table 4: Baseline regression results with Year and Industry dummies

VARIABLES	(7)	(8)	(9)	(10)	(11)	(12)
	Probit (Export Selection)			OLS (Export Intensity)		
	All	Homog.	Diff.	All	Homog.	Diff.
GDP	0.041***	0.013	0.049***	0.183***	0.085***	0.200***
<i>(log)</i>	(0.003)	(0.008)	(0.004)	(0.013)	(0.029)	(0.014)
GDP Per Capita	0.006	0.004	0.005	0.172***	-0.016	0.193***
<i>(log)</i>	(0.006)	(0.014)	(0.006)	(0.023)	(0.055)	(0.025)
Distance	-0.243***	-0.314***	-0.232***	-0.249***	-0.400***	-0.248***
<i>(log)</i>	(0.008)	(0.019)	(0.009)	(0.031)	(0.078)	(0.034)
Contiguity	0.250***	0.332***	0.224***	-0.889***	-0.529***	-0.938***
	(0.010)	(0.022)	(0.012)	(0.042)	(0.106)	(0.046)
Landlocked	-0.123***	-0.055	-0.139***	-0.402***	-0.455***	-0.341***
	(0.017)	(0.039)	(0.018)	(0.064)	(0.170)	(0.068)
English Dummy	0.066***	0.008	0.069***	0.377***	0.661***	0.313***
	(0.014)	(0.036)	(0.016)	(0.058)	(0.171)	(0.061)
Regional Trade Agreement	-0.175***	-0.216***	-0.159***	0.114*	-0.052	0.131**
	(0.015)	(0.034)	(0.017)	(0.060)	(0.140)	(0.066)
Value Added	0.033***	0.015	0.035***	0.213***	0.131*	0.229***
<i>(log)(lag)</i>	(0.009)	(0.019)	(0.010)	(0.031)	(0.074)	(0.034)
Human Capital	-0.128***	-0.225*	-0.146***			
<i>(lag)</i>	(0.036)	(0.119)	(0.039)			
Domestic Corporation	-0.111***	-0.098***	-0.122***	0.023	0.038	0.036
	(0.009)	(0.020)	(0.010)	(0.031)	(0.069)	(0.035)
Multinationals	-0.119***	-0.166***	-0.122***	0.419***	0.393***	0.410***
	(0.010)	(0.024)	(0.012)	(0.039)	(0.097)	(0.043)
Import Dummy	0.024***	0.042**	0.031***	0.139***	0.108	0.162***
<i>(lag)</i>	(0.008)	(0.019)	(0.009)	(0.028)	(0.068)	(0.031)
Country Experience	-0.000	0.053***	-0.012	0.021	0.034	0.038
	(0.009)	(0.019)	(0.010)	(0.030)	(0.072)	(0.032)
Constant	-0.716***	0.106	-0.821***	7.942***	12.357***	7.449***
	(0.090)	(0.212)	(0.101)	(0.344)	(0.864)	(0.381)
Observations	355,612	85,284	270,328	19,021	3,688	15,333
R-squared				0.159	0.121	0.181
Year dummies	YES	YES	YES	YES	YES	YES
Industry dummies	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Table 5: Heckman regressions by product groups

VARIABLES	(13)	(14)	(15)	(16)	(17)	(18)
	Selection All	(Export Participation) Homog.	Diff.	Outcome All	(Export Value) Homog.	Diff.
GDP	0.041***	0.013	0.049***	0.196***	0.066**	0.225***
<i>(log)</i>	(0.003)	(0.008)	(0.004)	(0.013)	(0.032)	(0.015)
GDP Per Capita	0.006	0.005	0.005	0.173***	-0.024	0.195***
<i>(log)</i>	(0.006)	(0.014)	(0.006)	(0.023)	(0.059)	(0.026)
Distance	-0.243***	-0.314***	-0.233***	-0.324***	0.031	-0.365***
<i>(log)</i>	(0.008)	(0.020)	(0.009)	(0.040)	(0.151)	(0.046)
Contiguity	0.249***	0.331***	0.223***	-0.814***	-0.977***	-0.829***
	(0.010)	(0.022)	(0.012)	(0.050)	(0.176)	(0.057)
Landlocked	-0.123***	-0.055	-0.139***	-0.440***	-0.365**	-0.411***
	(0.017)	(0.039)	(0.018)	(0.066)	(0.179)	(0.072)
English Dummy	0.066***	0.008	0.069***	0.397***	0.656***	0.348***
	(0.014)	(0.036)	(0.016)	(0.059)	(0.175)	(0.064)
Regional Trade Agreement	-0.174***	-0.216***	-0.159***	0.061	0.220	0.054
	(0.015)	(0.034)	(0.017)	(0.063)	(0.169)	(0.070)
Value Added	0.034***	0.017	0.036***	0.222***	0.122	0.245***
<i>(log)(lag)</i>	(0.009)	(0.019)	(0.010)	(0.031)	(0.080)	(0.034)
Human Capital	-0.142***	-0.272**	-0.171***			
<i>(lag)</i>	(0.039)	(0.110)	(0.042)			
Domestic Corporation	-0.111***	-0.096***	-0.123***	-0.010	0.170*	-0.022
	(0.009)	(0.020)	(0.010)	(0.033)	(0.088)	(0.039)
Multinationals	-0.119***	-0.160***	-0.121***	0.383***	0.641***	0.348***
	(0.010)	(0.024)	(0.012)	(0.041)	(0.141)	(0.046)
Import Dummy	0.024***	0.045**	0.031***	0.145***	0.055	0.175***
<i>(lag)</i>	(0.008)	(0.019)	(0.009)	(0.028)	(0.075)	(0.031)
Country Experience	0.000	0.054***	-0.011	0.021	-0.036	0.033
	(0.009)	(0.019)	(0.010)	(0.030)	(0.080)	(0.033)
Constant	-0.723***	0.080	-0.826***	7.501***	13.241***	6.685***
	(0.090)	(0.213)	(0.101)	(0.379)	(0.983)	(0.439)
Observations	355,596	85,277	270,319	355,596	85,277	270,319
Year dummies	YES	YES	YES	YES	YES	YES
Industry dummies	YES	YES	YES	YES	YES	YES

Robust standard errors in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Appendix

Country list

ISO2	Country Name	Distance*	ISO2	Country Name	Distance*
AE	United Arab Emirates	4,859.49	DK	Denmark	450.08
AF	Afghanistan	4,644.21	DO	Dominican Republic	8,006.54
AL	Albania	1,995.41	DZ	Algeria	2,709.28
AM	Armenia	2,899.19	EC	Ecuador	10,457.59
AN	Netherland Antilles	8,441.07	EE	Estonia	595.36
AO	Angola	7,644.17	EG	Egypt	3,412.79
AR	Argentina	12,404.68	ER	Eritrea	5,250.37
AT	Austria	1,228.47	ES	Spain	2,486.55
AU	Australia	15,385.40	ET	Ethiopia	5,847.94
AW	Aruba	8,587.53	FI	Finland	604.91
BA	Bosnia & Herzegovina	1,644.60	FJ	Fiji	15,252.19
BB	Barbados	7,930.83	FO	Faroe Islands	1,303.04
BD	Bangladesh	6,912.31	FR	France	1,616.32
BE	Belgium	1,151.50	GA	Gabon	6,577.58
BF	Burkina Faso	5,408.34	GB	United Kingdom	1,292.80
BG	Bulgaria	1,912.32	GE	Georgia	2,708.50
BH	Bahrain	4,526.21	GH	Ghana	6,005.78
BI	Burundi	7,027.18	GI	Gibraltar	2,956.84
BJ	Benin	5,803.46	GL	Greenland	3,368.65
BM	Bermuda	6,456.30	GM	Gambia	5,712.82
BN	Brunei Darussalam	10,069.25	GN	Guinea	5,966.61
BO	Bolivia	11,201.18	GR	Greece	2,353.03
BR	Brazil	10,185.49	GT	Guatemala	9,539.39
BS	Bahamas	7,808.63	HK	Hong Kong	8,368.68
BW	Botswana	9,199.48	HN	Honduras	9,338.07
BY	Belarus	986.48	HR	Croatia	1,519.27
CA	Canada	6,347.80	HT	Haiti	8,142.33
CG	Congo	7,007.02	HU	Hungary	1,315.38
CH	Switzerland	1,422.90	ID	Indonesia	10,632.05
CI	Cte d'Ivoire	6,129.18	IE	Ireland	1,549.43
CL	Chile	12,956.19	IL	Israel	3,315.60
CM	Cameroon	5,907.75	IN	India	6,308.11
CN	China	7,276.97	IQ	Iraq	3,552.56
CO	Colombia	9,491.13	IR	Iran	3,765.08
CR	Costa Rica	9,629.91	IS	Iceland	2,047.33
CU	Cuba	8,246.69	IT	Italy	1,833.43
CV	Cape Verde	5,794.42	JM	Jamaica	8,463.56
CY	Cyprus	2,955.68	JO	Jordan	3,358.22
CZ	Czech Republic	1,009.36	JP	Japan	8,226.76
DE	Germany	929.32	KE	Kenya	6,957.80

ISO2	Country Name	Distance*	ISO2	Country Name	Distance*
KH	Cambodia	8,820.19	PL	Poland	848.39
KP	North Korea	7,371.20	PT	Portugal	2,821.62
KR	South Korea	7,682.77	PY	Paraguay	11,477.31
KW	Kuwait	4,107.62	QA	Qatar	4,653.14
KY	Cayman Islands	8,589.82	RW	Rwanda	6,884.48
KZ	Kazakistan	3,774.62	SA	Saudi Arabia	4,479.74
LB	Lebanon	3,148.39	SD	Sudan	5,100.44
LC	Saint Lucia	7,928.13	SG	Singapore	9,782.64
LK	Sri Lanka	7,849.86	SI	Slovenia	1,420.52
LT	Lithuania	676.56	SK	Slovakia	1,176.30
LU	Luxembourg	1,207.73	SL	Sierra Leone	6,101.36
LV	Latvia	591.22	SM	San Marino	1,678.00
LY	Libya	2,993.48	SN	Senegal	5,613.46
MA	Morocco	3,274.22	SO	Somalia	6,638.56
MD	Moldova, Rep.of	1,580.09	SR	Suriname	8,366.51
MG	Madagascar	9,152.54	SV	El Salvador	9,548.48
MH	Marshall Islands	12,283.25	SY	Syrian Arab Republic	3,084.28
MK	Macedonia	1,950.69	TC	Turks & Caicos Is.	7,815.33
MO	Macau (Aomen)	8,201.04	TG	Togo	5,878.81
MT	Malta	2,558.88	TH	Thailand	8,415.42
MU	Mauritius	9,593.82	TJ	Tajikistan	4,346.91
MV	Maldives	7,861.62	TK	Tokelau	14,475.37
MW	Malawi	8,326.36	TN	Tunisia	2,582.25
MX	Mexico	9,357.39	TO	Tonga	15,710.15
MY	Malaysia	9,568.98	TR	Turkey	2,453.42
MZ	Mozambique	9,058.94	TT	Trinidad & Tobago	8,286.25
NA	Namibia	8,993.66	TW	Taiwan	8,551.70
NC	New Caledonia	15,294.21	TZ	Tanzania	7,468.98
NE	Niger	5,062.04	UA	Ukraine	1,616.60
NG	Nigeria	5,721.76	UG	Uganda	6,634.94
NI	Nicaragua	9,522.18	US	U.S.A.	7,440.51
NL	Netherlands	1,009.40	UY	Uruguay	12,286.37
NO	Norway	502.69	UZ	Uzbekistan	4,141.06
NP	Nepal	6,223.75	VC	St Vincent	8,018.46
NZ	New Zealand	17,389.62	VE	Venezuela	8,692.38
OM	Oman	5,162.00	VG	British Virgin Is.	7,718.33
PA	Panama	9,511.23	VN	Viet Nam	8,727.68
PE	Peru	11,219.56	YE	Yemen	5,474.30
PF	French Polynesia	15,277.91	YU	Serbia & Montenegro	1,686.69
PH	Philippines	9,639.51	ZA	South Africa	9,838.57
PK	Pakistan	5,294.92	ZM	Zambia	8,207.19
RO	Romania	1,640.88	ZW	Zimbabwe	8,722.59
RU	Russian Federation	2,081.84		Total countries	165

* Great-circle distance measured as km. from Sweden with major cities population as weight.

Variable description

Variable	Description	Source	Exp. Sign
Value	Total amount exported in current Swedish krona	Statistics Sweden	
GDP	Gross Domestic Product of destination country in current USD (in log).	CEPII	+
GDP per capita	GDP per capita of destination country (in log).	CEPII	+
Distance	Weighted distance as measured in km. from Sweden, calculated using great circle distance between major cities as weight (in log).	CEPII	-
Contiguity	Dummy taking value of 1 if the destination country shares border with Sweden and 0 otherwise.	CEPII	+
Landlocked	Dummy taking value of 1 if the destination country does not have coastal line.	CEPII	-
English Dummy	Dummy taking value of 1 if one of the official languages in the destination country is English.	CEPII	+
Regional Trade Agreement	Dummy taking value of 1 if the regional trade agreement is in effect.	CEPII	+
Value-Added	Firm's value-added per employee in SEK (in log and lagged 1 year).	Statistics Sweden	+
Human Capital	Fraction of employees graduated at university level (lagged 1 year).	Statistics Sweden	+/-
Domestic Corporation	Dummy taking value of 1 if the firm belongs to a domestic corporation group	Statistics Sweden	+
Multinationals	Dummy taking value of 1 if the firm belongs to a multinational enterprise	Statistics Sweden	+
Import Dummy	Dummy taking value of 1 if the firm import from destination country a year before and 0 otherwise.	Author-generated	+
Export Country Experience	Dummy taking value of 1 if the firm already exported to the country previously.	Author-generated	+

Participation of Swedish Exports

SNI	Industry	Total Producers	Exporters* (%)	Exported** (%)
15	Food products; beverages and tobacco	1296	18.9	17.57
16	Tobacco products	3	33.33	3.58
17	Textiles and textile products	380	41.84	18.58
18	Wearing apparel; dressing and dyeing of fur	102	51.96	26.6
19	Leather; luggage, handbags, and footwear	65	58.46	19.98
20	Wood and wood products except furniture	1540	31.75	25.32
21	Pulp, paper and paper products	218	78.44	31.96
22	Publishing, printing and reproduction of recorded media	1958	18.74	5.03
23	Coke, refined petroleum products and nuclear fuel	16	56.25	49.21
24	Chemicals, chemical products and man-made fibres	308	75	32.24
25	Rubber and plastic products	718	58.91	23.15
26	Other non-metallic mineral products	401	39.9	18.14
27	Basic metals	226	64.6	35.07
28	Fabricated metal products except machinery	4272	27.88	16.04
29	Machinery and equipment n.e.c.	2069	48.53	29.55
30	Office machinery and computers	90	36.67	34.4
31	Electrical machinery and apparatus n.e.c.	527	49.91	21.03
32	Radio, television and communication equipment and apparatus	192	45.83	31.05
33	Medical, precision and optical instruments, watches and clocks	747	37.88	36.77
34	Motor vehicles, trailers and semi-trailers	366	59.56	26.15
35	Other transport equipment	353	36.26	28.54
36	Furniture; manufacturing n.e.c.	859	45.52	18.27
Average		759	46.19	24.92

* Exporters' share of total number of producers.

** Average share of exports per total firm's sales.

Table 9: Heckman results using three product categories

VARIABLES	(19)			(20)			(21)			(22)			(23)			(24)			(25)			(26)			
	All	Org.	Diff.	All	Org.	Diff.	All	Org.	Diff.	All	Org.	Diff.	All	Org.	Diff.	All	Org.	Diff.	All	Org.	Diff.	All	Org.	Diff.	
GDP	0.041***	0.017	0.015*	0.049***	0.196***	0.342***	0.049	0.225***																	
<i>(log)</i>	(0.003)	(0.021)	(0.009)	(0.004)	(0.013)	(0.116)	(0.033)	(0.015)																	
GDP Per Capita	0.006	0.023	0.001	0.005	0.173***	-0.464***	0.035	0.195***																	
<i>(log)</i>	(0.006)	(0.044)	(0.015)	(0.006)	(0.023)	(0.170)	(0.061)	(0.026)																	
Distance	-0.243***	-0.256***	-0.324***	-0.233***	-0.324***	0.115	-0.074	-0.365***																	
<i>(log)</i>	(0.008)	(0.057)	(0.021)	(0.009)	(0.040)	(0.283)	(0.171)	(0.046)																	
Contiguity	0.249***	0.407***	0.329***	0.223***	-0.814***	-0.510	-0.982***	-0.829***																	
	(0.010)	(0.065)	(0.023)	(0.012)	(0.050)	(0.333)	(0.194)	(0.057)																	
Landlocked	-0.123***	-0.010	-0.053	-0.139***	-0.440***	0.072	-0.391**	-0.411***																	
	(0.017)	(0.118)	(0.042)	(0.018)	(0.066)	(0.557)	(0.187)	(0.072)																	
English Dummy	0.066***	0.031	-0.000	0.069***	0.397***	0.511	0.631***	0.348***																	
	(0.014)	(0.092)	(0.039)	(0.016)	(0.059)	(0.344)	(0.200)	(0.064)																	
Regional Trade Agreement	-0.174***	0.021	-0.247***	-0.159***	0.061	0.733	0.056	0.054																	
	(0.015)	(0.105)	(0.036)	(0.017)	(0.063)	(0.458)	(0.191)	(0.070)																	
Value Added	0.034***	0.085*	-0.016	0.036***	0.222***	0.032	0.145	0.245***																	
<i>(lag)</i>	(0.009)	(0.051)	(0.021)	(0.010)	(0.031)	(0.187)	(0.089)	(0.034)																	
Human Capital	-0.142***	-1.030**	-0.124	-0.171***																					
<i>(lag)</i>	(0.039)	(0.490)	(0.114)	(0.042)																					
Domestic Corporation	-0.111***	0.064	-0.128***	-0.123***	-0.010	0.002	0.105	-0.022																	
	(0.009)	(0.054)	(0.022)	(0.010)	(0.033)	(0.216)	(0.103)	(0.039)																	
Multinationals	-0.119***	-0.244***	-0.166***	-0.121***	0.383***	0.089	0.657***	0.348***																	
	(0.010)	(0.085)	(0.026)	(0.012)	(0.041)	(0.346)	(0.153)	(0.046)																	
Import Dummy	0.024***	0.018	0.057***	0.031***	0.145***	0.116	0.059	0.175***																	
<i>(lag)</i>	(0.008)	(0.056)	(0.021)	(0.009)	(0.028)	(0.201)	(0.083)	(0.031)																	
Country Experience	0.000	0.113**	0.049**	-0.011	0.021	-0.042	-0.030	0.033																	
	(0.009)	(0.055)	(0.021)	(0.010)	(0.030)	(0.206)	(0.085)	(0.033)																	
Constant	-0.723***	-1.397**	0.424*	-0.826***	7.501***	12.999***	13.346***	6.685***																	
	(0.090)	(0.664)	(0.230)	(0.101)	(0.379)	(2.759)	(1.016)	(0.439)																	
Observations	355,596	12,986	72,291	270,319	355,596	12,986	72,291	270,319																	
Year dummies	YES	YES	YES	YES	YES	YES	YES	YES																	
Industry dummies	YES	YES	YES	YES	YES	YES	YES	YES																	

Robust standard errors in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

Table 10: Distance coefficients from all model specifications

MODEL	(27)	(28)	(29)	(30)	(31)	(32)
	Selection (Export Participation)			Outcome (Export Value)		
	All	Homog.	Diff.	All	Homog.	Diff.
Baseline OLS	-0.238*** (0.008)	-0.294*** (0.019)	-0.227*** (0.009)	-0.270*** (0.031)	-0.348*** (0.076)	-0.265*** (0.034)
OLS <i>with Year dummies</i>	-0.241*** (0.008)	-0.302*** (0.019)	-0.229*** (0.009)	-0.276*** (0.031)	-0.372*** (0.076)	-0.269*** (0.034)
OLS <i>with Industry dummies</i>	-0.239*** (0.008)	-0.304*** (0.019)	-0.230*** (0.009)	-0.249*** (0.031)	-0.374*** (0.078)	-0.251*** (0.034)
OLS <i>with both dummies</i>	-0.243*** (0.008)	-0.314*** (0.019)	-0.232*** (0.009)	-0.249*** (0.031)	-0.400*** (0.078)	-0.248*** (0.034)
Baseline Heckman	-0.238*** (0.008)	-0.293*** (0.019)	-0.227*** (0.009)	-0.303*** (0.033)	-0.319*** (0.091)	-0.308*** (0.036)
Heckman one distance <i>with both dummies</i>	-0.232*** (0.006)	-0.331*** (0.015)	-0.219*** (0.006)	-0.182*** (0.049)	0.304** (0.146)	-0.239*** (0.045)
Heckman (<i>Main result</i>) <i>with both dummies</i>	-0.243*** (0.008)	-0.314*** (0.020)	-0.233*** (0.009)	-0.324*** (0.040)	0.031 (0.151)	-0.365*** (0.046)
Heckman SMEs sample <i>with both dummies</i>	-0.227*** (0.009)	-0.275*** (0.023)	-0.220*** (0.010)	-0.343*** (0.040)	0.152 (0.122)	-0.401*** (0.048)
Heckman Non-affiliated <i>with both dummies</i>	-0.247*** (0.008)	-0.315*** (0.020)	-0.237*** (0.009)	-0.338*** (0.058)	0.013 (0.162)	-0.386*** (0.058)

Robust standard errors in parentheses; *** p < 0.01, ** p < 0.05, * p < 0.1

References

- Aitken, N. D. (1973). The effect of the eec and efta on european trade: A temporal cross-section analysis. *The American Economic Review*, 63(5), pp. 881-892. Retrieved from <http://www.jstor.org/stable/1813911>
- Anderson, J. E. (1979). A theoretical foundation for the gravity equation. *The American Economic Review*, 69(1), 106-116.
- Anderson, J. E., & Marcouiller, D. (2002). Insecurity and the pattern of trade: An empirical investigation. *Review of Economics and Statistics*, 84(2), 342-352.
- Anderson, J. E., & Wincoop, E. v. (2003). Gravity with gravitas: A solution to the border puzzle. *The American Economic Review*, 93(1), 170-192.
- Andersson, M. (2007, February). *Entry costs and adjustments on the extensive margin - an analysis of how familiarity breeds exports* (Working Paper Series in Economics and Institutions of Innovation No. 81). Royal Institute of Technology, CESIS - Centre of Excellence for Science and Innovation Studies. Retrieved from <http://ideas.repec.org/p/hhs/cesisp/0081.html>
- Arkolakis, C. (2008, August). *Market penetration costs and the new consumers margin in international trade* (Working Paper No. 14214). National Bureau of Economic Research. Retrieved from <http://www.nber.org/papers/w14214>
- Bergstrand, J. H. (1985). The gravity equation in international trade: Some microeconomic foundations and empirical evidence. *The Review of Economics and Statistics*, 67(3), 474-481.

- Bernard, A. B., & Jensen, J. B. (2004). Why some firms export. *The Review of Economics and Statistics*, 86(2), 561-569.
- Carrère, C. (2006). Revisiting the effects of regional trade agreements on trade flows with proper specification of the gravity model. *European Economic Review*, 50(2), 223 - 247. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0014292104000583> doi: 10.1016/j.euroecorev.2004.06.001
- Clerides, S., Lach, S., Tybout, J., & of Economic Research, N. B. (1996). *Is "learning-by-exporting" important?: micro-dynamic evidence from colombia, mexico and morocco*. National Bureau of Economic Research. Retrieved from <http://books.google.se/books?id=MFIyAAAAIAAJ>
- Disdier, A.-C., & Head, K. (2008). The puzzling persistence of the distance effect on bilateral trade. *Review of Economics and Statistics*, 90(1), 37-48.
- Eaton, J., & Kortum, S. (2002). Technology, geography, and trade. *Econometrica*, 70(5), 1741-1779. Retrieved from <http://dx.doi.org/10.1111/1468-0262.00352> doi: 10.1111/1468-0262.00352
- Eaton, J., Kortum, S., & Kramarz, F. (2004). *Dissecting trade firms, industries, and export destinations*. Federal Reserve Bank of Minneapolis.
- Egger, P., & Pfaffermayr, M. (2011, Jun). *Structural estimation of gravity models with path-dependent market entry* (Tech. Rep.). C.E.P.R. Discussion Papers. (CEPR Discussion Papers)
- Grossman, G., & Helpman, E. (1993). *Innovation and growth in the global economy*. MIT Press. Retrieved from <http://www.google.se/books?id=4ikgmM2vLJ0C>
- Grossman, G. M. (1998). Determinants of bilateral trade: Comment. In J. A. Frankel (Ed.), *The regionalization of the world economy* (p. 29-31). Chicago: University of Chicago Press for the NBER.
- Helpman, E. (1984). Chapter 7 increasing returns, imperfect markets, and trade theory. In W. J. Ronald & B. K. Peter (Eds.), *Handbook of international economics* (Vol. Volume 1, p. 325-365). Elsevier.
- Helpman, E., Melitz, M. J., & Yeaple, S. R. (2004). Export versus fdi with heterogeneous firms. *The American Economic Review*, 94(1), pp. 300-316. Retrieved from <http://www.jstor.org/stable/3592780>
- Huang, R. R. (2007). Distance and trade: Disentangling unfamiliarity effects and transport cost effects. *European Economic Review*, 51(1), 161 - 181. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0014292105001455> doi: 10.1016/j.euroecorev.2005.11.004
- Koenig, P., Mayneris, F., & Poncet, S. (2010). Local export spillovers in france. *European Economic Review*, 54(4), 622-641.
- Krugman, P. (1995). Chapter 24 increasing returns, imperfect competition and the positive theory of international trade. In G. M. Grossman & K. Rogoff (Eds.), *Handbook of international economics* (Vol. 3, p. 1243 - 1277). Elsevier. Retrieved from <http://www.sciencedirect.com/science/article/pii/S1573440405800048> doi: 10.1016/S1573-4404(05)80004-8
- Lankhuizen, M., de Graaff, T., & de Groot, H. L. F. (2012, July). *Product heterogeneity, intangible barriers and distance decay: The effect of multiple dimensions of distance on trade across different product categories* (Working Paper). Tinbergen Institute.
- Lawless, K., Martina; Whelan. (2008). *Where do firms export, how much, and why?* (Tech. Rep.). University College Dublin. (UCD Centre for Economic Research Working Paper Series)
- Lawless, M. (2010). Deconstructing gravity: trade costs and extensive and intensive margins. *Canadian Journal of Economics/Revue canadienne d'économique*, 43(4), 1149-1172. Retrieved from <http://dx.doi.org/10.1111/j.1540-5982.2010.01609.x> doi: 10.1111/j.1540-5982.2010.01609.x
- Leamer, E. E., & Levinsohn, J. (1995). International trade theory: The evidence. In M. G. Gene & R. Kenneth (Eds.), *Handbook of international economics* (Vol. 3, p. 1339-1394). Elsevier.

- Linders, G.-J., & De Groot, H. L. (2006). Estimation of the gravity equation in the presence of zero flows. *SSRN eLibrary*.
- Linders, G.-J. M. (2006). *Intangible barriers to trade: the impact of institutions, culture and distance on patterns of trade*. Unpublished doctoral dissertation.
- Martin, W., & Pham, C. S. (2008). *Estimating the gravity equation when zero trade flows are frequent* (MPRA Working Paper). Munich RePEc Personal Archive [<http://mpra.ub.uni-muenchen.de/perl/oai2>] (Germany). Retrieved from http://mpra.ub.uni-muenchen.de/9453/1/gravity_june_08.pdf
- Martínez-Zarzoso, I. (2013). The log of gravity revisited. *Applied Economics*, 45(3), 311-327. doi: 10.1080/00036846.2011.599786
- Melitz, M. J. (2003). The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica*, 71(6), pp. 1695-1725. Retrieved from <http://www.jstor.org/stable/1555536>
- Möhlmann, L. J., Ederveen, S., de Groot, H. L. F., & Linders, G.-J. M. (2010). Intangible barriers to international trade. In P. van Bergeijk & S. Brakman (Eds.), *The gravity model in international trade: Advances and applications* (p. 224-252). Cambridge University Press. Retrieved from <http://books.google.se/books?id=vQSWRPuMoZMC>
- Rauch, J. E. (1999). Networks versus markets in international trade. *Journal of International Economics*, 48(1), 7 - 35. Retrieved from <http://www.sciencedirect.com/science/article/pii/S0022199698000099> doi: 10.1016/S0022-1996(98)00009-9
- Santos Silva, J., & Tenreyro, S. (2006). The log of gravity. *The Review of Economics and Statistics*, 88, pp. 641-658.
- Segura-Cayuela, R., & Vilarrubia, J. (2008). *Uncertainty and entry into export markets* (Working Papers No. 0811). Banco de España. Retrieved from <http://ssrn.com/abstract=1144564>
- Tinbergen, J. (1962). *Shaping the world economy; suggestions for an international economic policy*. Twentieth Century Fund, New York. Retrieved from <http://hdl.handle.net/1765/16826>
- Verbeek, M. (2008). *A guide to modern econometrics*. John Wiley & Sons. Retrieved from <http://books.google.se/books?id=uEFm6pAJZhoC>
- Verhoogen, E. A. (2008). Trade, quality upgrading, and wage inequality in the mexican manufacturing sector. *The Quarterly Journal of Economics*, 123(2), 489-530. Retrieved from <http://qje.oxfordjournals.org/content/123/2/489.abstract> doi: 10.1162/qjec.2008.123.2.489
- Wagner, J. (2007). Exports and productivity: A survey of the evidence from firm-level data. *World Economy*, 30(1), 60-82. Retrieved from <http://dx.doi.org/10.1111/j.1467-9701.2007.00872.x> doi: 10.1111/j.1467-9701.2007.00872.x
- Wagner, J. (2011). From estimation results to stylized facts twelve recommendations for empirical research in international activities of heterogeneous firms. *De Economist*, 159(4), 389-412.