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Information frictions and the two margins of trade: Evidence from Slovenian manufacturing*

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Abstract

We empirically investigate whether firms lower information frictions in foreign sourcing through prior exporting. Using a panel of Slovenian manufacturing firms in the period 1996-2011, we estimate the probability of import entry in a new market when the firm is already exporting to the same country and we find a positive and significant relation. To control for the endogeneity of the export decision, we implement an instrumental variable approach exploiting the notion of sequential exporting. Moreover, we rule out productivity growth as being the only predictor of entry in a foreign market through several falsification tests. These findings suggest information frictions play an important role for firms trading in international markets.

JEL Classification: F14, L20, D22, D83.
Keywords: Sourcing; Import entry; Information Frictions; Sunk costs.

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1 Executive Summary

Nowadays, exchange in intermediate goods accounts for a significant portion of international trade flows, giving rise to the phenomenon of global value chains. As such, a firm's production often spans across multiple countries, making it imperative to understand the sourcing decisions that firms make. When firms decide to import goods from foreign countries, they have to undergo a search process to find the right suppliers, which can be quite costly, especially when the buyers and sellers are geographically distant.

This paper aims to provide evidence for a new channel through which firms can reduce the costs of collecting information when searching for foreign suppliers. We study the idea that a firm that is already exporting to a foreign market can *indirectly* learn about new potential suppliers (importing) and reduce search frictions as a result. We posit that the probability of a firm starting to import from a foreign country increases if it was already exporting to that country. The evidence provided suggests that export entry increases the probability of starting to import from the same country by about 0.05 percentage points, with the strongest effect being observed three years after the entry.

We use two longitudinal datasets covering the activity of Slovenian manufacturing firms in the period 1996-2011. We include full company accounts, as well as records of Slovenian firms' export and import flows reported at the firm-country level. Standard gravity variables to account for geographical factors are inlcuded to complete the dataset. We then implement a linear probability model with a large number of fixed effects to control for several unobservable factors that could bias the results. We exploit the high-dimensionality of the data to add firm-country-specific fixed effects to account for time-invariant characteristics specific to a given firm's relationship with a specific country comparing the change in import probability between firms that export and those that do not, after controlling for firm-year and country-year fixed effects.

Despite these controls, we acknowledge that there could still be unobserved firm-country-specific shocks that could increase both the probability of import and export entry, making it difficult to determine the causal relationship between the two. To overcome this challenge, we introduce a novel instrumental variable based on the idea of sequential exporting among neighboring countries, i.e. the (lagged) export entry of the same firm in a country $d \neq c$ which is a neighbor of c.

Our study supports the idea that firms with prior experience in exporting to a foreign market are more likely to also start importing from that same market, building

on the idea that exporting can help firms reduce search frictions when looking for new suppliers. We find a positive and significant relation that is consistent across a set of different specifications, both for the linear probability model using OLS and 2SLS. The results are robust to several robustness checks that enable us to rule out that firm's productivity is the unobserved factor driving the relationship between import and export as it would be suggested by theories of the heterogeneous firms in internaitonal trade (Melitz (2003) on the export side and Antras et al. (2017) on the import side). Furthermore, we find that only larger firms are able to leverage their prior exporting experience to start importing, while smaller firms tend to access foreign markets indirectly through intermediaries and are unable to directly trade with foreign partners.

2 Introduction

Nowadays exchange in intermediate goods accounts approximately for two-thirds of international trade flows giving origin to the phenomenon of global value chains (Johnson and Noguera, 2017). As global value chains become more and more important, a firm's production will often span multiple countries and investigating how firms' sourcing decisions take place is of first-order importance. When a firm decides whether and from which countries to import from, it will inevitably start with searching and selecting ex-ante unknown suppliers. The search process to acquire information about foreign partners is costly especially when buyers and sellers are geographically distant. Therefore, finding ways of reducing these information frictions is key for profit-maximizing firms.

In this paper, we provide evidence for a new channel through which firms can reduce costs of information collection when searching for foreign suppliers: we study whether firm exporting to a foreign market can indirectly recover information about new potential suppliers (importing).[1] According to the mechanism we investigate, search frictions may be reduced by interactions between firms associated with trade flows already taking place in the opposite direction, i.e. firms that are already exporting to a country will recover more easily information about potential suppliers than non-exporting firms to the same market. The empirical question we want to address in this paper is: does the probability of importing increase when the firm was already exporting to the same country? Motivating evidence displayed in Figure 1 seems to suggest so. In particular, export entry increases by around 0.03 percentage points the probability of starting to import from the same country, with the effect being the strongest the first year after the entry.

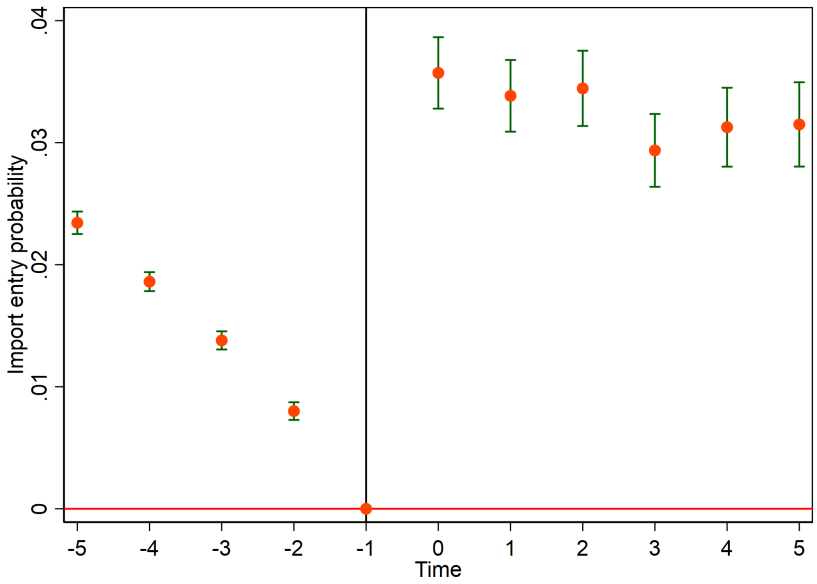
Unlike previous studies that have analyzed export and import jointly[2], this is the first one to link these two activities in a dynamic framework[3] to explain the process of internationalization of firms. The timing is as follows: at t_0 the firm is endowed with an information set about foreign markets; at t_1 it starts to export and indirectly learns about possible suppliers for intermediate inputs in a destination market; eventually, at t_2 the firm adds new suppliers to its portfolio and starts to import back from the same country. Why is the exporting margin driving the relation and not the other way

[1] By margins of trade we mean the ways in which a firm can be active in international markets, either by exporting or importing, following Bernard et al. (2018a) nomenclature.

[2] See among others Bernard et al. (2018a); Damijan et al. (2014); Bas and Strauss-Kahn (2014); Kasahara and Lapham (2013).

[3] The only other study addressing a similar question is Albornoz and García Lembergman (2015) who use data on Argentinean firms. The main difference with their paper is that we use an IV approach to control for endogeneity issues.

Figure 1: Event-study on the effect of exporting on import decision from same country

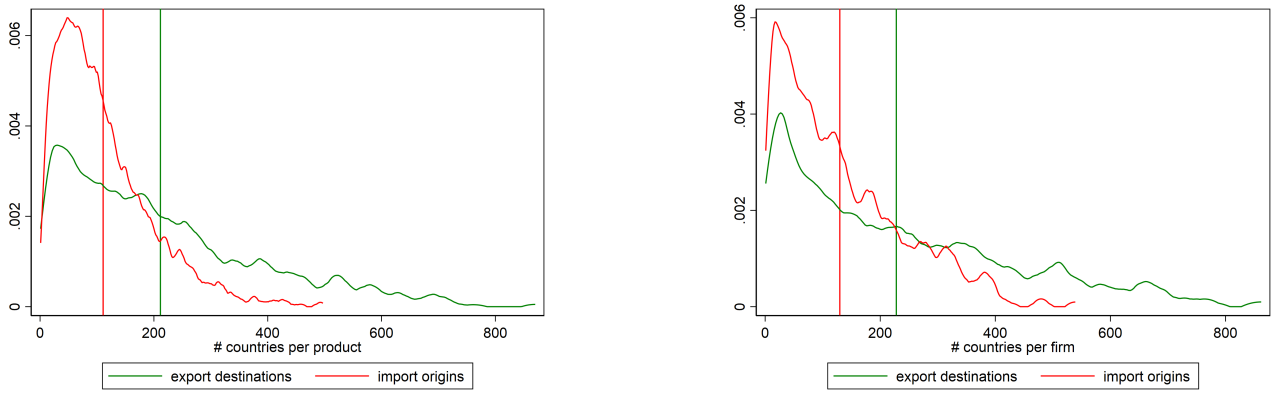


Note(s): Figure 1 plots the estimated event study coefficients from a regression where the dependent variable is an indicator variable equal to one if firms f starts to import from country c at calendar year t, and the regressors are event time dummies equal to one in the x-th year after the first year in which firm f started to export to country c for the first time. Firm $\times$ country, firm $\times$ year and country $\times$ year fixed effects are included in the specification. We also normalize the coefficient on the year prior to the event equal to zero. We cluster standard errors at firm-country level.
Source: Own calculations based on AJPES, SURS and FURS data.

round? Because firms want to reach as many profitable export markets as they can in order to benefit from economies of scale (Chaney, 2008; Arkolakis, 2010). This hints at the fact that firms seek to increase the number of destinations as much as possible since an additional country leads to an increase in profit (assuming the size of additional market-specific fixed costs is lower than the marginal increase in revenues). On the other hand, when a firm decides whether to import a product, it is not interested in sourcing it from as many countries, but only from one, which is the cheapest possible source or the best in terms of quality. Figures 2a and 2b provide motivating evidence behind this intuition: the number of export destinations is higher than the number of import origins, either if we consider one product exported (imported) across multiple destinations (origins), or a firm. Moreover, if we look at number of origins and destinations by firm-product as depicted in Figure 8 in the Appendix, a similar pattern emerges, and we can also notice that numbers of sourcing origins is in line with Antras et al. (2017) where they find that the typical firm purchases the same input from one country only.

Since differences in the ability to start sourcing from foreign markets have been ex-

Figure 2: Average number of destination and origin countries (1996-2011)



(a) By CN8 product

(b) By firm

Source: Own calculations based on AJPES, SURS and FURS data.

plained as mainly driven by heterogeneity in productivity (Antras et al., 2017)[4] we try to rule out productivity being the main (unobserved) determinant of import and export choices. In this sense, our study follows in spirit Armenter and Koren (2015) who point out that productivity differences can only account for a fraction of the exposure to international markets.

We employ two longitudinal datasets covering the activity of Slovenian manufacturing firms during the period 1996-2011. The first dataset contains the full company accounts, including nominal measures of output and different inputs at the firm level. The second dataset includes records of export and import flows of Slovenian firms reported at firm-country level. Due to the focus of the exercise, we have selected all manufacturing firms that are engaged in import or export activities at least once throughout the observed period. A third dataset with standard gravity variables such as distance and contiguity between countries is added to account for geographical dimension in the construction of the instrumental variable.

Our empirical strategy produces estimates of the effect of export entry on the probability of starting to import in the following year. We take advantage of the high-dimensionality of the data to control for several unobservable factors that might bias the results, implementing a linear probability model with a plethora of fixed effects.The main level of variation we exploit is within firm-country over time so that we absorb time-invariant characteristics specific to the relation of a given firm with a specific country. For instance, the fact that a firm has stronger and more constant ties with Japan because it has a Japanese CEO. We also add firm-year fixed effects which ac-

[4]Similarly on the export side, Bernard et al. (2003) or Melitz (2003) assume that differences in the ability of firms to enter foreign markets are entirely driven by heterogeneous productivities.

count for idiosyncratic shocks that could hit the firm in a given year, such as productivity shocks.

However, we still need to rule out the presence of unobserved firm-country-specific shocks that might increase both the probability of import *and* export entry such that the two actions appear sequentially causally related, while they are in fact not. In other words, the temporal ordering of events is not sufficient to be able to say that the first activity caused the second one. For instance, a positive foreign demand shock that increases exports of Slovenian firms may render these more efficient and thereby induce them to import more inputs.

To solve this endogeneity problem, we employ an instrumental variables approach exploiting exogenous variation in export entry. Specifically, we need an instrument that is correlated with the firm's decision to start exporting to a new market but not correlated with other unobservable determinants of the choice of importing. Since our goal is to use only demand-driven shocks[5], time-varying and specific to each partner country, that increases the likelihood of exporting to that specific country, we propose to use an export shifter that does not correlate with any unobservable factors affecting import and export decisions (exogeneity condition). Instead, it must affect import choice only via its effect on export decision (exclusion restriction) and it must have a clear effect on the export decision (first stage).

We introduce a novel instrument, which is the (lagged) export entry of the same firm in a country $d \neq c$ which is a neighbor of c. First stage results suggest that the IV is positively and significantly correlated with the decisions to start to export to new market c which is in line with the notion of extended gravity developed by Morales et al. (2019) and sequential exporting by Albornoz et al. (2012). Firms, indeed, tend to enter foreign markets similar or geographically closer to previous destinations since sharing similarities with a prior export destination reduces the cost of foreign market entry by around 80%. This rests on the identifying assumption that information spillovers are local, meaning that firms can learn about customers' preferences in country c via their interactions with customers in country d. Concerning the exclusion restriction, which cannot be directly tested, we reasonably assume that information spillovers do travel across countries, and more intensely the closer the two countries are, while spillovers related to the demand or supply shock in the destination country c do not spread into neighboring countries as d.

Our results suggest that firms do start importing from the same country to which

[5]We rule out supply-side shocks to be playing a major role in the sequential relationship from exporting to importing using different approaches as shown in Section 5.1.

they were already exporting. We find a positive and significant relation that is consistent across a set of different specifications, both for the linear probability model using OLS and 2SLS. Having export experience in the foreign market has a positive and significant effect on the probability of importing from the same country.

We complement these baseline results with evidence that firms of different sizes do not behave in the same way: only larger firms are able to exploit the fact that they are already exporters in a market in order to start also importing from the same country. A likely explanation behind these results is that smaller firms tend to access foreign markets indirectly, i.e. relying on intermediaries, and they are not able to directly trade their products with foreign partners (Bas and Strauss-Kahn, 2014; Bernard et al., 2015; Ahn et al., 2011). Therefore, this two-way relation between exporting and importing reinforces the international presence of only larger firms that are probably already benefiting from their presence in foreign markets.

Finally, we perform several tests to rule out that firm's productivity is the confounding factor driving the relationship between importing and exporting as it would be suggested by international trade theories with heterogeneous firms (Melitz (2003) on the export side and Antras et al. (2017) on the import side). First, we explicitly control for labor productivity computed as the ratio of (deflated) value-added over employment. Second, we perform two falsification tests which rely on the fact that if exporting spurs importing only via productivity growth, having experience in a foreign market should lead to entry in any other market, unlike information frictions which are country-specific, or to an increase in the intensive margin of imports instead of increasing the likelihood of entering a new import market. All robustness checks suggest that, indeed, productivity is not the only determinant of the sequential relation between exporting and importing. These findings have important implications for trade policy. If firm decisions are interdependent, as we prove here, the effect of a policy targeted towards export promotion, such as an export subsidy, might have indirect consequences also on sourcing decisions. Taking into account how the two margins of trade are interlinked allows policy-makers to develop better policies. Moreover, understanding the role of information frictions is particularly important to policymakers, as policies that reduce information frictions might have similar effects to more traditional policies that reduce trade costs.

Related Literature. Our work is related to several strands within the international trade literature. First, this paper adds to the promising literature on information frictions in an international trade context. These frictions matter because they can distort international flows of goods and thus may be one of the potential explanations behind the notion of *missing trade* (Trefler, 1995). Although much less investigated than direct

barriers to trade, indirect barriers such as information frictions could potentially be of major importance given that welfare from imported goods would be much higher in the absence of these frictions (Allen, 2014; Steinwender, 2018; Arkolakis et al., 2021) possible ways of addressing them.

Information frictions can be overcome in multiple manners. One way is through face-to-face interactions since travel can cancel the distance between the parties *"transforming a remote transaction into the type that would be conducted at home"* (Startz, 2016). An alternative way of reducing these frictions is through movements of people: either hiring workers who can bring their previous knowledge about their foreign network when changing firms as in Lenoir & Patault (2021) and Mion et al. (2016); or through migrant networks (Rauch, 2001). Also better technology can facilitate communications and hence reduce information frictions between partners in different countries (Bernard et al., 2018b; Steinwender, 2018).

Only a handful of papers have studied both firm-level exporting *and* importing activities. In Bernard et al. (2018a), the authors acknowledge the existence of global firms, which are "firms that participate in the international economy along multiple margins and account for substantial shares of aggregate trade". Kasahara and Lapham (2013) look at import and export complementarities using Chilean firm-level data, while Bas and Strauss-Kahn (2014) and Damijan et al. (2014) analyse the role imports play in determining firm's export performance for French and Slovenian enterprises, respectively. Eventually, the paper closest in spirit to ours is Berlingieri et al. (2021), where they find that experience in a given export market has implications on sourcing service inputs in the same country.

Broadly, we contribute to the strand of the literature investigating determinants of sourcing choices of the firm pioneered by the seminal paper byAntras et al. (2017). A dynamic version of that model has been recently developed by Hoang (2020).

This paper proceeds as follows. Section 3 describes the Slovenian institutional context and the data. Section 4 introduces the simple theoretical framework and outlines the empirical strategy. Section 5 and 6 present, respectively, OLS and IV results. Section 7 shows some robustness checks, discussing the size heterogeneity analysis in Section 7.1 and the use of an alternative instrumental variable in Section 7.2. Eventually, Section 8 concludes.

3 Institutional Background and Data

In this section we explain the main features of Slovenian economy during the period considered and the sources of data used in the empirical analysis.

3.1 Institutional Background

First, Slovenia is a particularly useful setting since the economy shifted from being a part of centrally planned ex-Yugoslavia to an independent state with market economy in 1991. Since then, a dramatic wave of reforms followed, reshaping the market structure in the majority of industries. Also trade benefited enormously from this wave of liberalization. As illustrated in Damijan and Majcen (2003) and De Loecker and Warzynski (2012), the reforms lead to a reorientation of trade flows from internal (within ex-Yugoslavian republics) to external towards areas like the European Union (EU). In this period, the number of firms engaged in international trade increased exponentially in a relative small number of years. Then, in 2004, Slovenia entered the EU and this represented an opportunity for joining a highly integrated area. Due to elimination of entry restrictions (in 1988), the number of firms in the whole economy grew between 1996 and 2007 from 160,740 to 174,770. After the 2008-2009 crisis, the number of firms slightly decreased to 164,042. Moreover, entries of firms to foreign markets followed.

3.2 Data Sources

In this paper, we employ three longitudinal datasets covering the activity of Slovenian manufacturing firms for the period 1996-2011, which were merged and analyzed within the secure room of the Slovenian Statistical Office.[6] The first dataset comes from the official files of the Slovenian Financial Authority (FURS), and includes exhaustive records of export and import flows of Slovenian firms. These transactions are originally reported for each partner or origin country Slovenian firms are trading with, at the eight-digit product level defined according to the EU Combined Nomenclature (CN) and then aggregated into roughly 5,000 products at the six-digit Harmonized System (HS) to be compatible with the CEPII data used to construct our instruments. For each trade flow we observe its value and weight in kilograms.

[6]We are grateful to the Slovenian Statistical Office for providing access to the confidential firm level data.

The second dataset comes from fiscal files of the Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES) and contains balance sheets and income statements for Slovenian firms. From this source, we use complete financial and operational information, among which we use total domestic and foreign sales[7], costs of intermediate goods, materials and services, the value of physical capital, the total value of assets, the number of employees based on total hours worked, and the NACE Rev. 2 5-digit industry code. Using a common firm identifier, we match product-level trade data with our firm-level data on an annual basis.
The third data set on inward and outward investments - used in one of the robustness exercises - is provided by the Bank of Slovenia. Based on the end-of-year ownership structure, we constructed an indicator variable that assumes value 1 for Slovenian firms that are at least 10 percent owned by foreign firms.

Sample Selection. Due to the focus of the exercise, the sample includes Slovenian manufacturing firms that are active in trade (either in exporting or importing) in the period of interest.[8] The original dataset reporting only positive trade flows, both in values and quantities, has been filled in with zeros whenever a pair firm-country did not report any information in order to obtain a balanced sample. Moreover, we only consider regular trade flows and exclude type of trade such as repairs and maintenance which might create the sequentiality between exports and imports, without reflecting the collection of information.
After merging data on manufacturing firms, and trade flows, we trim our sample in several ways to ensure the quality of our data. Therefore, we drop firms that have exported or imported only once throughout the full time period as they cannot demonstrably be considered exporters or importers. We drop firm-year observations that did not report employment, or report the total number of employees equal to zero because we cannot be confident about their performance and cannot calculate our measure of productivity. Moreover, we restrict the analysis to the top 70 partner countries of Slovenia[9] and we exclude other ex-Yugoslavian countries, i.e. Bosnia and Herzegovina, Croatia, Serbia, Northern Macedonia and Montenegro in order to eliminate the potential bias that could arise due to past linkages with these countries.

Additional Data Sources. The firm-level information is complemented with two additional datasets used to create the instrumental variables: the first dataset containing information on aggregate trade flows and the second one including the standard determinants of the gravity equation. Bilateral import and export transaction values are

[7]They are expressed in nominal values, i.e. in EUR converted 2004 exchange rate 239.64 tolars per EUR.

[8]We classify a firm as *manufacturing* if its main reported activity belongs to the NACE (Rev. 1) 2-digit industry classes 10 to 33.

[9]The ranking considers an average of trade flows over the time period considered.

taken from BACI (which is the World trade database developed by the CEPII) at 6-digit level of product disaggregation, classified according to the Harmonized System (HS) 1992 nomenclature, for more than 200 countries from 1995 to 2016[10]. An advantage of using BACI rather than the underlying information from UN Comtrade is that the same trade flow, which can be reported differently by the exporter and importer, has been reconciled reporting a single statistic on each directional bilateral relationship.
For the gravity variables we rely on the GeoDist dataset, which is also provided by the CEPII and includes several geographical variables such as distance between countries' pairs and standard indicator variables used to identify links between countries such as colonial past, common languages, contiguity. In particular, we select the variable *contiguity*, which we will use to construct the instrument.

3.3 Summary Statistics

Table 1 reports the number of firms per year in the manufacturing sector during the period considered. We can, first, observe that the overall number of firms slightly decreased over time, which is in line with the fact that Slovenia underwent a period of growth after passing market reforms following the breakup of Yugoslavia. We then count the number of exporters and importers[11] within the total number of firms per year, which reveals that the number of exporters is lower than the number of importers, on average by more than half. Moreover, they both decrease over time for several possible reasons. First, new firms are small and are less likely to export (to be able to afford entry and fixed costs of exporting). Second, large ex-socialist firms were disintegrating into smaller units. Third, Slovenia entered the EU in 2004, which allowed many firms to stop reporting intra-EU trade flows (exports and imports to EU countries below the cutoff of 100,000 EUR; the cutoff value for exports increased to 200,000 EUR by 2008, whereas for imports decreased to 85,000 EUR). Last, foreign demand shocks in 2008 led to reduction of trade flows.

In Table 2, we show the numbers of firms and relative shares for each sector in manufacturing between 1996 and 2011. We distinguish between three samples of firms: all firms (domestic and international), exporters and importers. We can see that there is substantial heterogeneity across sectors with the three largest ones, in terms of number of firms, being manufacture of fabricated metal products (25), manufacture of rubber

[10]Original data are provided by the United Nations Statistical Division (COMTRADE database). BACI is constructed using a procedure which reconciles the declaration of importers and exporters as explained in Gaulier and Zignago (2010).

[11]Exporters (importers) are defined as firms reporting a positive export (import) flow, expressed in value terms, in a given year.

Table 1: Numbers of registered and active firms, by year

Year	No. Firms	No. Exporters	No. Importers
1996	5,410	2,031	3,566
1997	5,526	2,006	3,486
1998	5,568	2,012	3,485
1999	5,564	2,057	3,469
2000	5,562	2,064	3,352
2001	5,504	2,102	3,332
2002	5,470	2,080	3,218
2003	5,455	2,141	3,370
2004	5,434	1,911	2,951
2005	5,406	1,481	2,027
2006	5,332	1,592	2,156
2007	5,356	1,553	2,402
2008	5,299	1,577	2,453
2009	5,272	1,556	2,285
2010	5,201	1,553	2,282
2011	5,055	1,565	2,293

Notes: The sample on which the statistics are computed includes only manufacturing sectors, i.e. from 10 to 33 of the NACE Revision 2 industry classes.
Source: Own calculations based on AJPES, SURS and FURS data.

and plastics products (22), and machinery (28). In Table 3, we look at the number of entries both in the export and import market divided by geographical area.

4 Framework, Specification and Instruments

Export entry and foreign sourcing decisions are related through various channels. In this paper, we focus on the role information frictions play. For this purpose, we adapt a standard framework used to analyze entry decisions to foreign markets as a special case. Then, we depict the resulting specification and the instruments we propose to control for endogeneity in the estimation.

Table 2: Number of firms in manufacturing sector by industry (1996-2011)

Sector	Code	No. Firms	No. Exporters	No. Importers
Fabricated metals	**25**	12,233	4,629	6,159
Rubber & plastic	**22**	8,394	2,997	5,092
Machinery	**28**	5,591	3,013	3,664
Printing	**18**	5,090	820	1,662
Wood	**16**	5,047	2,151	1,723
Food	**10**	3,484	878	1,850
Furniture	**31**	3,204	1,461	1,613
Electrical equipment	**27**	3,024	1,379	2,070
Wearing apparel	**14**	2,987	715	1,578
Computers & electronics	**26**	2,807	1,282	2,013
Non-metallic minerals	**23**	2,635	940	1,678
Other (n.e.s.)	**32**	2,011	670	1,116
Textiles	**13**	1,917	746	1,255
Chemicals	**20**	1,615	850	1,182
Automotive	**29**	1,480	870	1,082
Paper	**17**	1,283	520	773
Basic metals	**24**	997	684	687
Leather	**15**	716	347	423
Beverages	**11**	595	183	267
Other transports	**30**	532	238	322

Notes: The sample on which the statistics are computed includes only manufacturing sectors, i.e. from 10 to 33 of the NACE Revision 2 industry classes. For confidentiality issues, we do not report information for sectors that are scarcely populated.
Source: Own calculations based on AJPES, SURS and FURS data.

4.1 Theoretical Framework

To motivate our empirical work, we start by adapting the multi-period model of entry decisions presented in Bernard and Jensen (2004)[12] to the context of *sourcing* decisions. A firm f starts to import from a foreign country c at time t ($\mathbb{1}_{fct}^{imp}$) if the increment in expected (gross) profits associated with importing, Π_{ft}, exceeds the sunk cost to start importing, F_{ic}^{imp}. Since any import decision involves the trade-off between saving variable cost from the usage of foreign inputs and paying a sunk cost of importing[13], we can simplify the change in expected profits to a change in expected costs, C_{ft}, under the assumption that revenues remain constant.[14] It follows that the participation condition

[12]The theoretical foundation for their empirical model comes from Roberts and Tybout (1997) where they develop and estimate a dynamic discrete choice model that enables them to separate the role played by firm heterogeneity and sunk entry costs in explaining export decision.

[13]We abstract from potential improvement in quality of inputs due to foreign sourcing.

[14]Given the revenues $R_{ft} = p_{ft} \times Q_{ft}$ where the price $p_{ft} = f(mc_{ft}, \mu_{ft})$ is a function of marginal cost and markup of firm f at time t, a change in marginal costs (mc_{ft}) due to foreign sourcing will lead to a reduction in price p_{ft} (more or less proportionally according to pass-through rate), which will in turn

Table 3: Number of entries by geographical area (1996-2011)

	Export		Import	
Area	**No. Entries**	**Share**	**No. Entries**	**Share**
Central America	153	1%	160	1%
Central Asia	163	1%	24	0%
Eastern Asia	633	3%	1,889	8%
Eastern Europe	6,372	31%	5,372	23%
Northern Africa	510	3%	132	1%
Other more developed regions	1,198	6%	1,952	8%
South America	334	2%	210	1%
South-Eastern Asia	500	2%	726	3%
Southern Asia	485	2%	441	2%
Sub-Saharan Africa	169	1%	90	0%
Western Asia	1,545	8%	960	4%
Western Europe	8,235	41%	11,772	50%
Total	20,297	100%	23,728	100%

Note: The sample is made of manufacturing firms engaged in international trade at least once. An entry is defined as the fact that a firm starts to trade with a foreign country for the first time, i.e. the firm has not done so in the three previous years. This is why the baseline year now is 1999, since in the first three years of the sample (1996-1998) the number of entries are mechanically equal to zero.
Source: Own calculations based on AJPES, SURS and FURS data.

for importing is:

$$\mathbb{1}^{imp}_{f,c,t} = \begin{cases} 1 & \text{if } \Pi_{f,t} - F^{imp}_{f,c}(1 - \mathbb{1}^{imp}_{f,c,t-1}) > 0 \\ 0 & \text{otherwise} \end{cases} \tag{1}$$

Similar to Das et al. (2007), the return to becoming an importer today includes the option value of being able to continue importing next period without incurring again the sunk costs. If sunk costs do matter, they appear directly in the firm's participation condition (1) as the coefficients on binary variables that describe the past importing status of the firm, here simplified to the previous year only, $M_{f,c,t-1}$[15].

The novelty of this theoretical framework is that the sunk cost of imports $F^{imp}_{f,c}$ can be interpreted as the sum of two components: (i) search cost, S^{imp}_{c} (ii) cost of access to foreign markets, F^{imp}_{c}. Concerning the first one, each firm needs to incur it in order to gather information about new suppliers in the foreign market, e.g. price and quality of their goods, but also other characteristics related to delivery conditions like temporal availability of goods and logistics. One way of gathering this information could be to physically go in the foreign market to meet up with business partners (Eaton et al.,

impact output and revenues, and eventually profits given that $\Pi_{ft} = R_{ft} - C_{ft}$. Here, we abstract from the revenue channel and we focus on the cost channel only. Another simplification is that the setup of the model contains no real option value related to reduction in expected costs of entry to other markets.

[15] In our estimation, we implicitly allow the effect of exporting activity on subsequent entry costs to last only one period as in Roberts and Tybout (1997) and Morales et al. (2019)

2014). For instance, existing business partners (buyers of its export goods) can provide references about potential new suppliers regarding the prices and key characteristics of goods (and related services). If the firm is already exporting to that market, this search process might be facilitated such that S_c^{imp} might be reduced by an α fraction. The second component of the sunk cost, F_c^{imp}, represents all (non-search) costs related to the start of a trading activity with a foreign partner, such as understanding the regulation, and it is modeled as a function of standard gravity variables. In this respect, Antras et al. (2017) found that fixed costs of importing are 13 percent lower for countries with a common language, and increase in distance with an elasticity of 0.19.
Hence, the sunk cost of imports can be re-written as:

$$F_{f,c}^{imp} = S_c^{imp}(\alpha \mathbb{1}_{f,c,t-1}^{exp}) + F_c^{imp} \tag{2}$$

where the search cost S_c^{imp}[16] is reduced by a share $\alpha \in [0,1]$ if the firm f was already exporting to the same market c at time $t-1$ ($\mathbb{1}_{fct-1}^{exp} = 1$).
Thus, equation (1) becomes:

$$\mathbb{1}_{f,c,t}^{imp} = \begin{cases} 1 & \text{if } \Pi_{f,t} - [S_c^{imp}\alpha \mathbb{1}_{f,c,t-1}^{exp} + F_c^{imp}](1 - \mathbb{1}_{f,c,t-1}^{imp}) > 0 \\ 0 & \text{otherwise} \end{cases} \tag{3}$$

Adapting Roberts and Tybout (1997) to an import decision context, we estimate equation (3) as a reduced-form expression in exogenous plant and market characteristics at period t. In order to parametrize the model, we assume that variation in $\Pi_{ft} - F_{f,c}^{imp} = \Pi_{f,t} - [S_c^{imp}\alpha \mathbb{1}_{f,c,t-1}^{exp} + F_c^{imp}]$ comes from three different sources: a country-specific sunk costs common to all firms, which includes the start-up cost F_c^{imp} and the search cost S_c^{imp}, a firm-country specific component of the search cost which depends on previous exporting activities of firm f in the same market c, and observable time-varying firm-specific characteristics. This intuition leads us to the empirical specification in Section 4.2.

4.2 Empirical Specification

Our main estimating equation for import choice:

$$\mathbb{1}_{f,c,t}^{imp} = \alpha_0 + \alpha_1 \mathbb{1}_{f,c,t-1}^{exp} + \varphi_{f,c} + \varphi_{c,t} + \varphi_{f,t} + \varepsilon_{f,c,t} \tag{4}$$

[16] The time subscript is omitted from entry costs to keep the notion tractable. In the empirical section, however, we can test whether they vary over time.

where $\mathbb{1}^{imp}_{f,c,t}$ is an indicator variable equal to 1 if firm f is importing from origin country c in year t for the first time (i.e. it was not importing in $t-1$ and $t-2$), and $\mathbb{1}^{exp}_{f,c,t-1}$ indicates whether the same firm f was exporting for the first time to destination c in the preceding year $(t-1)$.[17] The main level of variation we are interested in is the temporal variation of a firm-country pair, captured by $\varphi_{f,c}$, which allows us to see whether a firm that started to export to a new destination in the past (i.e. the regressor switches from 0 to 1 over time) is more likely to start importing back from that same country (i.e. the dependent variable switches from 0 to 1 over time). Using firm-country FE allows to control for any unobserved factors specific to the firm and the country the firm is trading with. For instance the fact that a firm with a Japanese CEO will be more likely to have trading relations with Japanese firms as compared to a firm with a Belgian CEO. Thanks to the high granularity of the data, we can also control for unobserved time-varying shocks that may be firm-specific (through $\varphi_{f,t}$) or country-specific (through $\varphi_{c,t}$).

Even after including these controls, we are still left with a problem of endogeneity. There are, indeed, unobserved factors that affect the decision to import by the firm. These could be firm-specific permanent, or at least highly serially correlated, unobserved factors or time-varying shocks that increase the probability of import entry. A natural candidate is a firm-specific productivity shock that might increase the demand for inputs by the firm and thereby its imports of inputs. In order to control for this, we adopt several strategies that are illustrated in Section 5.1 and we are able to exclude that such within-firm productivity improvements are the main drivers behind the positive relation between exports and subsequent imports from the same country.

Estimating equation (4) allows us to investigate whether firms are more likely to learn about new sourcing opportunities after they already had export activity in a given country such that we expect $0 < \alpha_1 < 1$. The logic is simple: firms should be able to find new potential suppliers with greater likelihood in a country when they are already present through exporting compared to firms without previous trading relationship with that same foreign market. That is because previous exporting activities reduces the cost of recovering information about suppliers. However, using a simple OLS estimator, we cannot verify whether there is a causal link from export to import entry. In order to do that, we need to solve the identification challenge arising from the fact that there could be unobserved shocks either in the foreign country, other than information spillovers, leading to the same sequential pattern between exporting and

[17] Since we are interested in testing whether previous exporting activity in a country increases the likelihood of starting to import from the same country, we define the left-hand side variable, $\mathbb{1}^{imp}_{f,c,t}$, as import entry in country c at time t and by construction $\mathbb{1}^{imp}_{f,c,t-1}$ will be set equal to zero, which is why it disappears from equation 4.

importing besides the unobserved within-firm shocks discussed in section 5.1. For instance, aggregate shocks in a foreign market could foster both Slovenian imports from that country (aggregate supply shock, i.e. foreign suppliers become more productive and therefore start to export) and could lead export from Slovenia towards the same country to grow (aggregate demand shock). Given that adjustments take time, either imports from or exports to Slovenia could come one before the other, but any inference on causality from Slovenian exports to Slovenian imports might be erroneous. Moreover, even assuming we are able to isolate the information channel, we cannot exclude the possibility that the mechanism works in the opposite direction, from imports to exports, giving rise to a simultaneity issue which is exacerbated by the presence of serial correlation in the unobserved error term.

4.3 IV identification

Therefore, in order to interpret the effect of past export activity on import entry as causal, and excluding the reverse relation from importing to exporting, we implement an IV strategy on the endogenous variable, $\mathbb{1}^{exp}_{f,c,t-1}$. Conceptually, we can think of our problem as similar to a problem of demand estimation where demand and supply constitute a simultaneous system of equations, and researchers use a supply shifter to identify demand parameters (Bresnahan, 1989). Analogously, in our case imports and exports may be simultaneously determined and we cannot disentangle which one affects the other one. In order to correctly estimate the coefficient of interest, we resort to an export shifter, which is a variable that exogenously affects the export decision. The export choice equation expressed as a function of the export shifter and other variables represents the first-stage of a 2SLS procedure. The second stage corresponds to the import choice equation (4) already discussed in Section 4.2.We have added the superscript *imp* and *exp* to variables that also appears in the export equation in order to distinguish the two. The equations for the two stages are:

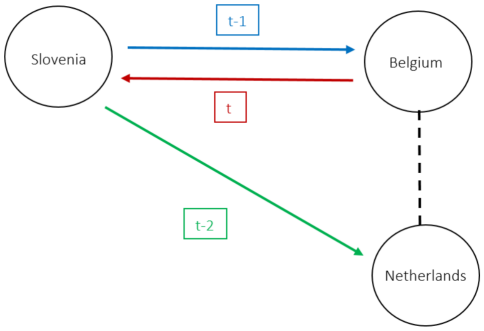
$$\text{First stage: } \mathbb{1}^{exp}_{f,c,t-1} = \beta_0 + \beta_1 \mathbb{1}^{imp}_{f,c,t-2} + \beta_2 \mathbf{Z_{f,c,t-1}} + \varphi^{exp}_{f,c} + \varphi^{exp}_{f,t-1} + \eta_{f,c,t-1} + \varepsilon^{exp}_{f,c,t-1}$$

$$\mathbb{1}^{imp}_{f,c,t} = \alpha_0 + \alpha_1 X_{f,c,t-1} + \varphi^{imp}_{f,c} + \varphi^{imp}_{f,t} + \alpha_2 \eta_{f,c,t} + \varepsilon^{imp}_{f,c,t}$$

The endogeneity problem arises because of a non i.i.d. component of the error term, what we call $\eta_{f,c,t}$, which is serially correlated over time creating a problem of simultaneity: either $X_{f,c,t-1}$ is affecting $M_{f,c,t}$ or $M_{f,c,t-2}$ is affecting $X_{f,c,t-1}$ through the unobserved impact of $\eta_{f,c,t-1}$ on $\eta_{f,c,t}$. To avoid biased estimates of the coefficient of interest α_1, we use $\mathbf{Z_{f,c,t-1}}$ as instrument, which is a vector made of exogenous variables. Therefore, we introduce our novel instrument, which is (lagged) export entry into at

least one neighboring country d of the partner country c, $export_{f,d\neq c,t-1}$ (see Figure 3 for a graphical representation). It builds on the notion of extended gravity (Morales et al., 2019) according to which firms tend to enter foreign markets similar to previous destinations. The instrument is constructed using the gravity variable *contiguity* from the CEPII GeoDist dataset, which indicates whether a pair of countries are neighbors. [18]

Figure 3: Entry in the neighboring country IV setup

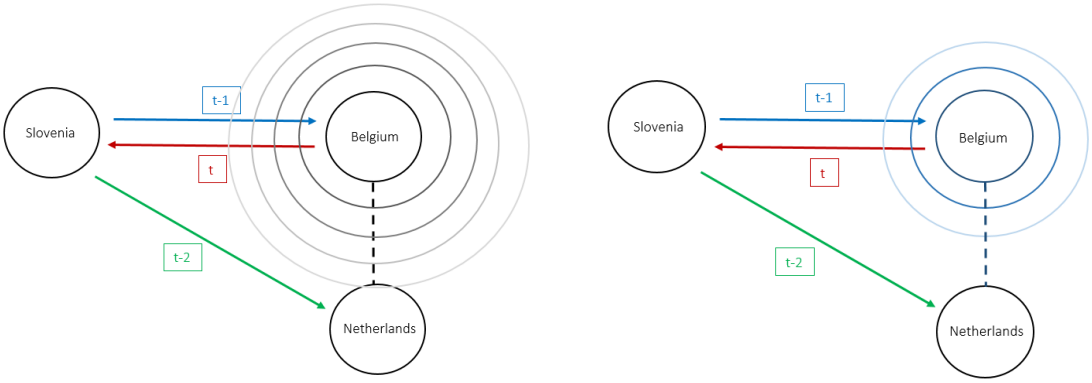


Two underlying assumptions should hold in order for the instrument to be valid: (1) the aggregate productivity spillovers do not travel across neighboring countries, e.g. the fact that firms in the foreign country become more productive does not make also firms in the neighboring country more productive causing higher trade with Slovenian firms; (2) information spillovers, on the other hand, do travel across contiguous and similar countries, meaning that information about the foreign customers come from the firms in the neighboring country who are in contact with Slovenian firms. They are quite strong assumptions and we cannot directly test them. However, we can adopt an alternative version of the instrument that imposes a weaker condition: (3) we allow for the existence of productivity spillovers across neighboring countries, but we assume information *and* productivity spillovers do not decay/spread across neighboring countries at the *same* rate (see Figure 4).

The intuition behind the instrument relies on distinct type of information flows that characterize export and import choices. In the sequential exporting argument, the firm enters exporting markets sequentially because there is a positive option value of doing so (instead of doing it in one step). This option value is positive only because firms learn something about the demand parameters from exporting in a neighboring country. Therefore, within country spillovers are about the potential partners (search), whereas instruments exploit correlations between markets' characteristics in terms of

[18] When we create this variable, we balance the dataset by year and country, which means we fill each pair firm-country with zeros not only along the time dimension but also for each potential country there could be trade flows from/to. Mainly due to computational reasons, we have restricted the analysis to the top 70 partner countries of Slovenian firms.

Figure 4: Spread of information vs other shocks



(a) Information shocks

(b) Other shocks

demand, other standard determinants of trade like in Chaney (2008) distance, etc., and also firm-level drivers of trade flows (Melitz, 2003). As we cannot completely rule out that there are geographically correlated shocks inducing a positive temporal correlation, we use an alternative instrument which is not subject to the main problem: the weighted average of the world import demand of a product k constructed using a "shift-share" approach proposed by Hummels et al. (2014).[19] Worldwide imports of product k for country c is an aggregate measure and therefore, by construction, exogenous to Slovenian firms. The weight, on the other hand, is built to vary across firms and time building on the fact that each firm has its bundle of imported products. Moreover, the weights used to build the firm-level average are the *pre-sample* share of product k purchased over the total of imports such that we do not have to worry about contemporaneous shocks to technology that could affect the types of inputs used and the import decision. In Section 7, we provide the results using this alternative instrument and compare them with results using the main instrument.

5 Baseline Results

There are several ways of estimating a binary-choice model, but given the high dimensionality of the fixed effects, the linear probability model is the only feasible option. Table 4 reports the estimation results of several models based on estimating equation 4 above using Linear Probability Model estimated with an OLS estimator. Regardless of the specification, entering a new export market increases the probability of sourcing from that same country in the following year. Since we are interested in import entry,

[19]There is a rich emerging literature on shift-share instruments which are used in a multitude of contexts as illustrated in Adao et al. (2019); Borusyak et al. (2019); Goldsmith-Pinkham et al. (2020).

we drop a pair firm-country after the first year the firm starts importing from a new country. Therefore, the pair is dropped from t+1 as soon as $\mathbb{1}^{imp}_{fct}$ becomes positive. If a firm starts to import more than once within the period considered (e.g. in 1999 and then again in 2004 where the definition of new import entry applies because the firm is not importing in t-1, t-2 and t-3 as it is required to have $\mathbb{1}^{imp}_{fct-x} = 0$ for all x=1,2,3), then we consider only the first entry as a *true* entry.

Table 4: Linear Probability Model for the Decision to Start Importing (OLS estimator)

Dep. Var.:	Import entry$_{f,c,t}$									
									1996-2004	multiple lags
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Export entry$_{f,c,t-1}$	0.031***	0.024***	0.023***	0.020***	0.017***	0.012***	0.016***	0.011***	0.012***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)
Export entry$_{f,c,t-2}$										0.009***
										(0.001)
Export entry$_{f,c,t-3}$										0.010***
										(0.001)
Observations	5,266,073	5,266,073	5,266,073	5,266,073	5,243,717	5,243,717	5,243,717	5,243,717	2,862,232	4,175,686
R-squared	0.001	0.008	0.009	0.016	0.179	0.204	0.185	0.211	0.258	0.251
firm FE	no	yes	yes	yes	no	no	no	no	no	no
year FE	no	no	yes	yes	yes	no	no	no	no	no
country FE	no	no	no	yes	no	no	no	no	no	no
firm-country FE	no	no	no	no	yes	yes	yes	yes	yes	yes
firm-year FE	no	no	no	no	no	yes	no	yes	yes	yes
country-year	no	no	no	no	no	no	yes	yes	yes	yes

Note: Robust standard errors are clustered at firm- and country-level; *p<.05; **p<.01; ***p<.001

Source: Own calculations based on AJPES, SURS and FURS data.

Column (1) reports the estimated coefficient of import entry indicator regressed on lagged export indicator in the specification without any fixed effects. The coefficient is around 3 percent and statistically significant, which implies that the lagged entry in a new market increases the likelihood of import entry from the same market by 3 percentage point. In the three following columns (columns (2)-(4)), we sequentially include firm, year and country FE, and we find that the coefficients are slightly lower, particularly when country fixed effects are included, although in all specifications statistically significant and around 2 percentage points. Then, we add to the specification the interacted fixed effects starting from firm-country fixed effects to take into account constant factors that are specific to a firm trading with a given destination (column (5)), constituting our preferred specification since we base our identification on within-firm-country temporal variation. The coefficients remain similar and point to the fact that export entry in a country leads to an increase of almost two percentage points in the probability of import entry the following year. In column (6), we also add firm-year FE

in order to take into account any potential shock that could hit the firm in a given year. Eventually, in column (7), we control for country-specific aggregate shocks (country-year FE) and we still find a positive effect, even though the magnitude of the effect has been reduced by as much as one third in comparison to the first specification. To give a sense of the magnitude, we can look at results from the most complete specification in the last column of Table 4, which suggests that export incursion in a market increases the probability of starting to import the next year by slightly more than 1 percentage point. Given that the unconditional probability of import entry is 3%, it corresponds to a 33% increase in the probability of importing with respect to the unconditional probability which is quite remarkable.

In the last two columns, we check for two factors potential affecting our estimates. We restrict the sample to 1996-2004 in order to eliminate the effect of reporting cutoffs to comply with EU rules: results remain the same. Eventually, we relax the assumptions that only a change in export behavior at time $t-1$ produce an effect on the change in import behavior at time t adding to the specification also changes in export at time $t-2$ and $t-3$. We find that coefficients for the three separate lagged regressors - jointly inserted - are very similar in magnitude hinting at the fact that there is not a specific timing for the effect to take place.

Table 5: (Reverse) Linear Probability Model for the Decision to Start Exporting (OLS estimator)

Dep. Var.:	Export entry$_{f,c,t}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Import entry$_{f,c,t-1}$	0.026***	0.020***	0.020***	0.016***	0.015***	0.011***	0.013***	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Observations	5,357,486	5,357,486	5,357,486	5,357,486	5,334,806	5,334,806	5,334,806	5,334,806
R-squared	0.001	0.017	0.018	0.021	0.172	0.210	0.175	0.214
firm FE	no	yes	yes	yes	no	no	no	no
year FE	no	no	yes	yes	yes	no	no	no
country FE	no	no	no	yes	no	no	no	no
firm-country FE	no	no	no	no	yes	yes	yes	yes
firm-year FE	no	no	no	no	no	yes	no	yes
country-year	no	no	no	no	no	no	yes	yes

Note: Robust standard errors are clustered at firm- and country-level; *p<.05; **p<.01; ***p<.001

Source: Own calculations based on AJPES, SURS and FURS data.

The relation could potentially also go the other way around: now it is import experience, and the associated interactions with new suppliers, that increases the likelihood

of starting to export to the same country because it is easier to find new customers in that foreign market. Although possible, we think that it is a less likely channel due to differences in economic motivation between importing and exporting decisions which create a different dynamic pattern. Profit maximization in exporting requires increasing the number of products and/or markets up to the number that still increases profits, whereas importing depends on the input characteristics and maximizing the number of product and/or markets is not the objective of a company. Therefore, firms trying to expand in export markets will have to put greater effort in searching new customers than simply relying on information coming from import markets. Moreover, results seem to confirm our intuition: although the effect of import on export entry is still positive, as shown in Table 5, the estimates are always smaller that those for reverse relationship across all specifications.

5.1 Controlling for Productivity

As it is well known in the trade literature, there is a clear link between trade and productivity. Not only will more productive firms find it easier to export or import (selection effect in Melitz (2003)), but also engaging in these activities makes firm subsequently more productive (learning effect in De Loecker (2013); Van Biesebroeck (2005), for exports and in Halpern et al. (2015) for imports). Therefore, importing after exporting might be the result of a particular process through which firms that started to export become more and more productive. This is why they also start to import. If this is the case, our identification strategy would be invalidated since there is an unobserved element driving the relationship between lagged export entry and current import entry, which we do not take into account. In order to rule out the possibility that the effects on imports are driven by positive shocks to productivity, we will follow four different methods. First, we add to the baseline regression (column (1) of Table 6) already using firm-country and year-country fixed effects also firm-year fixed effects (column (2)), which account for any positive shock hitting the firm in a given year. When moving from column (1) to column (2), we can see that the coefficient of interest is reduced in size, meaning that productivity does play a role, but it stays positive and significant, which suggests that productivity is not accounting for the entire effect.

Second, we perform a falsification test creating a new dependent variable called $\mathbb{1}^{imp}_{f-ct}$, import entry of firm f in country $-c$ which means any country different from the market c where the firm has started to export at year $t-1$. Namely, productivity would increase the probability of importing from *any* region, independently on whether this

was a new export destination or not. Therefore, the new specification is as follows:

$$\mathbb{1}^{imp}_{f,-c,t} = \beta\ \mathbb{1}^{exp}_{f,c,t-1} + \varphi_{f,c} + \varphi_{f,t} + \varphi_{c,t} + \varepsilon_{f,c,t} \tag{5}$$

The fact that the coefficient turns negative in column (3) means that productivity is not the driver of the positive relation we find in previous specifications.

As a third approach, we explicitly take into account productivity including (log) labor productivity, which is computed as real valued added[20] over total number of employees, as a control in the regression. The results for this specification are reported in column (4). We can notice that the coefficient remains with the same sign as before and statistically significant.

Eventually, another falsification test is implemented exploiting the idea that if a productivity shock is driving the positive relation, unlike for information shocks, we should see that export entry has also impact on the intensive margin of imports, meaning the total value of imported products by a firm, and not only on the extensive margin, which is the decision to start to import. The new estimating equation is:

$$\ln Import_{f,-c,t} = \beta\ \mathbb{1}^{exp}_{f,c,t-1} + \varphi_{f,c} + \varphi_{f,t} + \varphi_{c,t} + \varepsilon_{f,c,t} \tag{6}$$

where $\ln Import_{f,c,t}$ is the (log) value of imports of firm f from any other country $-c$ different from the market c where the firm has started to export in the previous year. Again, the coefficient in column (5) is not statistically significant ruling out the productivity-enhancing effect on the probability of importing from country c.

5.2 Role of FDI

One potentially alternative channel behind the sequential relation between exporting and importing could be FDI. A firm might start exporting to a certain country, and, after sometime, it sets up a new subsidiary there as shown in Conconi et al. (2016). This eventually could lead to re-import back into Slovenia from the new affiliated factory abroad. In order to rule out this as being the main reason driving our results, we insert into the estimating equation an indicator variable $FDI_{f,c,t-1}$ which is equal to 1 if firm f has outward foreign direct ownership in country c at time $t-1$.

In Table 7 we report results only for the most complete specification, i.e. where all pairs of double fixed effects are included (firm-country, firm-year and country-

[20] Value added is deflated by the appropriate NACE 2-digit industry producer price deflators.

Table 6: Threats to identification: productivity shocks

Dep. Var.:	Import Entry$_{fct}$		Import Entry$_{f,-c,t}$	Import Entry$_{fct}$	log(import$_{f,-c,t}$)
	(1)	(2)	(3)	(4)	(5)
Export entry$_{f,c,t-1}$	0.016***	0.011***	-0.004***	0.014***	0.005
	(0.001)	(0.001)	(0.001)	(0.001)	(0.008)
log(LP)$_{f,t-1}$				0.001***	
				(0.000)	
Observations	5,243,717	5,243,717	5,243,717	4,318,631	2,471,112
R-squared	0.185	0.211	0.990	0.197	0.963
firm-country FE	yes	yes	yes	yes	yes
firm-year FE	no	yes	yes	no	yes
year-country FE	yes	yes	yes	yes	yes

Note: Robust standard errors are clustered at firm- and country-level; *p<.05; **p<.01; ***p<.001

Source: Own calculations based on AJPES, SURS and FURS data.

Table 7: Controlling for outward FDI

Dep. Var.:	Import entry$_{f,c,t}$	
	(1)	(2)
Export entry$_{f,c,t-1}$	0.011***	0.010***
	(0.001)	(0.001)
FDI dummy$_{f,c,t-1}$	0.013***	0.012*
	(0.005)	(0.006)
FDI dummy$_{f,c,t-2}$		0.002
		(0.006)
Observations	5,243,717	4,698,203
R-squared	0.211	0.263
firm-country FE	yes	yes
firm-year FE	yes	yes
country-year FE	yes	yes

Robust standard errors are clustered at firm- and country-level;
*p<.05; **p<.01; ***p<.001

Source: Own calculations based on AJPES, SURS, FURS and Bank of Slovenia data.

year FE). Moreover, we also insert an additional lag for the FDI indicator variable, $FDI_{f,c,t-2}$, to consider dynamic and not an immediate response. Estimates for our main variable of interest, $ExportEntry_{f,c,t-1}$, remain positive and strongly significant across specifications, highlighting the fact that FDI relations in the foreign country are not the reason why a firm starts importing after having exported.

6 IV Results

Having established that exporting in $t-1$ has a positive impact on importing in t, we now present the results of our IV estimations that control for the endogeneity of the main regressor. In Table 8, we use instruments building on the notion of *contiguity* between trading partners. We instrument using export entry in the neighboring country, where entry takes place either at time $t-1$ or $t-2$ or $t-3$, and also a more general export dummy at time $t-1$ or $t-2$ or $t-3$ if firm f was exporting to a country c at time t without necessarily starting to export for the first time. Columns (1) and (4) report the estimates from the OLS specification, where all pairs of fixed effects are included, in order to have a direct comparison. In columns (2) and (5), we show first-stage estimates: all the version of the lagged instrument, being $t-1$ or $t-2$ or $t-3$, have a positive and significant effect of the regressor. We also include results from two standard first-stage tests. First, we look at the Wald F-statistic, which is higher than 10 for both types of instruments, either entry or dummy, dismissing the hypothesis of weak instruments. This is confirmed by results for the Anderson Rubin weak identification test.
Eventually, columns (3) and (6) display the second-stage results: moving from OLS to IV estimates, we again see an increase in the size of the coefficient which is quite consistent across different definitions of the instrument with estimates ranging between 67 and 83 percentage points. Also for the second-stage we include results from standard tests, i.e. the p-value form the Hansen test of over-identifying restrictions and the F-statistics for joint significance of the coefficients. They both suggest that we can safely accept our choice of instruments.

From results in Tables 8, we can see that the positive effect of lagged export entry on import entry becomes even larger in magnitude than it was for OLS and stays significant across the two specifications. This confirms our preceding results that exporting to a market increases the likelihood of starting to import from the same country in the next period. However, the increase in magnitude is rather large and does not necessarily go in the expected direction. Given the type of endogeneity described in Section 4.3 we would expect the OLS coefficient to be biased upward, therefore the estimates should decrease once the endogenous variable is instrumented. We observe the opposite, i.e. coefficients increasing enormously from OLS to IV estimates, and we think this could be attributed to the fact that we are estimating a local average treatment effect instead of an average effect. This is the case in several articles, mainly from the labor literature, on estimates of returns to schooling where coefficient size, when moving from OLS to IV, increases, albeit the expected bias would go in the opposite direction (An-

Table 8: Entry instrument: IV results

	OLS	IV		IV	
	Import entry$_{f,c,t}$	Export entry$_{f,c,t-1}$	Import entry$_{f,c,t}$	Export entry$_{f,c,t-1}$	Import entry$_{f,c,t}$
	(1)	(2)	(3)	(4)	(5)
Export entry$_{f,c,t-1}$	0.011***		0.667***		0.833***
	(0.001)		(0.100)		(0.070)
Export entry neighb.$_{f,c,t-1}$		0.004***			
		(0.001)			
Export entry neighb.$_{f,c,t-2}$		0.007***			
		(0.001)			
Export entry neighb.$_{f,c,t-3}$		0.003***			
		(0.001)			
Export dummy neighb.$_{\cdot,t-1}$				0.004***	
				(0.000)	
Export dummy neighb.$_{\cdot,t-2}$				0.003***	
				(0.000)	
Export dummy neighb.$_{\cdot,t-3}$				0.003***	
				(0.000)	
Constant	0.005***				
	(0.000)				
F stat (1st stage)		37.0		114.5	
Weak identif. test		28.6		90.5	
Hansen P-value			0.0		0.0
F stat (2nd stage)			44.2		141.7
Fixed effects:	firm×country	firm×country	firm×country	firm×country	firm×country
	firm×year	firm×year	firm×year	firm×year	firm×year
	country×year	country×year	country×year	country×year	country×year
No. Obs.	5,243,717	5,243,717	5,243,717	5,243,717	5,243,717

Source: Own calculations based on AJPES, SURS and FURS data.

grist and Keueger, 1991; Acemoglu and Angrist, 2000; Oreopoulos, 2006).[21]. Further details are illustrated in Section 7.2, where the second instrument is also discussed.

7 Robustness Checks

7.1 Size Heterogeneity

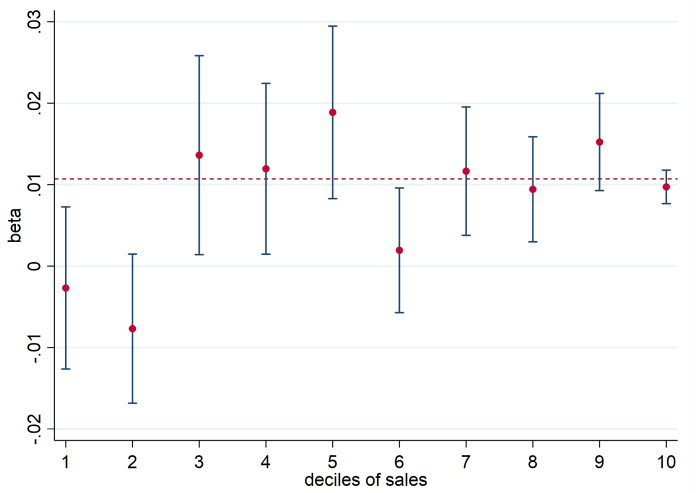
Running the regressions by decile of firm size based on sales, we find that the positive impact of export entry on the probability of import entry is concentrated among larger firms, i.e. firms in the highest deciles of the size (in terms of sales) distribution. Figures 5-6 present estimates for each size group. We produced these estimates by interacting the main regressor, lagged entry in the export market, with indicators of firm's size. The dashed horizontal line represent the average coefficient. The results suggest that firms throughout the size distribution do not behave in the same way: only larger firms are able to exploit the fact that they are already exporters in a market in order to start also importing from the same country. A potential explanation behind these results is that smaller firms tend to access foreign markets indirectly, i.e. relying on intermediaries, and they are not able to directly trade their products with foreign partners (Bernard et al., 2015; Ahn et al., 2011). Therefore, this two-way relation between exporting and importing reinforces the international presence of only larger firms that are probably already benefiting from their presence in foreign markets. It does not open up new opportunities for smaller firms, whose effects can even be negative (see left-hand side of Figures 5 and 6 where coefficients for lower deciles of the size distribution are reported).

7.2 Shift-Share Instrument

Since we cannot completely rule out the hypothesis that there are geographically correlated shocks among neighboring countries, we apply an alternative instrument that is widely used in the trade literature: a shift-share IV based on the concept of weighted world import demand. The world import demand, WID_{ckt}, is country c total pur-

[21] Authors from these papers suggest that the IV estimates, based on compulsory schooling or school proximity, give estimates of returns to schooling above the average marginal return to schooling in the population because they are capturing the effect for a marginal group. An increase in the compulsory attendance age will not affect the majority of students, but it will be relevant for those who would have otherwise dropped out. Economic returns to schooling for this marginal group are substantial.

Figure 5: Heterogeneity by size, OLS



Note(s): OLS linear probability regression where the main regressor is interacted with the decile of sales a firm belongs to. Firm-country, firm-year and country-year fixed effects are included in this specification. The dashed horizontal line represents the estimated coefficient for the full sample.
Source: Own calculations based on AJPES, SURS and FURS data.

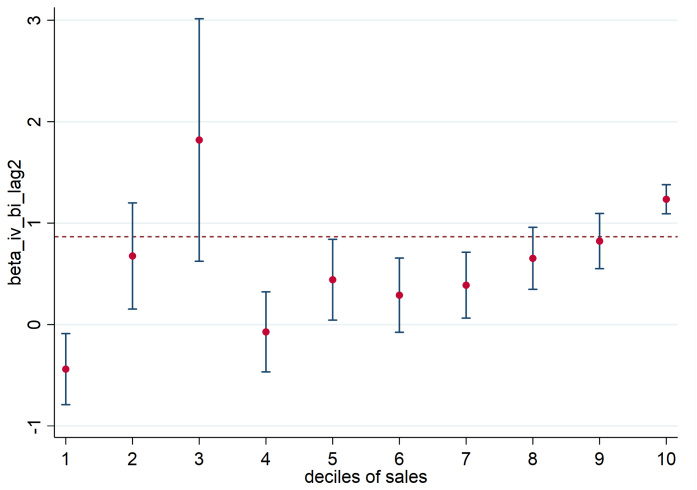
chases of product k from the world (less its purchases from Slovenia) at time t,.[22] An increase in WID_{ckt} could result from shocks to demand either in consumer tastes or in firms' uses of particular inputs, or reflect a reduction in comparative advantage by c in product k. Since this instrument has country-product-time variation, we get a single value for each firm-country-year by using aggregation similar to Hummels et al. (2014). [23]

More specifically, we weight WID_{ckt} for importing country c selling HS code at 6-digit product k at time t using $share_{fkt_0}$ which is the share of value of imports of product k in total value of imports for firm f in the pre-sample year (1996) t_0. For those firms which were not there in the pre-sample year (either because they entered or began to export within sample), we use information from their first year of exporting and use data from the second year onward for the regressions. Then we create a time varying instrument for firm f trading with partner country c, namely $shWID_{fct} = \sum_{k \in K_c} share_{fkt_0} WID_{ckt}$ where K_c represents the set of products exported by firm f to country c in the pre-sample year t_0.

The logic behind this demand-type instrument is as follows: over time there are shocks to the demand of product k from country c which are exogenous to firm f, and these are reflected in changing import demand to the world as a whole; since firm f

[22] The validity of this type of instrument has been extensively explored in recent papers (Adao et al., 2019; Borusyak et al., 2019; Goldsmith-Pinkham et al., 2020).
[23] Similar demand shock is used in Mayer et al. (2016).

Figure 6: Heterogeneity by size, IV export to a neighboring country



Note(s): Linear probability regression where the main regressor is interacted with the decile of sales a firm belongs to and (lagged) export entry is used as instrumental variable. Firm-country, firm-year and country-year fixed effects are included in this specification. The dashed horizontal line represents the estimated coefficient for the full sample.
Source: Own calculations based on AJPES, SURS and FURS data.

exports product k more than other firms (i.e. the share is larger), it benefits from these changes more than a firm which does not export the same product to that country or which exports it but in a relatively smaller share.

A potential threat to identification might be that WID_{ckt} is directly affecting M_{fct}. However, thanks to the high level of disaggregation of the data, it is reasonable to exclude this threat. Assume firm f is exporting and importing a single-product k. Due to a technological improvement, the production of this product k, say computers, becomes cheaper in several countries. Then, country c, e.g. Germany, starts to import more computers from all over the World ($WID_{ckt} > 0$). At the same time, the Slovenian firm f starts to import a lot of computers from Germany too. It is unlikely that Germany both imports and exports computers.[24] It could happen, however, that we capture intra-industry trade if products are reported at 2-digit level. For instance, Germany might be importing computer-related components from other countries and export computers to Slovenia. Since products are reported at 6-digit level, we can safely exclude we are capturing this intra-industry type of trade.

Table 9 illustrates coefficient estimates when export entry is instrumented with the weighted average of World import demand: the coefficient moves from almost 3 percentage points of the OLS estimation displayed in the column (1) to 22 percentage

[24]Unless many firms in Germany are doing the so-called carry-along trade (Bernard et al., 2019) also called pass-on-trade in Damijan et al. (2013).

Table 9: Shift-share instrument: IV results

	OLS	IV	
		1st stage	2nd stage
	Import entry$_{f,c,t}$	Export entry$_{f,c,t-1}$	Import entry$_{f,c,t}$
	(1)	(2)	(3)
Export entry$_{f,c,t-1}$	0.029***		0.221***
	(0.002)		(0.005)
log(shWID$_{f,c,t-1}$)		0.019***	
		(0.000)	
F stat (1st stage)		20890.1	
Weak identif. test		1581.4	
F stat (2nd stage)			1876.9
Fixed effects:	firm×country	firm×country	firm×country
	firm×year	firm×year	firm×year
	country×year	country×year	country×year
No. Obs.	3,022,518	3,022,518	3,022,518

Source: Own calculations based on AJPES, SURS and FURS data.

points when using the shift-share, which remains positive and highly significant (column (3)). Given that these results are very similar in sign and size to those in Table 8 where the instrument was export to at least a neighboring country, we can conclude we do not need to worry about geographically correlated errors. First-stage results and some tests for validity and significance of the instrument, reported here in the same fashion as in Table 9, suggest that the shift-share instrument is working correctly.

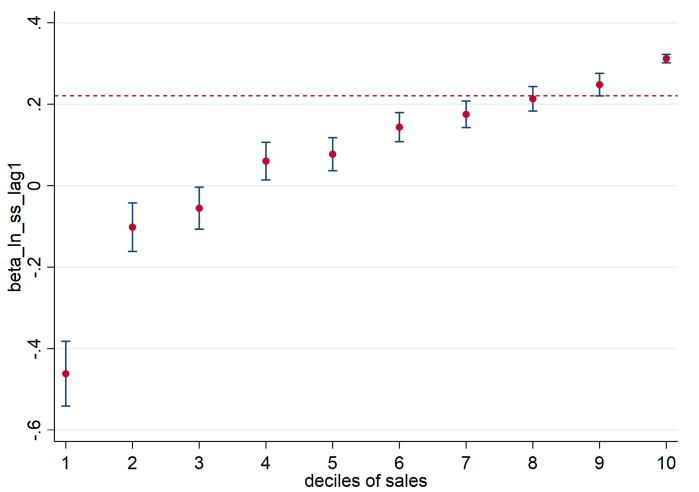
LATE and compliers' characteristics Since the IV estimand corresponds to the local average treatment effect (LATE), which is the effect of the treatment on a specific subgroup of the population, the *compliers*, we need to investigate this group's characteristics. The exogenous variation driven by the instrument is only a subset of the total variation in export entry. IV, thus, reduces the variation in the data and the variation we are left with comes only from the units which responded to the instrument in the first place (Cunningham, 2021). Therefore, the questions are: how is this sub-sample of units composed? What are its characteristics? To answer these queries, we describe the distribution of characteristics of the compliers as opposed to characteristics for the whole sample following the methodology in Pinotti (2017) for some variables of interest. This is based on the following formula:

$$E(g(K)|compliers) = \frac{[E(g(K)X_{f,c,t-1})|Z_{f,c,t-1}=1) - E(g(K)X_{f,c,t-1})|Z_{f,c,t-1}=0)]}{[E(X_{f,c,t-1}|Z_{f,c,t-1}=1) - E(X_{f,c,t-1}|Z_{f,c,t-1}=0)]} \tag{7}$$

where g(K) is the distribution of an individual characteristic K (see, e.g. Angrist et al. (2016)). The right-hand side of Equation (7) is easily estimated by the 2SLS regression of g(K)$X_{f,c,t-1}$ on $X_{f,c,t-1}$ using vector component of $\mathbf{Z_{f,c,t-1}}$ as instruments. More specifically, we pick three characteristics of the firms, i.e. employment, sales and tan-

gible capital[25]. Therefore, we present the distribution of these characteristics for the whole sample vs distribution for compliers in order to answer the following question is: are the average characteristics of compliers similar to those of other firms? As shown in Figures 9-15 in the Appendix, compliers are, on average, larger, both in terms of employment and sales, and are also more capital intense. While the full sample distribution (blue bars) follows more or less a Pareto one, the compliers distribution (red bars) is more skewed to the right. In particular, red bars are always higher than blue bars for greater values of the variable considered confirming that compliers, namely firms that started to export in previous year(s), are systematically different from other firms. This holds across all possible definitions of the instrumental variable, either export entry or export dummy to a neighboring country - being lagged by one, two or three periods, or the shift-share instrument. We also perform the IV regression by

Figure 7: Heterogeneity by size, IV shift-share



Note(s): Linear probability regression where the main regressor is interacted with the decile of sales a firm belongs to and the shift-share variable is used as instrument. Firm-country, firm-year and country-year fixed effects are included in this specification.
Source: Own calculations based on AJPES, SURS and FURS data.

deciles of size for the shift-share instrument (in its logarithmic version). Results from these regressions are reported in Figure 7 where estimates have a similar pattern as those depicted in Figure 6: coefficients are higher, the larger the firm is. Therefore, the positive effect of export on import entry is mainly driven by the activities of firms in the right tail of the distribution.

[25]They have been transformed from continuous to categorical variables divided in different categories as illustrated in each figure

8 Conclusions

This paper shows a positive effect of export on the decision to start importing in the subsequent year. We attribute this effect to reduction of information frictions. We find that an export incursion in a market increases the probability of starting to import the next year by slightly more than 1 percentage point using the OLS specification. Given that the unconditional probability of import entry is 3%, it corresponds to an increase of 33% in the probability of importing with respect to the unconditional probability which is quite remarkable.

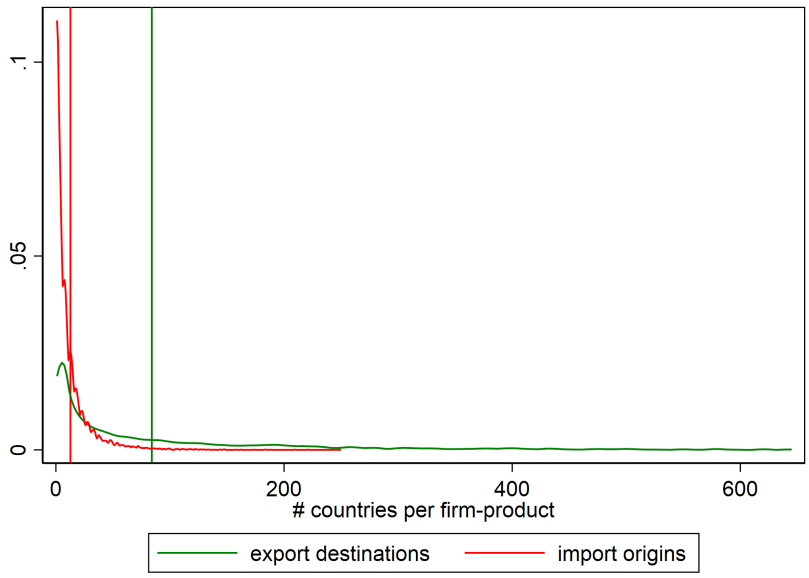
However, OLS estimates are subject to endogeneity issues even after controlling for a plethora of fixed effects. Therefore, we introduce a novel instrument which builds on the notion of sequentiality in exporting: export entry in at least one neighboring country. The IV approach allows us to assert causality of the relation and argue that the direction of the sequentiality goes from export to import, and not the other way around.

IV estimates do confirm the positive effect of export on import entry found using OLS. Moreover, the coefficients increase significantly in size across several specifications. This, at first, might seem suspicious given that we would have expected a reduction in magnitude for the IV estimates due to an over-estimation of OLS. Given that the IV estimand is providing a local average treatment effect (LATE), which is the effect on a sub-sample of the population, i.e. only firms that have responded to the treatment, we investigate whether the effect is heterogeneous across size categories.

We find that the effects of lagged export entry on import entry are increasing in firm size, for OLS and, even more, for IV estimates, More specifically, coefficients for our main IV specification are around 10-20 percentage points for the last three deciles of the size distribution, while they become negative for smaller firms. We additionally perform several robustness checks that rule out the role of productivity as the main driver of this relation. Overall, we can interpret these findings to be consistent with a narrative of information frictions about suppliers that can be overcome by exploiting the firm's presence in a foreign market through exporting. However, this positive effect holds only for firms that are larger and therefore more likely to be already importers, reinforcing even more their presence in international markets at the expense of smaller firms.

A Appendix

Figure 8: Average number of destination and origin countries by firm-product (1996-2011)



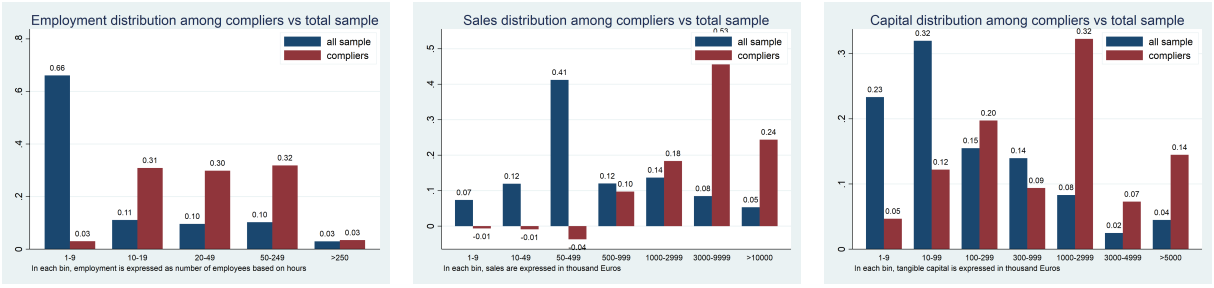
Source: Own calculations based on AJPES, SURS and FURS data.

Table 10: Value (m. Euros) , by year

	sample: manufacturing firms engaged in international trade at least once			
Year	**Export value**	**Export value (>0)**	**Import value**	**Import value (>0)**
1996	662	1763	486	737
1997	721	1987	533	845
1998	821	2272	607	970
1999	880	2382	628	1007
2000	1,084	2920	775	1286
2001	1,303	3413	941	1554
2002	1,412	3713	984	1672
2003	1,479	3767	1027	1662
2004	1,572	4471	1078	1986
2005	1,811	6609	1215	3240
2006	2,068	6928	1356	3352
2007	2,313	7976	1493	3330
2008	2,342	7868	1504	3248
2009	1,893	6412	1113	2568
2010	2,233	7478	1371	3124
2011	2,507	8097	1476	3254

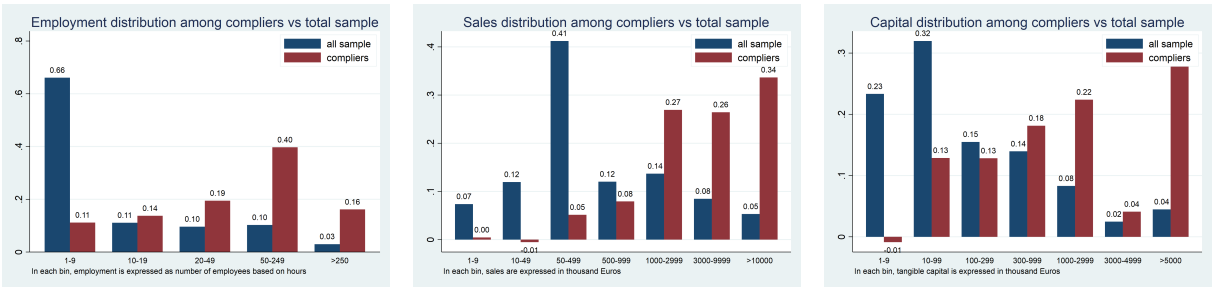
Source: Own calculations based on AJPES, SURS and FURS data.

Distribution of characteristics for the whole sample vs distribution for compliers



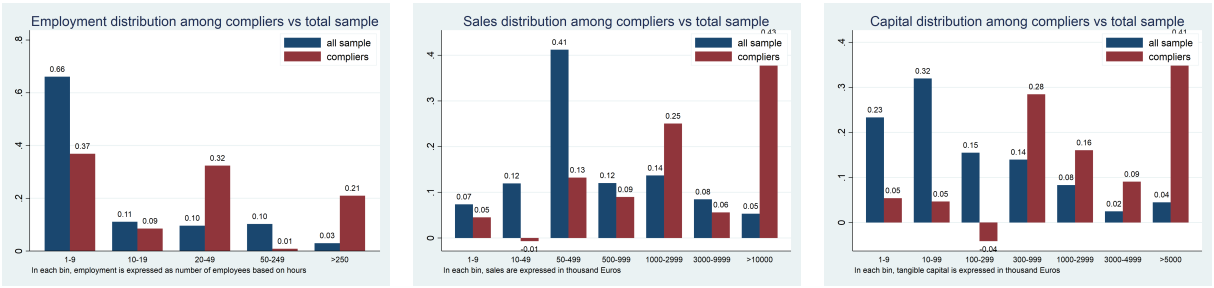
(a) Employment (b) Sales (c) Capital

Figure 9: *Instrument:* Export entry to d at time $t-1$



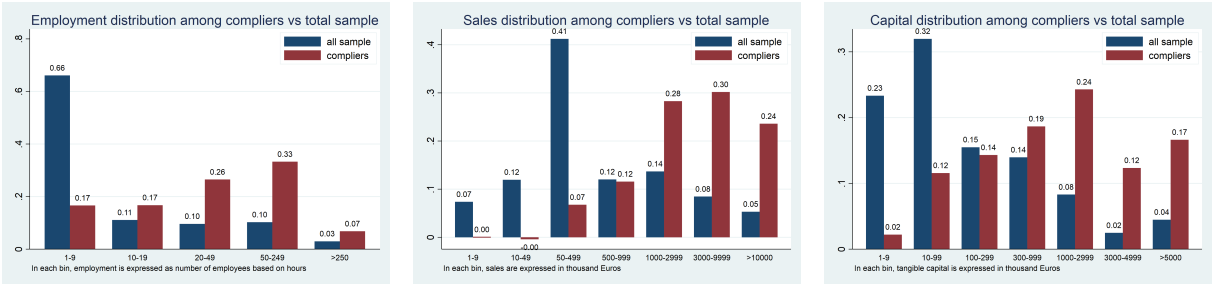
(a) Employment (b) Sales (c) Capital

Figure 10: *Instrument:* Export entry to d at time $t-2$



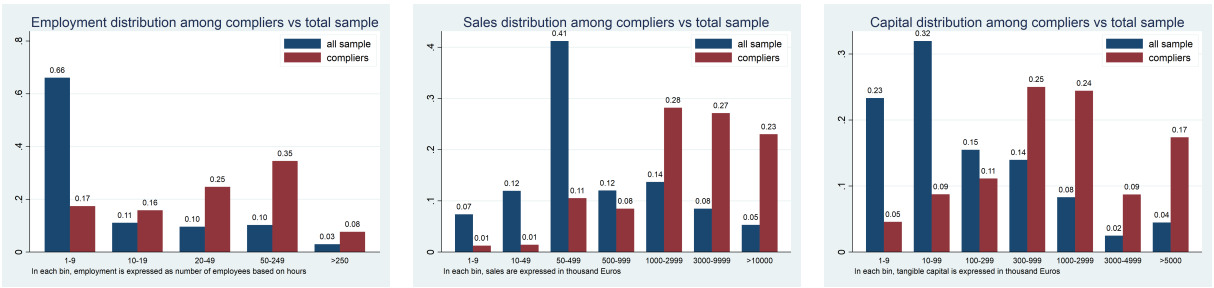
(a) Employment (b) Sales (c) Capital

Figure 11: *Instrument:* Export entry to d at time $t-3$



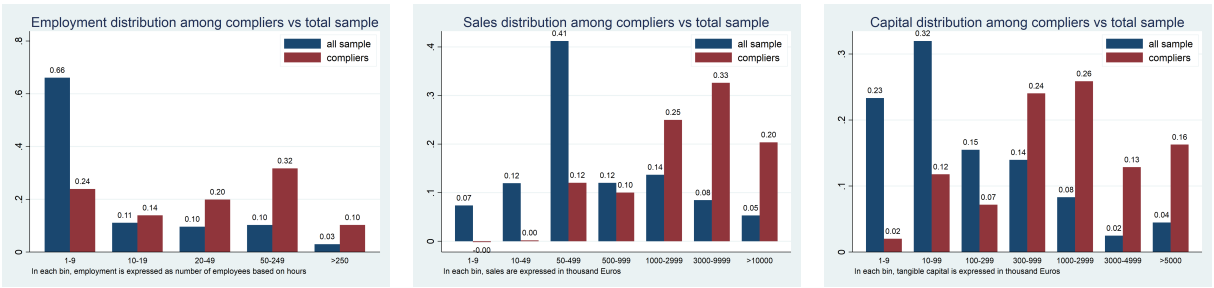
(a) Employment (b) Sales (c) Capital

Figure 12: *Instrument:* Export dummy to d at time $t-1$



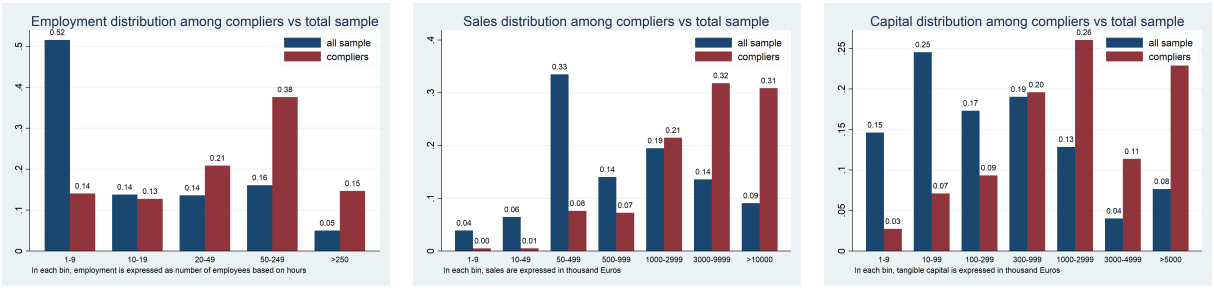
(a) Employment (b) Sales (c) Capital

Figure 13: *Instrument:* Export dummy to d at time $t-2$



(a) Employment (b) Sales (c) Capital

Figure 14: *Instrument:* Export dummy to d at time $t-3$



(a) Employment (b) Sales (c) Capital

Figure 15: *Instrument:* shift-share log(shareWID)

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