Importing after Exporting

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Abstract

Using a comprehensive database of Argentine firms, we show that exporting to a new destination increases the probability of a firm beginning to import from that market within mainly the lapse of one year. We develop a model of import and export decisions to study the effect of productivity and import costs on the intensive and extensive margins of importing. We show that "importing after exporting" implies that export entry reduces the cost of importing from that market. This effect is more likely to occur in distant markets, and in situations where importing involves non-homogeneous and rarely imported goods. Furthermore, new import activities from a new export destination continue regardless of whether the firm remains as an exporter in that market. This evidence emphasizes the influence of export experience on firms' sourcing decisions. The effect of export entry on sourcing costs has implications that go beyond qualitative insights: according to our quantitative exercise, import costs fall 15% in a given destination after export entry.

JEL Classification Codes: F10, F12, F14
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1 Introduction

It is well known that importers and exporters are more productive than firms serving only domestic markets. Firms engaged in international trade also use skilled labor and capital more intensively, pay higher wages and are associated with higher quality standards. Firms involved in both activities (global firms) rate even higher in these measurements (Bernard, Jensen, Redding, and Schott 2012, Kasahara and Lapham 2013, Manova and Zhang 2012, Bernard, Jensen, Redding, and Schott 2018). Yet, surprisingly, the research in international trade mainly focuses on either exporting or importing as if they were independent activities.[1] As a consequence, little is known about how exporting and importing interact with each other.

We begin our analysis by establishing a novel fact about the relationship between exporting and importing. Using a database of the universe of Argentine exporters and their export and import transactions at the HS6 product level, for the period of 2002-2012, we find that exporting to a new destination raises the probability that the firm will begin importing from that same country within a year (by 51% in our preferred estimation). This fact is intriguing. Why does a new destination for exports become a new source of imports? Why does the effect require time? As both activities are jointly determined by productivity, "importing after exporting" might be the result of a particular productivity process through which firms gain efficiency. An alternative potential explanation involves exporting reducing import costs. A priori, it is unclear whether the effect of export entry on firms' sourcing decisions reflects changes in productivity or in import costs. Furthermore, if export entry reduces import costs, it is also unclear whether this is due to concurrent complementarities in export and import activities or due to the effect of export experience on import costs. In this paper, we provide answers to these questions and discuss their relevance to understanding firm export and import dynamics in global markets.

We develop a model of exporting and importing. As in Bernard, Jensen, Redding, and Schott (2018) and Blaum (2019), we put together a standard model of sourcing decisions (e.g. Antras, Fort, and Tintelnot 2017, Blaum, Lelarge, and Peters 2019, Gopinath and Neiman 2014, Halpern, Koren, and Szeidl 2015) with the canonical model of exporting. A novel feature of our framework is that we let import costs from a sourcing market vary with the export experience of a firm in that market. This generates heterogeneity of import costs at firm-market level.[2] In this framework, whether

[1] Redding (2011), Bernard, Jensen, Redding, and Schott (2012), Melitz and Redding (2014) summarize the literature on exporting. There is far less work available about importing. Halpern, Koren, and Szeidl (2015) and Amiti and Konings (2007) find that importing is associated with higher productivity. Goldberg, Khandelwal, Pavcnik, and Topalova (2010) find that importing extends the product scope. Finally, Blaum, Lelarge, and Peters (2019) and Antras, Fort, and Tintelnot (2017) propose models of firms' sourcing decisions. Early exceptions considering both import and export decisions are provided by Kasahara and Lapham (2013), finding a positive association between importing and exporting sunk costs, and Bas and Strauss-Kahn (2014) and Bas (2012), where importing increases the probability of becoming an exporter. More recent examples are Blaum (2019) and Bernard, Jensen, Redding, and Schott (2018).

[2] Other papers analyzing global firms focus on complementarities between importing and exporting that do not depend on whether the export and import activities are in the same markets (e.g. Blaum 2019, Bernard, Jensen,

export entry affects sourcing decisions as a result of productivity gains or by reducing import costs yields contrasting empirical implications. If the driver of new sourcing is productivity, export entry in a given country should affect the firm's probability of new imports from any potential sourcing country. This is one of the channels explored in Bernard, Jensen, Redding, and Schott (2018).[3] Contrarily, if export entry reduces import costs in the new market, then it should only affect the firm's decision to source from that same market; and not from others. Also, productivity gains should affect the intensive margin of imports from every existing source. This would not the case if new sourcing reflects reductions in market-specific import costs. Based on these predictions, we use the observed effect of reaching a new destination to infer that exporting does reduce market-specific import costs, ruling out productivity as a driver of "importing after exporting". This conclusion opens a new set of questions.

Why does exporting reduce the cost of importing? Are import and export costs complementary? This would be the case if, for example, both activities shared the same concurrent operational fixed costs. Do import costs vary with experience as an exporter in international markets? Does this type of complementary take place at the destination level? This would be the case if, for example, finding input sources in a particular market required knowledge about potential suppliers, and if acquiring this knowledge was facilitated by previous export experience in the market. Explaining the nature of import cost-savings associated with export entry is one of the contributions of our analysis. In our framework, we derive a number of predictions that contrast according to whether "importing after exporting" reflects concurrent complementarities in import and export costs, or whether experience in new export destinations reduces import costs from that market. First, as experience in a market requires time, sourcing from a new export destination should come after export entry. We find that this is the case. Second, if import and export operational costs are concurrent, the effect of exporting on import sourcing should not be restricted to new exports. This is not corroborated by the data: exporting affects the probability of importing only when the destination is new for the firm. Moreover, we observe that the effect vanishes when we consider firms that re-enter the export market, suggesting that export entry of experienced firms does not affect sourcing decisions. Third, if exporting affects the sourcing strategy by providing experience, and experience eases the process of finding potential suppliers, we should find a stronger association between export entry and importing in situations where the firm is poorly informed about the characteristics of the destination market, or when importing involves relatively rare goods. Consistent with the explanation based on experience, we find that the effect of exporting on importing is stronger (a) in long-distance destinations; (b) for varieties that are rarely imported by Argentinian firms, and (c) for differentiated or high-tech intermediate inputs. Finally, import and export cost concurrent complementarity requires both activities to be carried out simultaneously. In contrast, if the effect

Redding, and Schott 2018).

[3]We discuss more in detail this paper below.

is driven by experience, newly established relationships with foreign suppliers in the new export market may last, regardless of whether the firm continues serving that market as an exporter or not. Consistent with the experience being the driver of "importing after exporting", we find a higher probability of importing from the new export market even when the firm stops exporting right after entry.

Our analysis bolsters the importance of experience to make sourcing decisions, which is expressed in lower import costs. Experience gained in a market after export entry provides, for example, an opportunity for the firm to gain knowledge on -or establish links with- potential suppliers. The effect of export entry on import costs in the new market is more than a qualitative insight. We use our model to derive the quantitative implications of export entry on import fixed costs. The estimated effects are large. For a median firm, import costs fall 15% in a given destination after export entry; while the estimated fixed cost to start sourcing from a market without export experience is US$ 110,800, the cost for importing after export entry falls to US$ 94,000.[4] Notably, we find that the entire distribution of estimated import fixed costs lies below for firms that enter a new export destination prior to starting importing from that market. Importantly, we estimate fixed costs in a source country that vary according to firms' recent export experience in that market. As noted by Antras, Fort, and Tintelnot (2017), the literature generally assumes homogeneous import costs; which is at odds with the data and contradicted by our results. In particular, we rationalize variations in import fixed costs with differences in the experience of the firm in a given market. Our findings show that this experience can be acquired by exporting.

Our work contributes to the understanding of the connection between importing and exporting. Early research focused on how importing favors export performance. For example, Bas and Strauss-Kahn (2014) and Bas (2012) observe that importing intermediate goods (from any source) reduces firms' marginal costs (or increases quality) and, thus, extends the extensive margin of exports. Our findings are compatible with firms using imported intermediate goods as a way to prepare for new export activities, but we stress different aspects of the import-export interplay. More closely related to our work, Amiti and Davis (2012), Bache and Laugesen (2006), and Kasahara and Lapham (2013) emphasize complementarities between the costs of exporting and importing. For example, Kasahara and Lapham (2013) provide evidence that supports concurrent complementarity between importing and exporting sunk costs. More recently, Bernard, Jensen, Redding, and Schott (2018) emphasize that exporting increases firm revenue, which makes it more likely that the firm will find it profitable to incur the fixed costs of sourcing inputs from any market. Similar to the effect of productivity gains, this interaction between exporting and importing generates interdependence between the import and export decisions across markets. Our paper emphasizes a completely different facet of the interaction between importing and exporting, which is not driven by productivity, scale, or

[4] As a benchmark, Halpern, Koren, and Szeidl (2015) finds that fixed costs of importing for local firms are 50% higher than for foreign firms in Hungary. Exporting reduces 15% the fixed costs of importing.

reductions in variable costs, but by interconnected activities between importing and exporting that are confined to the same foreign market. In particular, our paper highlights the importance of experience gained in the import market after export entry.

The existence of complementarities between importing and exporting that are confined to the same market bears important implications. Consider first the effect of currency devaluations on aggregate productivity. As mentioned above, the literature on importing (e.g. Halpern, Koren, and Szeidl 2015, Amiti and Konings 2007) find that importing is associated with higher productivity. By increasing the cost of imported inputs, devaluations may have a negative effect on aggregate productivity as emphasized by Gopinath and Neiman (2014). However, the net effect of devaluations on importing, and therefore on productivity, requires considering the expansion of exporters and the associated increase in the demand for imported inputs. More recently, Blaum (2019) makes precisely this point. If sufficiently large, devaluations increase import intensity and aggregate productivity. Our emphasis on the complementarity between exporting and importing at the destination level could generate an additional complementary channel through which a currency devaluation may affect productivity: export entry in a market affecting firms' sourcing decisions. Second, as noted by Amiti, Itskhoki, and Konings (2014), when a firm sources from an export market, the exchange rate pass-through into destination prices is lower. In our framework, it is not just that large exporters are simultaneously large importers, but also that exporters are more likely to import inputs from their new export markets. According to our calculations, one year after export entry to a market, new imports from that market account for 50% of the value generated by exports in the new destination. This market-specific connection between exporting and importing is what attenuates the effect of bilateral exchange rate shocks on exporters' decisions. Third, our findings warn against interpretations of "learning by exporting" that rely exclusively on firms improving their core productivity after entering export markets (i.e: De Loecker (2013)). We highlight that part of the evidence on learning by exporting, even if holding constant a firm's core productivity, could be explained by the association between exporting and importing: a new export destination triggers a re-optimization process of import sourcing through which the firm becomes more productive. At the same time, our findings give new content to "learning by exporting" as they reflect a specific way of gaining efficiency. Finally, although only positive, our analysis could have normative implications if firms do not fully internalize the effect of reaching new export destinations on subsequent sourcing decisions. We consider this analysis beyond the scope of our paper but note that if that were the case, "importing after exporting" would provide a novel rationale for export promotion.

Our paper highlights that importing is not a simple activity. In making import decisions, firms must evaluate how imports of intermediate goods affect their production costs and weigh this against the fixed costs when dealing with foreign suppliers. However, this decision requires knowledge about products and potential suppliers that is not fully available for firms *ex ante*. Dasgupta and Mondria

(2018) formalize the role of incomplete information with rational inattentive importers and explore the implications of trade and information costs on bilateral trade shares. In their quantitative exercise, they find that information costs are large and magnify the effect of trade costs on trade flows. In our paper, experience in foreign markets is a way to overcome potential informational barriers to importing. Our results suggest that exporting is a source for such experience. On this ground, this paper is also related to recent literature on export dynamics that emphasizes the role of export experience in learning about a firm's potential in foreign markets (e.g. Albornoz, Calvo Pardo, Corcos, and Ornelas 2012, Timoshenko 2015). While these papers focus on uncertainty related to demand and profitability abroad, our findings highlight that experience in new export markets affects firms' sourcing decisions. On this score, we also provide estimates that show that the cost-saving effect of experience is quantitatively relevant.

Finally, there is a large literature in development economics that studies environments with poor information and how agents overcome those issues. Consistent with our mechanism, Startz (2016) provides evidence that Nigerian small final-good importers spend a considerable amount of money to travel in order to reduce informational barriers and contracting frictions. We show that even large formal firms are not fully informed and can acquire information about foreign suppliers by exporting to new destinations.

The remainder of the paper is organized as follows. In Section 2, we present the data and the preliminary observations. In Section 3, we establish the main fact. In Section 4, we derive predictions on how productivity and import costs affect the intensive and extensive margins of importing and show how importing after exporting is only empirically consistent with falls in import costs triggered by export entry in new destinations. In Section 5, we analyze the channels through which exporting reduces import costs. In Section 6, we estimate the fall in import costs associated with export entry. Section 7 discusses the implications of our results. To finish, we assess the plausibility of alternative explanations (Section 8) and offer some concluding remarks in Section 9.

2 Facts on importing

In this section, we describe the data, report relevant descriptive statistics, and provide preliminary observations about the relationship between exporting and importing.

2.1 Data

We use Argentine customs data comprising the universe of the country's exports and imports transactions. This dataset covers 2002-2012 and includes annually reported information about the value (in US dollars) of exports and imports for each firm by country (origin / destination) and

product (HS6). We focus on manufacturing firms and restrict imports to intermediate goods (inputs and capital goods), according to the BEC classification.

For most of our analysis, we collapse the database at the firm-market-year level; where we fill in with zeros every market- year combination for which the firm does not report any trade. Using unique firm identifiers, we have matched this data set to fiscal files generated by the Fiscal Administration of Public Revenue (AFIP) from which we have obtained information on formal employment and firms' main sector of activity. As we investigate extensive margin decisions at the firm, HS6 products and 12 years, we restrict our analysis to the top 50 trading partners to reduce the high dimensionality and the number of zeros of our dataset. These countries explain more than 97% of total Argentinian trade.[5]

The main sample consists of a balanced panel of 22,662 manufacturing firms. Taking 2007 as a typical year, there are 11,305 firm involved in trade. 3008 firms are only exporters, 3636 are only importers and 4661 are importers and exporters. Table 1 reports summary statistics, In an average year, Argentine firms export US$ 35,452M and import intermediate goods for US$ 19,789M. Each year, firms reach 7,985 new destinations (new export market - firm combinations) and source from 9,482 new markets.

Table 1: Descriptive statistics: by year

Year	Imports (millions US$)	Exports (millions US$)	New sources #	New destinations #
2003	6963	18052	9621	8760
2004	10235	21486	9142	8529
2005	13000	25143	10095	9160
2006	15675	29139	9800	8704
2007	20053	36023	9857	8739
2008	25831	45515	9992	8316
2009	16241	35818	8442	7378
2010	25504	42855	10239	7297
2011	32751	51750	9357	6887
2012	31633	48737	8275	6079
Average	19789	35452	9482	7985

Exports and imports values are in millions of US$

[5] As an alternative, we have repeated the same analysis by restricting the analysis to 10 regions: ASEAN+3 (ASEAN), Rest of Asia (RAsia), European Union (EU), Rest of Europe(REu), Africa, Australia, Mercosur, Rest of South America (RSA), North America (NA) and Central America (CA). Results are similar and available in previous versions of this paper or upon request.

In our analysis, we exploit two additional features about exporting. First, around 25% of firms that reach a new export destination are re-entrants. That is, firms that exported to a market in year $t-2$ or before, do not export in $t-1$ and re-enter in t (See Table A1 in Section A.1). Second, a remarkably high number of firms reaching a new destination leave within a year. Only about 50% of exporters that reach a new destination in year t remain active in that market after two years.

3 The main fact: importing after exporting

In this section, we uncover a novel fact about the relationship between exporting and importing at the country level. We estimate the probability for a firm to start importing from a new source.[6] Formally, the linear probability model we estimate is:

$$New\ Origin_{ijt} = \alpha Export\ Entry_{ij,t-s} + \beta X_{i,t} + \{FE\} + \mu_{ijt} \tag{1}$$

where $New\ Origin_{ijt}$ is a dummy indicating whether firm i imported from market j in year t for the first time, $Export\ Entry_{ij,t-s}$ indicates whether firm i exported to destination j in $t-s$ for the first time, where $s = \{0,1,2,3,4\}$. $X_{i,t}$ is a set of time-varying firm characteristics. Since there are other factors that affect a firm's decision to start to import from and start to export to a country (e.g. specific characteristics of a market, economic shocks in a given year, firm-specific characteristics, etc.), we take advantage of the multi-dimensionality of the data set and include a wide range of fixed effects, $\{FE\}$. In particular, the vector $\{FE\}$ includes different combinations of firm-year-market fixed effects, as well as interactions between them, such as firm-year, firm-market, and year-market fixed effects.

Since there can only be one new origin per pair firm-region $'ij'$, we drop that pair from $t+1$ onward after the first observation of positive imports at t (i.e. $imports_{ij,t} > 0$). Similarly, as we want to identify the effect of export entry to j on the probability of sourcing from j for those firms without any previous experience as exporters in that market, we drop pair firm-countries $'ij'$ from t onward whenever exports in $t-s$ to country j are positive ($exports_{ij,t-s} > 0$).[7] Finally, as errors can be correlated across markets or over time, we allow standard errors to be clustered at the firm level.[8]

Table 2 reports the estimation results for a series of models based on equation 1. For reasons that become clear below, we focus on $s = 1$.[9] The results reported in Table 2 establish the main fact: export entry to a market increases the probability of sourcing from that market in the following year. Column 1 reports the basic specification including firm, year, and market fixed effects. We find that

[6] Results are robust to non-linear estimations such as Probit or Logit models.

[7] Notice that this definition drops every firm-region pair that is always positive in our sample.

[8] Main results are robust to different clustering strategies: year-market, firm, firm-year, firm-market.

[9] This implies estimating the effect of an export incursion to a market on new imports from that market in the following year.

export entry to a market increases the probability of sourcing from that market in the following year by 0.9 percentage points. As the firm's decision to import and export from a market might be a joint decision due to, for example, a stable specific relationship with a partner abroad, we include firm-market fixed effects in the regression displayed in column 2. In column 3, we add market-year fixed effects to capture those aggregate shocks that affect the general attractiveness of a market, such as exchange rate variations or political changes. When included, we find that the effect of export entry is similar. However, even if firm fixed effects control for time-invariant unobserved heterogeneity, it is possible that positive idiosyncratic productivity shocks induce firms to initiate export and/or import activities. In order to address this concern, we adopt two different approaches. First, results reported in column 4, column 5, and column 6 add different combinations of firm characteristics as proxies for productivity (or any change in the firms' scale): total amount of exports, imports, and employment. Second, and more importantly, in the estimation reported in column 7 we include firm-year fixed effects that control for all the firm's characteristics that vary over time, but are constant across markets. Arguably, productivity shocks fit under this category since they are specific to a firm and are unlikely to vary across markets. We find that the main coefficient remains positive and significant in all these different specifications, suggesting that productivity is not driving the observed relationship between exporting and importing. As reported in column 7, once every firm-year specific characteristics are controlled for, export entry to a given market increases the probability to start sourcing from that market by 0.7 percentage points. Reassuringly, the main coefficient remains stable throughout the different ways to proxy for productivity. Our finding remains even after several additional robustness checks. For example, in Table A4 of the Appendix, we show that the effect of exporting on importing withstands the inclusion sector-market trends. This way, we control for the possibility of industry-market shocks (e.g. a new trade agreement that disproportionately affects some industries more than others). Table A4 also shows that our findings are robust to using other proxies for productivity. Furthermore, in Table A5 we show that the main conclusion holds if we focused on a sample of firms that were already exporters in the first year of our data. As the regression reported in column 7 includes the full battery of fixed effects, we adopt it as our preferred estimation in the following sections.

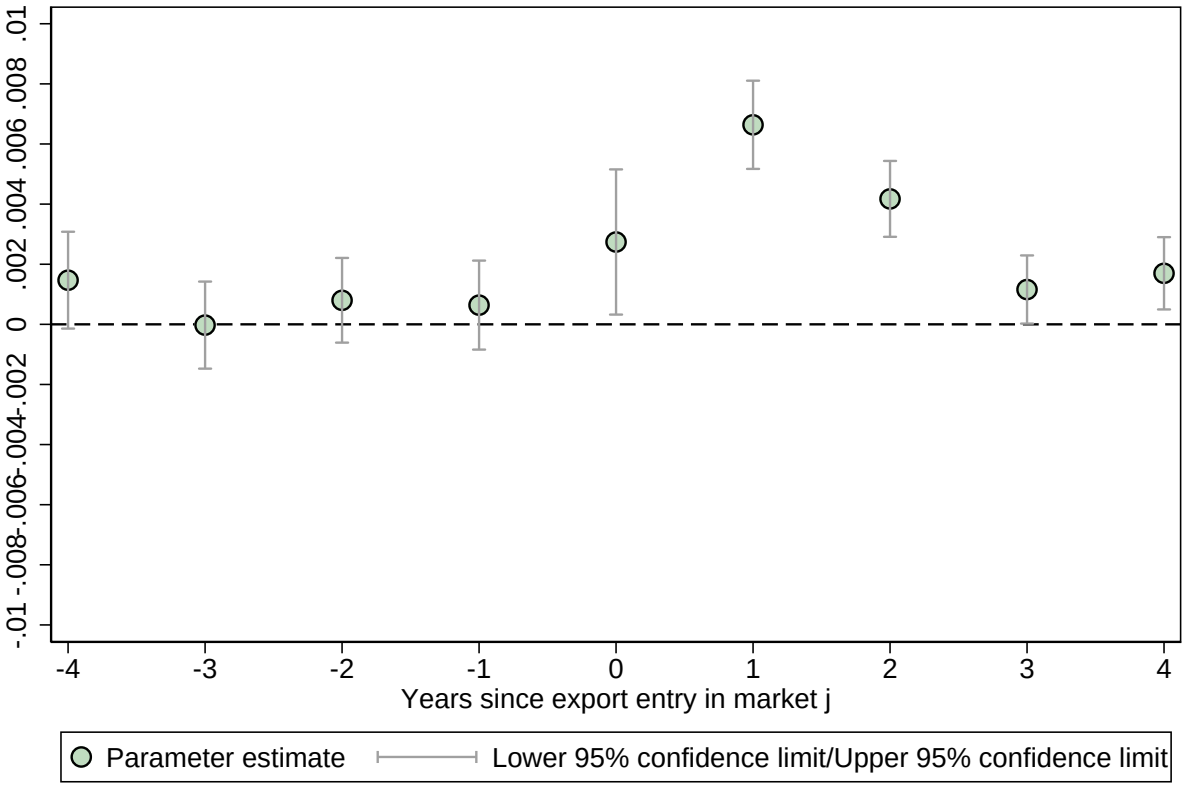
Table 2: Probability of importing from a new market

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
$Export\ Entry_{ijt-1}$	0.009***	0.009***	0.009***	0.008***	0.009***	0.008***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$log(Exports)_{it}$				0.000***		0.000***	
				(0.000)		(0.000)	
$log(Imports)_{it}$				0.002***		0.002***	
				(0.000)		(0.000)	
$log(Labor)_{it}$					0.006***	0.003***	
					(0.000)	(0.000)	
Observations	7,097,564	7,097,564	7,097,564	7,097,564	7,097,564	7,097,564	7,097,559
R-squared	0.049	0.320	0.322	0.326	0.322	0.326	0.350
Firm FE	yes	yes	yes	yes	yes	yes	yes
Year FE	yes	yes	yes	yes	yes	yes	yes
Market FE	yes	yes	yes	yes	yes	yes	yes
Firm-Market FE	no	yes	yes	yes	yes	yes	yes
Market-Year FE	no	no	yes	yes	yes	yes	yes
Firm-Year FE	no	no	no	no	no	no	yes
Mean dep variable	0.0110	0.0110	0.0110	0.0110	0.0110	0.0110	0.0110
N Clusters	19813	18975	18975	18975	18975	18975	18975

Robust standard errors in parenthesis are clustered at the firm level. ***,** and * indicates significance at the level 1%, 5%, and 10% respectively.

Our findings establish that export entry increases the probability of importing from the new export market within the lapse of one year. Is the uncovered fact confined to $s = 1$? Figure 1 shows the regression coefficients α for $s = \{-4, -3, -2, -1, 0, 1, 2, 3, 4\}$ under our preferred specification, where negative values are years before export entry. First, note that we do not observe any effect on the probability of new imports the years before the firm reaches market j as an exporter. Now, focus on $s = 0$. Although not significant at 1%, the effect of an export entry manifests within the same year. This could be reflecting simultaneity between both activities in a given market or partial year effects as emphasized by Bernard, Boler, Massari, Reyes, and Taglioni (2017) in the case of export entry. Unfortunately, the yearly nature of of our data prevents us from distinguishing between both effects. Nonetheless, note that the coefficient is considerably lower than in the case of $s = 1$.Finally, we note that the peak of the effect takes place when $s = 1$, falls two years after export entry ($s = 2$), and stabilizes around zero after three years ($s = 3$ and when $s = 4$). For this reason, we focus on the case of $s = 1$ henceforth.

Figure 1: Estimated α for $s = \{-4, -3, -2, -1,\ 0,\ 1,\ 2,\ 3,\ 4\}$



4 Model

In this section, we develop a model of import and export decisions. The main goal is to derive our main fact as a theoretical prediction. We also use this framework to derive and test predictions for the main alternative mechanisms behind importing and after exporting: a productivity process or import costs savings.

4.1 Environment

Firms produce final goods that can be sold to J foreign markets and combine in production inputs that can be sourced domestically or from foreign markets. Since foreign suppliers are more efficient (or deliver higher quality) at producing some of the varieties, firms may be willing to demand imported inputs as a vehicle to reduce the marginal cost of production.

Demand

We assume that in each market j there is a demand for final goods given by a standard CES:

$$U_j = \left[\int_i s_{ij}^{1/\sigma} q_{ij}^{\sigma-1/\sigma} di \right]^{\sigma/\sigma-1},$$

where $\sigma > 1$ is the elasticity of substitution.[10] s_{ij} summarizes the taste for firm i's good in destination j. We let s_{ij} depend on two components: $s_{ij} = a_j \mu_{ij}$. a_j denotes the average taste of consumers in market j for goods produced by Argentinian firms. μ_{ij} is a taste component specific to the link between firm i and market j. We refer to this component as firm-market profitability. Note that the presence of this component implies that a firm may change its export decisions when facing a demand shock to μ_{ij}, even in absence of any variation of productivity.

Supply

On the supply side, there is a measure N of final-good producers, all of each produce a single differentiated product. Firms are characterized by an heterogeneous attribute φ that, for concreteness, is interpreted as core productivity. Just like in Melitz (2003), this parameter is exogenously drawn from a probability distribution $\xi(\varphi)$ and revealed to the firms once they start to produce.

There is a set of products $\mathbb{K}$ and a set of markets $\mathbb{J}$, from which the foreign inputs can be sourced. Varieties are differentiated by their market of origin within the same product class. The difference between products and varieties is embedded in the technology. In particular, we assume that the production function takes the following nested form:

$$y = q(z) = \varphi \left[\sum_k x_k^{\frac{\theta-1}{\theta}} \right]^{(\theta/\theta-1)} \quad with \quad x_k = max[z_{dk}; \eta_{1k} z_{1k}; ...; \eta_{mk} z_{mk}]$$

where η_{jk} represents the quality of product k sourced from market j, z_{jk} denotes the quantity of product k sourced from market j. $\theta > 1$ is the elasticity of substitution between inputs. Within an intermediate product k, input varieties are perfectly substitutes, so the firm optimally selects only one source for each intermediate product. This feature is borne out in the data as for a given product at HS6-digit level, around 80% of firms import it from only one source (see Figure A1 in Appendix).

Importing k from j involves a fixed cost. A novel aspect of the framework is that import costs can also vary across firms according to their trading experience in market j. This feature of the model delivers multi-dimensional heterogeneity in productivity and firm-market-specific trade experience.[11] Formally, the fixed cost of importing product k from market j is given by $F_{ijk}^M = \kappa_{jk} g\left(\left\{\mathbb{I}_{ij,(t-s)}^X; s = 0, 1, ..., T\right\}\right)$. $I_{ij,(t-s)}^X$ are indicators that take value 1 if firm i exported to market j in year $t-s$ and, for convenience, we denote $h_{ij} = \left\{\mathbb{I}_{ij,(t-s)}^X; s = 0, 1, ..., T\right\}$ the history of

[10] The main conclusions remain unchanged if we let σ_j vary across markets.

[11] On exporting, Albornoz, Fanelli, and Hallak (2016), Morales, Sheu, and Zahler (2019), Das, Roberts, and Tybout (2007) also allow export costs to vary with experience or knowledge.

export status of firm i in market j. We assume that $g(h_{ij}) \in [0,1]$ is weakly decreasing in the firm's experience in export market j, $g'(h_{ij}) \leq 0$. Intuitively, if there are import cost savings associated with exporting experience, then we expect to find that $g'(h_{ij}) < 0$. In this section, we do not specify the source of the cost reduction and focus on testing whether $g'(h_{ij}) < 0$ or $g'(h_{ij}) = 0$. We give more structure to this function in section 5. In equilibrium, each firm is characterized by a vector $(\varphi_i, \kappa_{dk}(g(h_{id})), ..., \kappa_{mk}(g(h_{im})))$. We further assume that firms take the set of input prices (including variable transport costs) $[p_{jk}]_{jk}$ as given.

4.2 Firm's decisions

We briefly study decisions in steady-state. It is convenient to define a sourcing strategy Ω as the subset of input varieties (j,k), such that the firm imports these varieties. Similarly, we define an exporting strategy Ω^X as the subset of destinations j, such that exports are positive.[12] To characterize the firm's decision, we proceed in three steps. First, conditional on the sourcing strategy Ω and the export strategy Ω^X, we characterize the intensive margin of imports from active sources, the minimum cost function, and derive the optimal revenues in each active market. Second, conditional on the sourcing strategy, we characterize the exporting strategy. Third, we characterize the sourcing strategy.

Step 1: Optimal amount of imports, cost function and revenues conditional on sourcing and exporting strategy

We begin by solving the optimal minimum variable cost. To do so, we compute the intensive margin for each variety in the sourcing strategy set (z^*_{jk}); the minimum marginal cost function $c(\Omega)/\varphi$; and optimal prices and revenues.

Conditional on the sourcing strategy, the intensive margin of imports is fully determined by the solution to the cost function,

$$z^*_{jk}(\varphi, \Omega, y) \equiv \underset{z_{jk}}{arg\min} \sum_{(j,k)\in\Omega} p_{jk} z_{jk} \text{ s.t } y = \varphi \left[\sum_{(j,k)\in\Omega} (\eta_{jk} z_{jk})^{\frac{\theta-1}{\theta}} \right]^{(\theta/\theta-1)}. \tag{2}$$

This yields that the value of imports of intermediate k from market j is given by :

$$p_{jk} z^*_{jk}(\varphi, \Omega, y) = \frac{y}{\varphi} \frac{\left(\frac{\eta_{jk}}{p_{jk}}\right)^{\theta-1}}{\left[\sum_{(j,k)\in\Omega} \left(\frac{\eta_{jk}}{p_{jk}}\right)^{\theta-1}\right]^{\theta/(\theta-1)}} \qquad \forall (j,k) \in \Omega, \tag{3}$$

[12] Note that both sourcing and export strategy are firm-year specific.

Once we have the intensive margin of imports for any potential sourcing strategy, it is straightforward to obtain the minimum unit cost function for a given sourcing strategy:

$$\frac{c(\Omega)}{\varphi} = \frac{1}{\varphi}\left[\sum_{(j,k)\in\Omega}\left(\frac{\eta_{jk}}{p_{jk}}\right)^{\theta-1}\right]^{-\frac{1}{\theta-1}}.$$

To derive optimal prices, each firm chooses its price in each market to maximize profits subject to a downward-sloping residual demand curve with constant elasticity of substitution. From the first-order condition, the equilibrium price for each variety is a constant mark-up over marginal costs. This constant mark-up implies the typical relationship between productivity and prices. The difference imposed by considering importing is that prices also depend on the firm's sourcing strategy. In particular, local prices are given by:

$$p = \frac{\sigma}{\sigma-1}\frac{c(\Omega)}{\varphi}.$$

Thus, revenues for a firm i exporting to market j, paying an iceberg cost equal to τ_j are given by,

$$r_{ij}(\Omega^X, \Omega, \varphi) = \left[\frac{\varphi_i}{c(\Omega_i)}\right]^{(\sigma-1)} A_j \mu_{ij},$$

defining A_j as destination specific appeal: $A_j = \left(\frac{\sigma}{\sigma-1}\right)^{-\sigma}(1+\tau_j)^{1-\sigma}P_j^{\sigma-1}X_j a_j.$, where τ_j are iceberg costs to reach destination j and P_j is the price index in destination j.

It follows that total revenues for a firm with sourcing strategy Ω and export strategy Ω^X are given by,

$$R_i = \left[\frac{\varphi_i}{c(\Omega_i)}\right]^{(\sigma-1)} B_i(\Omega^X),$$

where $B_i(\Omega^X) = \sum_j I_{ij}^x A_j \mu_{ij}$ is a firm specific variable that summarizes different components of the demand. For concreteness, we refer to this variable as demand scale.

Step 2: Exporting Strategy

Conditional on the sourcing strategy and the optimal unit cost $c(\Omega_i)$, a firm will export to market j if the benefits outweigh the fixed costs of exporting to that market (F_j^x):

$$r_{ij}(\Omega^X, \Omega, \varphi) = \left[\frac{\varphi_i}{c(\Omega_i)}\right]^{(\sigma-1)} A_j \mu_{ij} \geq F_j^x,$$

There are three determinants of export entry to a market. First, firms with higher core productivity (φ) are more likely to export to any destination j. Second, firms are more likely to export

to markets with higher A_j. Third, firms are more likely to export to destinations with higher firm-market profitability, μ_{ij}. Given these features of export entry, it follows:

REMARK **1** *Conditional on productivity, a positive shock to market profitability of a firm i in market j, μ_{ij}, increases the probability of export entry in market j.*

This remark is crucial to justify our empirical preferred specification, reported in column (7) of Table 2. As we include firm-year fixed effects, we control for shocks to core productivity of a firm. In addition, market-year fixed effects control for any shock in time specific to the destination. Therefore, in our empirical analysis, we exploit variability in export entry coming from shocks to the firm's profitability in a given market.

Notice that we are not allowing firms to internalise the potential benefit of learning about potential suppliers when deciding whether they enter new markets (exporting-to-learn). In our setting, this could be incorporated without any implications on our analysis. If firms could export-to-learn, some firms would find it optimal to export with smaller revenues to learn about suppliers in the destination market (similar to Albornoz, Calvo Pardo, Corcos, and Ornelas (2012)). However, since exporting-to-learn lowers the entry cutoff of exporting to j at every point in time, the decision to start exporting in response to a shock on its profitability in a market will not depend on the degree of potential learning associated with exporting. Put it differently, exporting-to-learn would be analogous to a lower fixed cost of exporting F_j^x at any point in time. Although not the main focus of the paper, we explore in Appendix whether there are patterns in the data that suggest that firms export-to-learn. In particular, if firms export-to-learn, we should observe that firms with and without previous import experience should enter the import market with different sizes (proxy by total export values). Results reported in Table A3 of Appendix A.2.2 suggest that this does not seem to be the case. For this reason and easing the exposition, we assume the possibility of exporting-to-learn away.

Step 3. Sourcing strategy

Note that for a given sourcing strategy (Ω) and optimal export strategy (Ω^{X*}), profits are:

$$\pi_i(\Omega^{X*}, \Omega, \varphi) = \left[\frac{\varphi_i}{c(\Omega_i)}\right]^{(\sigma-1)} B_i(\Omega_X^*) - \sum_{(j,k)\in\Omega} \kappa_{jk} g(h_{ij}) - \sum_{(j)\in\Omega^{X*}} F_j^x, \tag{4}$$

Equation 4 implicitly contains the basic ingredients to determine the extensive margin of imports. The first term represents variable profits, which are increasing in the quality of the variety within each intermediate product k, and also in the number of products k combined in production. Intuitively, quality-differences and love for variety reduce marginal costs, generating incentives to import inputs. The second term corresponds to the import costs associated with the sourcing

strategy. Importantly, we allow these costs to vary with experience as exporter in market j. Note that $g'(.)$ being negative could be interpreted as complementarity between both activities. Alternative, a negative $g'(.)$ could reflect reduction in import costs associated with trading experience (e.g. export entry). For example, reaching a new export market may reduce informational costs associated with finding new input suppliers.

We can now define the optimal sourcing strategy. A sourcing strategy Ω^* is the firm's optimal strategy if and only if $\pi(\Omega^{X*}, \Omega^*, \varphi) > \pi(\Omega^X, \Omega, \varphi) \quad \forall \quad \Omega \neq \Omega^*$. Explicitly, this condition implies,

$$\frac{R(\Omega^{X*}, \Omega^*, \varphi)}{\sigma} - \sum_{jk \in \Omega^{X*}} F_j^X - \sum_{jk \in \Omega^*} \kappa_{jk} g\left(h_{ij}\right) > \frac{R(\Omega^X, \Omega, \varphi)}{\sigma} - \sum_{jk \in \Omega^X} F_j^X - \sum_{jk \in \Omega} \kappa_{jk} g\left(h_{ij}\right) \quad (5)$$

for all $\Omega \neq \Omega^*$. If $g'(h_{ij}) < 0$, Equation 5 highlights that export experience in a market increases the likelihood of this market to be included in the sourcing strategy. Furthermore, if $g'(h_{ij}) < 0$, a shock to export profitability in a market (μ_{ij}) inducing entry in new export markets may trigger imports of new varieties from those markets. This feature is important for our empirical strategy (see equation 1).[13]We summarize the main predictions of the model in the next subsection.

4.3 Predictions on the extensive and intensive margin of importing

We solve for firms' optimal responses to shocks in productivity (φ_i) and in market-profitability (μ_{ij}). How does importing after exporting emerge in this framework? On the one hand, it is a established fact that exporting is related to productivity and productivity is related to importing (e.g. Halpern, Koren, and Szeidl (2015), Antras, Fort, and Tintelnot (2017), Blaum, Lelarge, and Peters (2019)). Thus, export entry to market j could reflect unobservable productivity shifts that may also affect the probability of importing. On the other hand, export entry can reduce the cost of importing. In this subsection, we derive predictions that clarify the effect of export entry on the extensive and intensive margins of importing according to whether entry reflects productivity gains or import cost savings.

4.3.1 Export entry and the extensive margin of imports

Importing from a new source may be driven by multiple forces. Some of these drivers are also determinants of exporting to new markets. In particular, productivity (or any change that affect the scale of the firm) can affect entry in export markets and also the firm's sourcing strategy. Conversely, market-specific profitability shocks are confined to the decision to export. If these shocks induce export entry in a market, and exporting to a market reduces the cost of importing

[13] Antras, Fort, and Tintelnot (2017) remark that assuming homogeneous fixed costs across firms is at odds with the data. We provide one rationale for those differences: firm experience in export markets can affect costs of importing.

from that market, then export entry may affect the subsequent decision to source specifically from the new export destination; and not necessarily from other markets. We summarize this logic in the following proposition:

PROPOSITION **1 (Extensive margin)**

1. ***Import cost savings*** *Conditional on productivity (φ) and demand scale ($B(\Omega^X)$):*
   - A. *(import cost savings) If $g'(h_{ij}) < 0$, export entry in market j, increases the probability of sourcing from market j.*
   - B. *(import cost savings) If $g'(h_{ij}) < 0$ and export entry in market j is not followed by new imports from j, the probability of importing from other sources $m \neq j$ remains unchanged.*
2. ***Productivity:***
   - A. *(scale effects) Export entry in market j driven by a productivity (φ_i) shock (or any scale shock), increases the probability of sourcing from **any** potential source (the effect of a productivity shock is not confined to a particular market).*

Proof See Appendix. ■

Part 1.A. of this proposition delivers as a prediction the fact that we uncover in Section 3: after controlling for firm-year FE (productivity and scale), export entry in market j leads to an increase in the probability of start sourcing from that market. Part 1.B. and Part 2.A. are related to the effect of reaching a new export destination on importing from any other potential source. These parts provide contrasting predictions on the extensive margin in other markets, according to whether export entry is related to productivity gains or to import cost savings.

If export entry in market j does not affect costs through the acquisition of new inputs from that market, then there is no reason to expect new import sources, unless export entry changes the scale of the firm or reflects a productivity shock; in which case new imports should come from any potential market. Put it differently, if importing after exporting is related to import costs savings, through the function g(.), we should not observe any effect on new imports from third markets. In contrast, if importing after exporting is related to a shift in productivity or a considerable increase in the firm's scale after entry, then we expect an increase in the probability of start importing from every market. In order to test these implications, we estimate the probability of start sourcing from m following export entry in market j, controlling for employment as a proxy for productivity.[14] Formally,

$$New\ Origin_{ijt} = \alpha Export\ Entry_{i,-j,t-1} + \beta log(labor)_{i,t} + \{FE\} + \mu_{ijt} \tag{6}$$

[14]Results are qualitatively unchanged if we use other proxies of productivity (e.g. total exports, employment growth, among others).

where $Export\ Entry_{i,-j,t-1}$ is an indicator that takes value 1 if the firm started to export to any market $m \neq j$ the previous year.

We display the results in Table 3. Consistent with the import cost savings explanation, export entry in destination m carries no significant impact on the probability of starting sourcing from market $-j \neq m$. Additionally, as expected, an increase in firms' productivity/scale (proxied by labor) is associated with an increase in the probability of importing from every market.

Table 3: The effect of export entry in market k on importing from market $-j \neq m$

	(1)	(2)	(3)	(4)
$Export\ Entry_{i,-j,t-1}$	0.0001*	0.0001	0.0001	-0.0009
	(0.0001)	(0.0001)	(0.0001)	(0.0008)
$log(Exports)_{it}$	0.0001***		0.0001***	
	(0.0000)		(0.0000)	
$log(Imports)_{it}$	0.0010***		0.0010***	
	(0.0000)		(0.0000)	
$log(Labor)_{it}$		0.0012***	0.0013***	
		(0.0001)	(0.0001)	
Observations	6,465,641	6,465,641	6,465,641	6,465,641
R-squared	0.2924	0.2924	0.2925	0.3072
Firm FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Market FE	yes	yes	yes	yes
Firm-Market FE	yes	yes	yes	yes
Market-Year FE	yes	yes	yes	yes
Firm-Year FE	no	no	no	yes
Mean dep variable	0.0120	0.0120	0.0120	0.0120
N Clusters	18286	18286	18286	18286

Standard errors in parenthesis are clustered at the firm level. ***,** and * indicates significance at the level 1%, 5%, and 10% respectively. Column 1 includes firm-market and market-year fixed effects. Remaining columns include firm and year FE.

4.3.2 Export entry and the intensive margin of imports

In this section, we examine how export entry affects the intensive margin of imports. The following proposition summarizes firms' responses on the intensive margin, depending on whether export entry is associated with productivity gains or with a decline in import costs.

PROPOSITION **2 (Intensive margin)**
Conditional on the sourcing strategy,

A. ***Conditional on productivity and scale,*** *if* $g'(h_{ij}) < 0$*, export entry does not affect the value of imports from pre-existent sources.*

B. *Export entry associated to a positive productivity shock (or a scale shock) increases the value of imports from every pre-existent source.*

Proof See Appendix

■

We can use these predictions to obtain further evidence about whether importing after exporting reflects an increase in productivity or a reduction in import costs through the function $g(.)$. According to Proposition 2, conditional on the sourcing strategy, export entry should affect the intensive margin of imports only if it relates to productivity or scale gains. Conditional on scale, when export entry into market j is driven by a market profitability shock, we should not observe a rise in the value of imports from pre-existent sources. By contrast, when export entry into a market is related to positive productivity shocks or scale gains, we expect an increase in the value of imports from every pre-existent source. In order to assess how export entry affects the value of imports from pre-existent sources, we hold constant the sourcing strategy and estimate:

$$log(Imports_{ijt}) = \alpha Export\ Entry_{i,t-1} + \beta log(labor_{i,t}) + \delta_{ij} + \delta_{jt} + \mu_{ijt}, \tag{7}$$

where $Imports_{ijt}$ is firm i's value of imports from market j at year t, $Export\ Entry_{i,t-1}$ is a dummy indicating whether firm i entered to a new destination in $t-1$ for the first time. We also include firm-market fixed effects (δ_{ij}) and market-year fixed effects (δ_{jt}). Since we are interested in the intensive margin of imports, we only consider active markets in $t-1$ ($imports_{ij,t-1} > 0$).

Results of the estimation of equation 7 are reported in Table 4. As Part A of Proposition 2 predicts, we do not find a significant effect of export entry on the value of imports from pre-existent sources. In contrast, as expected, labor (as a proxy for productivity) positively affects the value of imports from all pre-existent sources.[15]

We take these results on the intensive margin, together with results regarding the extensive margin, and the fact that the main effect remains after controlling for firm-year fixed effects as indicative that the effect of export entry on new imports is associated with a fall in import costs.[16]

[15] We find similar results when we focus in the change in $log(imports_{ijt})$ from existent sources as outcome.
[16] We further discard other explanations related to productivity in Section 5.4.

Table 4: Intensive margin: The effect of an export entry on the value of imports from pre-existent sources

	(1)	(2)
$Export\ Entry_{i,t-1}$	0.029	0.024
	(0.018)	(0.018)
$log(Labor)_{it}$		0.613***
		(0.045)
Observations	36,924	36,924
R-squared	0.807	0.811
Firm-Market FE	yes	yes
Market-Year FE	yes	yes
Cond Sources	yes	yes

Standard errors in parenthesis are clustered at the firm level. ***,** and * indicates significance at the level 1%, 5% and 10% respectively.

5 Cost complementarity versus trading experience

Our previous analysis shows that reaching a new export destination affects the probability of importing by reducing import costs. As shown by Halpern, Koren, and Szeidl (2015), Amiti and Konings (2007), import costs play a crucial role in determining sourcing decisions. But, what are these costs? While there is indirect evidence of the existence of import costs, little is known about their nature. We consider two types of import costs. One category includes import costs that are complementary with export costs. Both activities may share the same concurrent fixed costs. For example, the cost of setting-up a trade division belongs to this category. The second category includes import costs that depend on trading experience in a market. For example, the presence of a firm in a market facilitates setting up intermediate networks, learning about potential suppliers, building commercial relationships or specifying particular attributes of the goods to be acquired.

Our empirical strategy will be based on deriving distinct implications for how complementarity in import-export costs and how trading experience affect import sourcing. In our model, the effect of exporting on import costs is captured by changes through the function $g(.)$. We proceed by first shutting down the effect of cost complementarities to focus exclusively on the effect of trading experience. More specifically, we let function $g(.)$ depend only on knowledge of the firm about a

market j (K_{ij}). We further assume $g'(K_{ij}) < 0$ and $g''(K_{ij}) > 0$. Under this specification, trading experience acquired by export entry in market j affects import costs by increasing K_{ij}. Since $g''(.) > 0$, we expect a stronger effect on importing in situations where the firm is less informed about the characteristics of the market and the inputs to be sourced. Intuitively, gaining trading experience is more relevant when the market is relatively unknown or the inputs to be imported are relatively rare. We establish these intuitions formally:

PROPOSITION **3** *If $g'(K_{ij}) < 0$ and $g''(K_{ij}) > 0$, export entry that reduces the cost of acquiring information implies:*

I Market previous knowledge DOES *matter for import decisions: stronger effect in less explored markets.*

II Product specificity DOES *matter for import decisions: stronger effect when imports involve non-homogeneous goods or higher technological content*

III Export survival DOES not matter for import decisions: start sourcing from market j after export entry to j DOES NOT *require export survival.*

Proof See Appendix ■

Alternatively, there may be a potential association between exporting and importing given by cost complementarity (as emphasized by Kasahara and Lapham (2013), for example). For instance, we could define the function $g(.)$ as $g(.) = \Gamma * \mathbb{I}_{ij}^{x}$, where Γ captures the cost complementarity between importing and exporting. Note that this specification assumes the effect of trading experience away (i.e: Γ does not depend on the knowledge that the firm has about each market (K_{ij})).[17] Besides, an explanation based on complementarity in import-export costs requires export survival upon entry in a new market, since the possibility of cost savings requires both activities to be carry out simultaneously. On this score, each part of Proposition 3 provides a contrasting prediction that allows us to distinguish between the empirical relevance of each competing explanation. We examine the validity of each prediction in the following sections.

5.1 Market previous knowledge

Learning about suppliers is a possible channel through which trading experience in an export destination reduces the cost of importing from that market. If this is the case, the occurrence of

[17]Note that, in part, we have already ruled out some explanations related to operational costs since most of the operational costs complementarities are not confined to the same market. In addition, most of stories related to complementarity in costs would usually require a simultaneous relation between importing and exporting. However, it is still possible that the observed sequence of export entry followed by new sourcing from the same market to be explained by cost complementarity. In this section, we note that if this were case, it would be unlikely that the magnitude of the effect varies according to a firm's previous knowledge about the market and the specificity of the product.

importing after exporting should depend on previous knowledge about the market. In this section, we design different exercises to explore the empirical relevance of this potential channel. How do we proxy for previous knowledge about a market? We explore different possibilities.

Previous knowledge might have been acquired in a previous export experience. If this is the case, and previous knowledge is relevant, then re-entry should be associated with a smaller increase in the probability of sourcing from that the market. To test this hypothesis, we exploit the fact that a considerable number of the firms in our sample are re-entrants to export markets. These are firms that did not export at $t-2$, but did so before $t-2$ and export again at $t-1$.[18] The underlying hypothesis is that a firm that re-enters a market already has already acquired relevant experience in the past. For this reason, we expect re-entry to have a weaker effect on import sourcing.

We estimate $Pr[NewOrigin_{ijt} = 1]$ as a function of $Re - entrant_{ijt-1}$; a variable that takes value 1 if the firm entered as an exporter to market j in t, but already had experience as an exporter in that market before $t-1$. Table 5 reports the results. Consistent with experience being a driver of sourcing decisions, the effect on the probability of new imports is smaller and less stable when the firm starts exporting to a market that the firm has already served in the past. Once we include firm-year fixed effects in column (2) we do not observe a significant effect on the probability of importing for firms that are re-entering a market. [19]

[18] As shown in Table A1 of the Appendix, about 25% of firms entering to a new destination are re-entrants.

[19] Notice that, even if self-selection into re-entry may bias our estimates, the fact remains that re-entry in an export market is likely a more informed decision than a first-entry (Albornoz, Calvo Pardo, Corcos, and Ornelas 2012, Albornoz, Fanelli, and Hallak 2016), which provides further evidence in favor of the experience-based channel.

Table 5: Exporting does not affect importing if the export market is not new

	$Pr[NewOrigin_{ijt} = 1]$	
	(1)	(2)
$Re - entrant_{ijt-1}$	0.003***	0.000
	(0.001)	(0.001)
$log(Exports)_{it}$	0.000***	
	(0.000)	
$log(Imports)_{it}$	0.001***	
	(0.000)	
$log(Labor)_{it}$	0.002***	
	(0.000)	
Observations	7,460,218	7,460,218
R-squared	0.276	0.309
Firm-Market FE	yes	yes
Market-Year FE	yes	yes
Firm-Year FE	no	yes
Mean dep variable	0.011	0.011

Standard errors in parenthesis are clustered at the firm level. ***,** and * indicates significance at the level 1%, 5% and 10% respectively.

Arguably, the fact that re-entry does not affect sourcing rules out the possibility of "importing after exporting" being explained by complementarity in import-export costs. If our results reflected cost complementarity, the reduction in import costs should be associated with all types of export activities, not only with export-entry.

Furthermore, previous knowledge (K_{ij}) should also vary across markets, making the potential gains from new trading experiences differ across markets. And this is indeed the case. We run our baseline estimation for each market j, including firm and year fixed effects, as well as employment to control for productivity.[20] Results are reported in Table 6. Clearly, the effect of exporting on importing varies across regions. For example, as shown in columns 3-8, the effect is stronger in North-America, EU, and ASEAN countries, while the association between exporting and importing is significantly lower in nearby markets such as Mercosur and the rest of the American continent. To test whether the effect varies across distance, in columns 1 and 2, we report the regressions at

[20]Results are qualitatively similar if we include other proxies for productivity such as the amount of exports/imports, or growth of these variables. These estimations are available upon request.

the country level with different sets of fixed effects including an interaction term to account for the distance between country j and Argentina. The coefficients associated with the interaction terms are both positive and significant, which suggests that the effect of reaching a new export destination on new sourcing increases with distance. Inasmuch distance is negatively correlated with familiarity, this additional result provides additional support to Proposition 3, part I.

Table 6: Importing after Exporting and Geographical Variation

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	All	All	ASEAN+3	EU	NA	Mercosur	RAme
$Export\ Entry_{ijt-1}$	0.011***	0.009***	0.010***	0.014***	0.021***	0.003*	0.002**
	(0.001)	(0.001)	(0.004)	(0.003)	(0.006)	(0.002)	(0.001)
$Export\ Entry_{ijt-1}$	0.002***	0.002***					
x $(log(Dist) - p50(log(Dist))_j$	(0.001)	(0.001)					
Observations	7,097,564	7,097,559	1,275,104	1,660,824	223,792	340,837	945,484
R-squared	0.322	0.350	0.421	0.424	0.685	0.584	0.426
Firm FE	yes	-	-	-	-	-	-
Year FE	yes	-	-	-	-	-	-
Firm-Market FE	yes	yes	yes	yes	yes	yes	yes
Firm-year FE	no	yes	yes	yes	yes	yes	yes
Employment proxy	yes	-	-	-	-	-	-

Standard errors in parenthesis are clustered at the firm level. ***,** and * indicates signicance at the level 1%, 5% and 10% respectively.

Of course, it could still be the case that this result may be driven by destination-specific complementarity in costs between exporting and importing. An alternative interpretation of this finding is that trading experience matters more to source from markets where Argentinian firms lack of relevant information about potential suppliers.[21] This explanation can be tested further. We generate a measure that proxy knowledge about potential suppliers in a market at the firm level before export entry to a destination. For each input variety (a combination of product k at the HS 6-digit level and origin j), we define whether it is "known" or "unknown" according to the following rule:

Let N_{vjk} denote the number of firms that import the variety (j, k) in sector v (at the ISIC 4-digit level). Then, define an unknown variety for sector v at year 2003 as:

[21] In general, Argentine firms have more experience with some markets than others. For example, even if a firm never exported to Mercosur, we expect that it has good enough information about inputs available there. In contrast, a firm that had never established trade with the European Union or ASEAN+3 might have less information about those markets, and thus more to learn.

$$Unknown\ Variety_{vjk} = \begin{cases} 1, & \text{if } N_{vjk,0} < Median_v\left[N_{vjk}\right] \\ 0, & \text{if otherwise} \end{cases}$$

We can use $Unknown\ Variety_{vjk}$ to generate two types of imported inputs:

$$u = \{known, unknown\}$$

Thus, for each firm, we can distinguish imported inputs according to $Unknown\ input_{iju}$, which takes the value of 1 for imports of unknown varieties and 0 otherwise.[22] This variable allows to explore, for a given firm, whether the probability of a new sourcing following an export entry in the same market depends on the type of input. Implicitly, even when a firm had never imported a variety (jk), knowledge about potential suppliers increases for varieties that are known in the sector where the firm belongs. Put it differently, we assume that knowledge available about a particular variety increases with the number of firms belonging to the same sector importing that variety. To test this, we estimate:

$$NewOrigin_{ijut} = \beta_1 ExportEntry_{ij,t-1} + \beta_2 ExportEntry_{ij,t-1} * Unknown_{iju} + \{FE\} + \epsilon_{iujt},$$

where the vector of fixed effects includes our baseline FE combined with the type of input u.

The estimated coefficients are reported in Table 7. The results are eloquent. Column 1 and Column 2 show that the effect of export entry on the likelihood of importing from the same market crucially depends on whether the firm has previous knowledge about the market. In particular, consistent with the experience channel, export entry has a stronger effect on import entry when the newly imported variety is relatively unknown in the sector where the firm operates.

[22] Results are qualitatively similar is we use amount of imports, instead of number of firms and are available upon request.

Table 7: Importing after exporting: Stronger effect when new import variety is relatively unknown

	(1)	(2)
‘	$NewOrigin_{ijt}$	
$Export\ Entry_{ijt-1}$	0.002*	0.002*
	(0.001)	(0.001)
$Export\ Entry_{ijt-1} \times Unknown$	0.011***	0.011***
	(0.001)	(0.001)
$log(Labor)_{it}$	0.004***	
	(0.000)	
Observations	14,664,825	14,664,825
R-squared	0.243	0.257
Firm-Market FE	yes	yes
Market-Year-unknown FE	yes	yes
Firm-Year FE	no	yes
N Clusters	19839	19839

The dataset is at the firm-market-year-product type level. Where unknown takes values 0 or 1 for unknown and known varieties, respectively. Standard errors in parenthesis are clustered at the firm level. ***,** and * indicates significance at the level 1%, 5% and 10% respectively.

5.2 Product specificity

In this section, we exploit the fact that certain types of inputs may be more likely to require previous knowledge about specific suppliers. For example, homogeneous goods do not require a specific supplier and are sold in relatively competitive markets, where information is more likely to be conveyed by the price. By contrast, non-homogeneous goods are differentiated across different attributes, such as quality, and typically require more information about the specific supplier. Similarly, low-technology inputs are easier to acquire than high-tech goods, for which knowledge about suppliers may be more valuable.

We consider two ways to distinguish between different inputs: product differentiation and technology differentiation. For product differentiation, we use the classification proposed by Rauch (1999). To distinguish products according to their technological content, we use the OECD classification. Thus, we generate two types to classify imported inputs:

$$u = \{\text{Differentiated, Non-Differentiated}\}$$

or alternatively,

$$u = \{\text{High-tech, low-tech}\}$$

We then run our baseline regression distinguishing between the differential effect of export entry on new imports, depending on whether the newly imported product is differentiated ($Diff_u$=1), or not ($Diff_u$=0) for both definitions of u:

$$New\ Origin_{ijut} = \beta_1 Export\ Entry_{ij,t-1} + \beta_2 Export\ Entry_{ij,t-1} * Diff_u + \{FE\} + \epsilon_{iujt},$$

where the vector of fixed effects includes those of our baseline regression, interacted with the input type u. In this case, we are interested in estimating β_2, which captures the effect of interacting $ExportEntry$ with the type of imported input.

Results are reported in table 8. We can observe that the effect of export entry on the probability of start importing is remarkably higher when the newly imported input is differentiated (columns 1 and 2). We obtain similar conclusions if we focus on technology differentiation of the newly imported input (columns 3 and 4).

Table 8: Product specificity: stronger effect for differentiated and med-high tech inputs

	$NewOrigin_{ijut}$			
	(1)	(2)	(3)	(4)
	Product Differentiation (Rauch)		Technology Differentiation (OECD)	
$Export\ Entry_{ijt-1}$	0.002***	0.000	0.002***	0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
$Export\ Entry_{ijt-1} \times Dif$	0.007***	0.007***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)
$log(Labor)_{it}$	0.003***		0.003***	
	(0.000)		(0.000)	
Observations	14,195,128	14,195,128	14,195,128	14,195,128
R-squared	0.303	0.318	0.307	0.321
Firm-Market-Diff FE	yes	yes	yes	yes
Market-Year-Diff FE	yes	yes	yes	yes
Firm-Year FE	no	yes	no	yes
Mean dep variable	0.006	0.006	0.006	0.006
N Clusters	18975	18975	18975	18975

The dataset is at the firm-market-year-differentiated level. Diff takes value 1 for differentiated inputs. Standard errors in parenthesis are clustered at the firm level. ***,** and * indicates significance at the level 1%, 5% and 10% respectively.

5.3 Importing after exporting does not require export survival

Finally, a more clear-cut distinction is given by observing that operational cost complementarity in exporting and importing requires both activities to be carried out concurrently. In contrast, the effect of experience may last, regardless on whether the firm continues serving the market as an exporter or not. We explore whether the effect of export entry on new imports depends on the firm survival in the export market.[23] Formally, we estimate the following variation of equation 1,

$$New\ Origin_{ijt} = \alpha_1 Export\ Entry_{ij,t-1} + \alpha_2 Exporter_{ijt} + \alpha_3 Export\ Entry_{ij,t-1} * Exporter_{ijt} + \{FE\} + \mu_{ijt},$$

where $Exporter_{ijt}$ is an indicator that takes value one if the firm exports positive amount to market j in year t. The key parameter is α_3, which indicates how relevant is export survival for our main fact. If the effect is related to concurrent complementarity in import-export costs, then we expect a positive estimate for the interaction term, indicating that export survival is required. In contrast, if the effect operates through newly acquired trading experience (e.g: acquisition of information about suppliers), then the interaction term would not be relevant. As we report in Table 9, consistent with the trading experience channel, surviving in the export market is not required to trigger new sourcing after export entry.

[23] We exploit variability coming from the fact that a considerable number firms exit the export market just after export entry (see Table A1).

Table 9: Does the persistence of the export relationship matters?

	(1)	(2)
	$NewOrigin_{ijt}$	
$ExportEntry_{ijt-1}$	0.008***	0.006***
	(0.001)	(0.001)
$Exporter_{ijt}$	0.014***	0.012***
	(0.001)	(0.001)
$Export\ Entry_{ijt-1} * Exporter_{ijt}$	-0.003	-0.003
	(0.002)	(0.002)
$log(labor)_{it}$	0.006***	
	(0.000)	
Observations	7,097,564	7,097,559
R-squared	0.323	0.350
Firm-Market FE	yes	yes
Year-Market FE	yes	yes
Firm-Year FE	no	yes

Standard errors in parenthesis are clustered at the firm level. ***,** and * indicates significance at the level 1%, 5% and 10% respectively.

Taken together, the results presented in this section suggest that firms gain experience after export entry, and this experience is associated with lower import costs.

5.4 Further discussion on alternative explanations

To conclude the exhaustive examination of alternative explanations, we briefly explore two other potential channels: i) market-specific similarity in fixed costs for exporting and importing; and ii) customization.

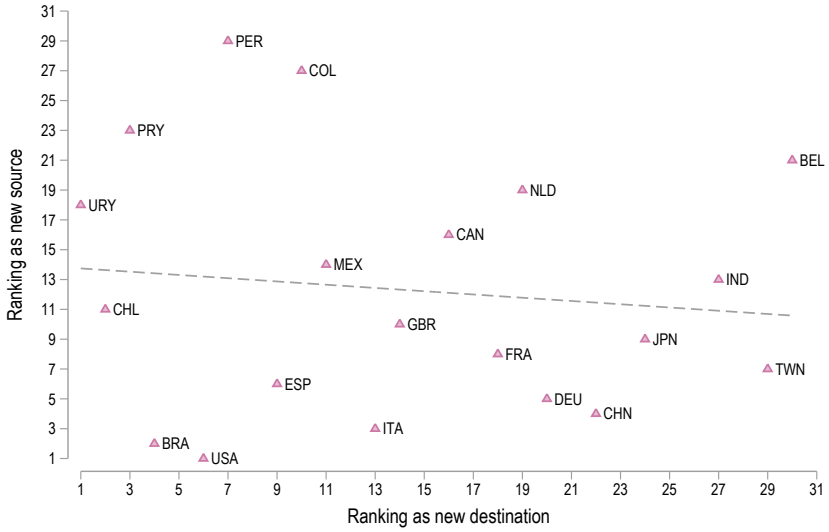
i) **Market-specific similarity in fixed costs for exporting and importing:** Despite including firm-year fixed effects to control for firm-specific changes in productivity, and showing that exporting only affects the probability of importing in the same market, there is still a remaining possibility in which firm-year shocks (e.g.: productivity shocks) can affect the probability for a firm to start exporting to and importing from the same market. If there was a positive correlation between export and import costs across countries, or whether export profitability in a market potential is also correlated with cost savings from importing, then it

is still possible that a productivity shock could induce export entry in and new sourcing from the same market. In this section, we show patterns observed in the data that contradict this alternative explanation.

First, recall that we include market-year fixed effects in our preferred specification. This rules out firm-invariant variability across markets in any given year; which mitigates potential issues related to a market being, on average, easier to reach by Argentine firms. Second, we find evidence that is inconsistent with a positive correlation between import and export entry costs. Such a correlation would imply that, on average, the easiest export destination markets should also be the easiest markets to source from. Hence, if we rank markets by the size of firms when they enter those markets, the rank should be similar for export and imports.

To test this, we rank firms according to their size (number of employees) at the moment of reaching a new destination and at the moment of starting sourcing from a new origin. In Figure 2, we show that the ranking of a firm as a new exporter to and as a new importer from a country are not correlated. For example, even relatively small firms can source from Germany (ranked 5), but Germany is hard for Argentinian exporters to reach that market (ranked 21).

Figure 2: Ranking of number of employees when a firm reaches a new market



ii) **Customization:** Finally, it is possible that, in order to export to a market, firms might need to adapt their products by importing inputs from that market.

If the firm realizes the benefits of customization after the first export experience, we would observe a sequence that is similar to the one uncovered by this paper. In a way, customization is a special case of learning about suppliers. Notice, however, that if our results were mainly

driven by customization, importing would require continuous exporting to the export market. However, we show that importing after exporting does not require survival in the export market. This implies that the newly imported input from market j is used by the firm to produce a good for many markets and not specifically for the export market j.

5.5 On the direction of the effect

If experience as an exporter is a way to reduce import cost, it is possible that experience as an importer helps a firm to gain access to a particular market. In principle, it is possible that the activities associated with finding and maintaining links with new foreign suppliers could be conducive to reaching new consumers. For example, a firm can learn about the demand for their products in a market from interacting with a supplier. We are agnostic about this possibility as the role experience on importing does not require the opposite channel to be true. For example, it is plausible that, by selling a car a firm acquires information about steel suppliers, while importing steel from the same country may not reveal relevant information about the demand for cars in that country. For this reason, we consider the possibility of exporting after importing as an empirical question that we test for completeness.

We estimate the probability of a firm starting to export to a new destination ($ExportEntry_{ij,t}$) on a indicator variable $NewOrigin_{ij,t-1}$ that takes the value of 1 if the firm started to source from market j in the previous year, and our battery of fixed effects. As reported in Table A6, sourcing from a new market does not affect the probability of exporting there the following year. This fact remains both in the whole sample and also doing the estimation market by market.

This finding does not contradict the effect of experience of export entry on importing. Note however that it is indeed inconsistent with the alternative explanation based on cost complementarities between exporting and exporting. In that case, the relationship should definitely be bidirectional. We consider this last finding as further indirect evidence in favour of our preferred interpretation.

6 Backing up Fixed costs and Fixed cost savings g(.)

According to our model, importing after exporting reflects a reduction in the fixed cost of importing after export entry. Although unobservable, we approximate the fixed costs of importing and estimate the savings in import costs that are associated with recently acquired experience in a new export destination.

The estimation requires the additional assumption of time being continuous. This implies that a firm starts to import from a new source as soon as the gains from importing are equal to the fixed costs of importing from that market. Thus, the fixed cost of importing from market j can be approximated by the variation in the firm's total revenues between $t-1$ and t at the moment the firm starts importing from j, controlling for new operations in other markets.

This strategy entails two sources of bias. First, as time is discrete, the change in revenues at entry constitutes an upper bound for the fixed costs of importing. Second, revenues at t depend on decisions taken after export entry. For these reasons, the main aim of this exercise is not to come up with a precise estimation of the level of the fixed costs of importing, but rather to give an idea of the variation in fixed costs associated with previous export experience.

Given that export entry and new sourcing in a given year are relatively rare events, we need to focus on larger markets to ensure we have enough observation to estimate savings in fixed costs. For this reason, we group countries into ten regions: ASEAN+3 , Rest of Asia , European Union (EU), Rest of Europe, Africa, Australia, Mercosur, Rest of South America , North America and Central America.

Following the model, we let fixed costs depend on the firm's previous status as exporter in a given market. Hence, by comparing the predicted fixed costs for firms with no previous export experience in a market with the predicted fixed costs for firms that started to export the year before starting to import, we can infer the magnitude of the fixed cost savings: $\left[\frac{g(I^X_{ij,t-1}=1)}{g(0)}\right]$ (see equation 5).

Formally, normalize $g(0) = 1$ the cost savings when the firm has no export experience and recall that $g'(.) < 0$ is decreasing with experience in a market. For simplicity, we suppress the product k dimension and write fixed costs of importing from j as κ_j. Now consider a firm that starts importing from market j in year t.

The difference in revenues before and after sourcing from a new market is given by:

$$R_{it}\left(\varphi_{it}, \Omega^{X*}_{it}, \Omega_{it-1} \cup j\right) - R_{it-1}\left(\varphi_{it-1}, \Omega^{X*}_{it-1}, \Omega_{it-1}\right) = (1 - \mathbb{I}^X_{jt-1})\kappa_j + \mathbb{I}^X_{jt-1}\kappa_j g(.),$$

where we denote $\Omega_{it-1} \cup j$ the subset that combines the sourcing strategy at $t-1$ with sourcing from a new market j. The equation above indicates that the cost savings can be estimated by comparing the change in revenues for a firm that starts to import after export entry (denoted by MaX) relative to a similar firm that starts to import with no export experience ($No-MaX$).Taking logs and rearranging,

$$lng(.) = ln\frac{\left[R_{it}\left(\varphi_{it}, \Omega^{X*}_{it}, \Omega_{it-1} \cup j\right) - R_{it-1}\left(\varphi_{it-1}, \Omega^{X*}_{it-1}, \Omega_{it-1}\right)\right]^{MAX}}{\left[R_{it}\left(\varphi_{it}, \Omega^{X*}_{it}, \Omega_{it-1} \cup j\right) - R_{it-1}\left(\varphi_{it-1}, \Omega^{X*}_{it-1}, \Omega_{it-1}\right)\right]^{No-MAX}}, \tag{8}$$

In order to take this object to the data, we need to make two additional assumptions. First, we assume that the change in total exports in response to a reduction in costs is proportional to the change in revenues. This feature is consistent with our theoretical framework and is common to standard trade models. Second, in order to avoid a mechanic increase in total exports for firms that started exporting to market j in $t-1$, our dependent variable excludes exports to j in the

estimation.[24]

Rearranging equation 8, we can now estimate the cost saving $g(.)$ with the following linear model:

$$ln\left(Exports_{it} - Exports_{it-1}\right) = \beta ExportEntry_{ijt-1} + X_{it} + \gamma_i + \gamma_{sjt} + \epsilon_{ijt}, \text{for } NewOrigin_{ijt} = 1.$$

We include market-year-sector fixed effects and control for different sourcing strategies by including the number of previous sources of the firm. The estimate β approximates the savings in import costs due to recently acquired export experience: $\beta = ln(g(.))$.

As shown in Table A7 of the Appendix, the coefficient of the regression is -0.13 and it is statistically significant at the 1% level. We predict the outcome value for new importers and summarize the main estimations in Table 10. The median firm fixed cost of importing is $110,000$ dollars. However, previous export entry reduces these costs by a factor of $1-g(.) = 0.15$, leading to a fixed cost of $58,831$ dollars for firms that start importing after export entry. In order to compare to a benchmark, we can take estimates from Halpern, Koren, and Szeidl (2015). They compare fixed costs of local firms to those for foreign firms in Hungary. According to their estimates, foreign firms pay 40% lower fixed costs of importing than local firms. Our findings suggest that export experience acquired after after export entry reduces fixed costs of importing by 15%. Notably, we find that the entire distribution of import fixed costs is below for firms that start importing after export entry.

Table 10: Fixed costs and Fixed Costs savings

Percentile	Fixed Cost		g(.)
of Fixed Cost	$ExportEntry_{ijt-1} = 0$	$ExportEntry_{ijt-1} = 1$	
10th	69536	58831	0.85
25th	84925	71804	0.85
50th	110833	94009	0.85
75th	149834	132221	0.88
90th	203033	184131	0.91

[24] Since exports upon entry to a market are usually low, results remain almost unchanged if we include exports to j.

7 Implications

Our findings emphasize the complexity of the importing activities. Importing requires experience in the foreign market and exporting can help the firm acquire that experience. For example, acquiring export experience may also generate information about import sources, which facilitates the process of finding suppliers. On this ground, our findings highlight the relevance of informational barriers that firms face to finding suppliers abroad and how experience gained by exporting may help firms overcome these barriers. In this section, we discuss the broader economic implications of importing after exporting.

First, interpreting the findings of this paper through the lens of our model indicates that the effect of acquiring export experience is higher for relatively unknown and differentiated import varieties. On this ground, new export markets become a channel through which firms improve input quality and production efficiency.

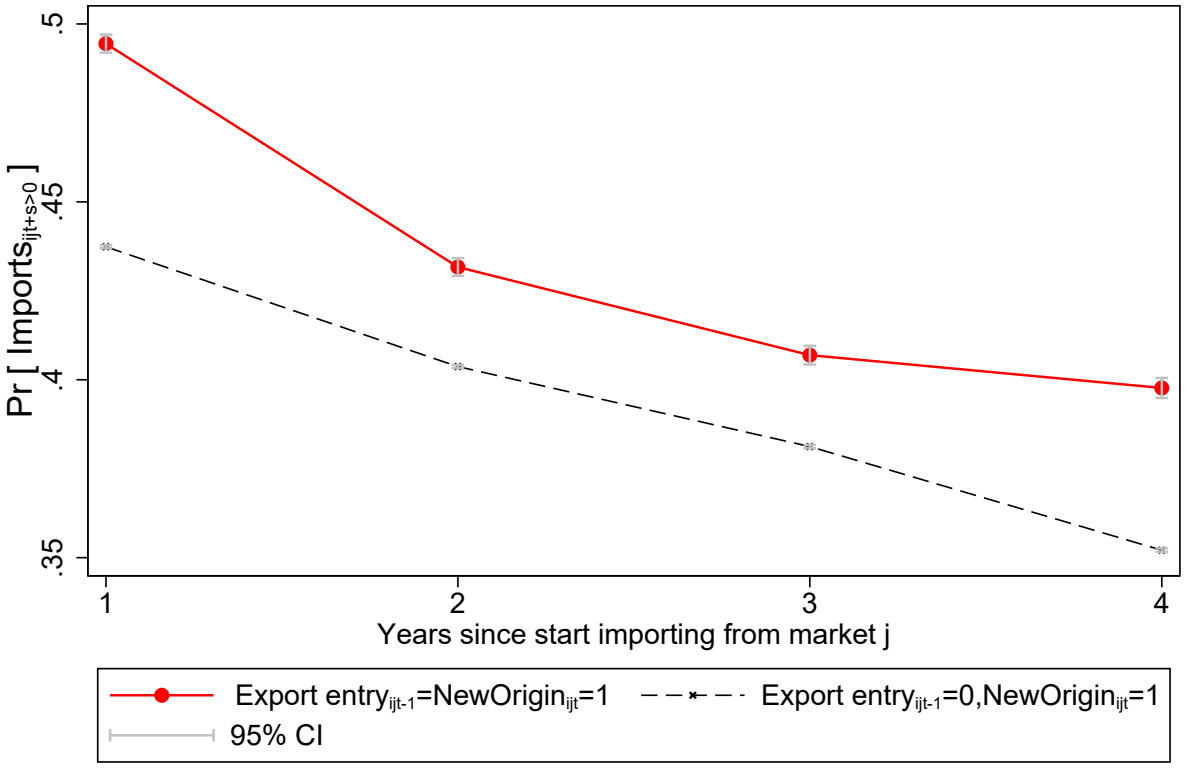
Second, we have shown that export entry provides firms with experience that may help them operate as importers. For example, the experience gain as exporter could allow the firm to resolve part of the uncertainty about suppliers in the foreign market. In this case, as sourcing decisions are made with more accurate information, we expect import relationships generated after export entry to last longer. This would be reflected in higher survival rates.[25] To test this implication, we compare the likelihood of being active in the import market for firms that start importing after export entry, relative to firms that start importing with no previous export experience in the market. Formally,

$$ImportStatus_{ij,t+s} = \beta_1 NewOrigin_{ij,t} + \beta_2 NewOrigin_{ij,t} * ExportEntry_{ij,t-1} + \delta_{ij} + \delta_{jt} + \delta_{it} + \epsilon_{ijt}$$

for $s = \{1, 2, 3, 4\}$, where s denotes years after the initial year of importing from j. We report β_1 and $\beta_1 + \beta_2$ for different values of s in Figure 3. We observe that one year after start sourcing from a market, the probability of being active in the market is 11% higher for firms that started to import after export entry. This initial difference remains stable even four years after import entry. Higher survival rates indicate that importing after exporting generates longer and more stable trading relationships.

[25] For example, Besedeš (2008) shows that duration of relationships increases for more reliable suppliers.

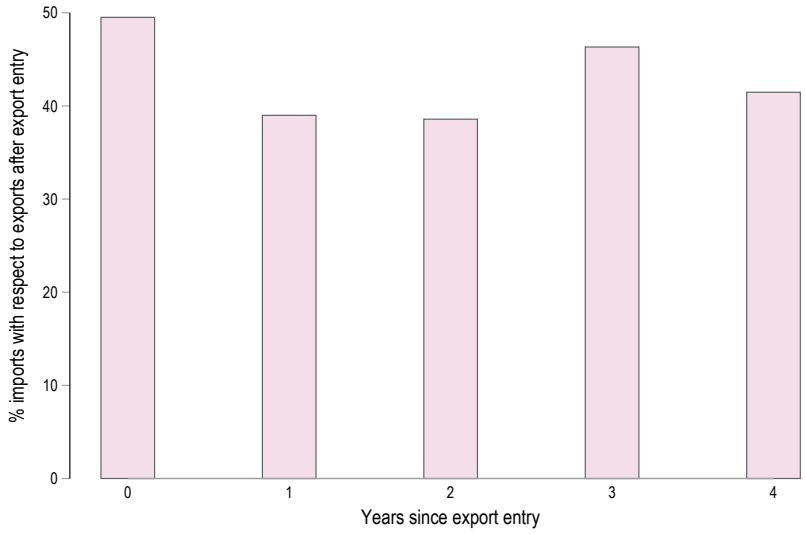
Figure 3: Importers after exporting are more likely to remain active in the import market



Notes: we report estimations of β_1 and $\beta_1 + \beta 2$ for different values of s according to equation 7 including firm-market, market-year and firm-year fixed effects.

Third, importing after exporting has an effect on trade balances. In Figure 4, we focus on firms that start importing after exporting and report the total value of imports from market j as a percentage of total exports to that market at the moment of entry. According to our calculations, one year after reaching a new destination, total imports from market j account for about 50% of exports to market j at entry. As expected, this new flow of imports generated after export entry continues over time. This entails implications for policy. For example, if export promotion policies were motivated by the goal of reducing trade imbalances, our findings warn against the effectiveness of these policies. On the other hand, the fact that export entry generates experience in the foreign market that also facilitates importing activities might serve as a novel rationale for export promotion if firms do not internalise the effect of export experience on import costs.

Figure 4: Average imports as a % of Average Exports at the moment of entry to market j



Sub-sample of firms that start importing after exporting.

Taken together, a substantial part of new exports is translated on new imports from that market within a year. In addition, import relationships that are established after having exported to a market involve relatively unknown and differentiated inputs and are more likely to persist overtime.

8 Conclusion

In this paper, we document a novel fact about the interrelationship between exporting and importing. Exporting to a specific market increases the probability of importing from that market within a year. We develop a framework where firms make decisions on exporting and importing that accounts for different aspects of import behavior and allows us to rationalize our main fact, clarify the channels through which exporting affects importing, and establish qualitative and quantitative implications.

Our paper sheds new light on import behavior that motivates future research and the design of policies. We emphasize the complexity of the importing activities. Importing requires knowledge about available inputs and potential suppliers. This knowledge is not readily available and depends on a firms experience in foreign markets. Our paper shows that acquiring export experience help firms reduce their costs of importing. For example, export experience may generate important information about suppliers in the foreign market, which, in turn, may facilitate the process of importing. We estimate that the import cost savings associated with export entry are, on average, around 50% and are higher in markets beyond the Americas. On this ground, our results encourage future research on the determinants of import costs, the role of informational barriers, and the

policies that may help firms overcome these barriers.

Furthermore, we show that the duration of the import relations for firms that start importing after exporting is longer. This suggests that importing relations that start with better information are more likely to succeed. This fact is important to design policies oriented to provide information about foreign markets to importers. We leave for future research to understand what factors determine the duration of the import relation.

Finally, if access to better quality foreign inputs fosters productivity and product quality, our finding that exporting eases the process of reaching the right suppliers opens a new set of questions related to the effectiveness of export promotion policies.

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A Appendices

A.1 Descriptive statistics

We classify firm-market exports into 4 categories: Continuers, Exiters, Entrants and Re-entrants. Continuers are firms that export to a market in t and t-1. Exiters are firms that export to a market in $t-1$, but not in t. Entrants are firms that export to a market in t, but were not exporting to that market in $t-1$ and in any previous year. Finally, there is a considerable number of re-entrants: firms that exported to a market at $t-2$ or before, did not export in $t-1$ and export again in t. We summarize the number of firm-market combinations for each of these categories in Table A1. We can observe that around 37% of export entries into a market are explained by re-entrants in 2012.

Table A1: Descriptive: Exporters

Year	*Exporters*	*Continuers*	*Exiters*	*Entrants*	*Reentrants*
2002	20027	.	.	.	.
2003	22383	13623	8760	6404	0
2004	24112	15583	7794	6800	735
2005	26620	17460	7700	6652	1460
2006	27841	19137	6792	7483	1912
2007	28872	20133	6310	7708	2429
2008	29098	20782	5529	8090	2787
2009	27391	20013	4526	9085	2852
2010	27315	20018	3975	7373	3322
2011	27016	20129	3619	7186	3268
2012	25174	19095	3185	7921	2894

Exporter count the number of active markets for the firms in year t. Continuers are firm-markets for which the firms exported in $t-1$ and also export in t. Exiters are firm-markets that exported in $t-1$, but not in t. Entrants are the number of markets for which the firms never exported and export in t. Re-entrants are the number of markets for which firms did not export in $t-1$, exported in $t-n$ with $n>1$ and re-enter in t.

A.1.1 Descriptive: variability in the type of importer

Similarly, we summarize the information according to different importer types:

Table A2: Descriptive: Importers

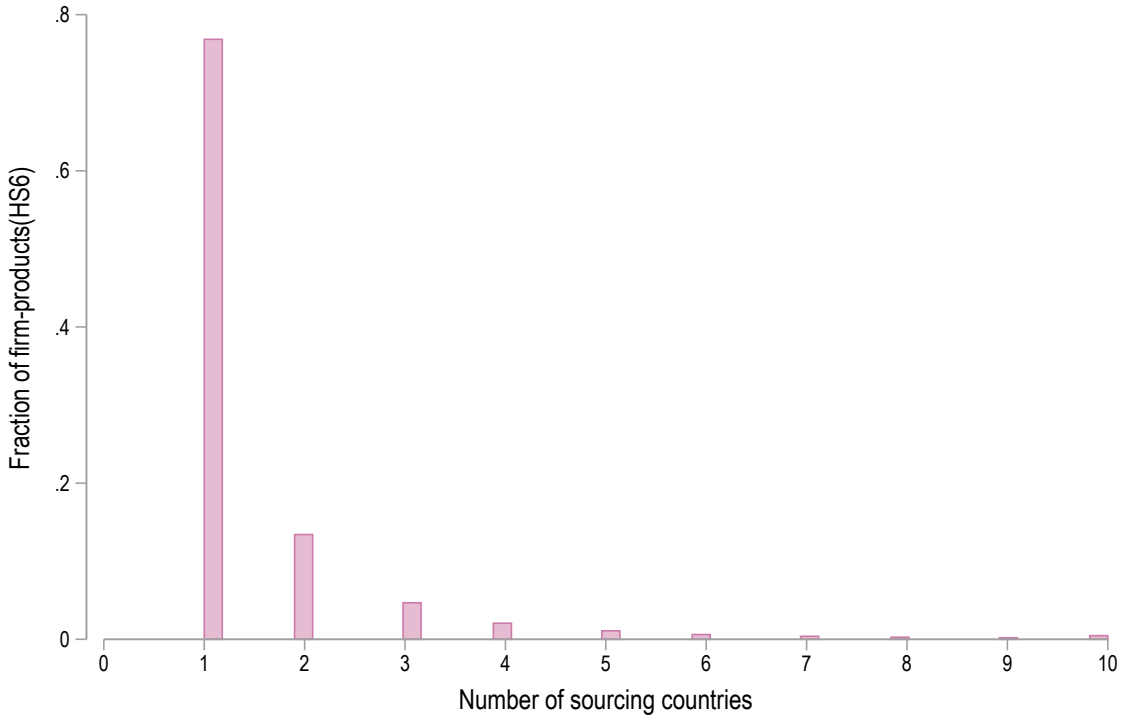
Year	*Importers*	*Continuers*	*Exiters*	*Entrants*
2002	17159	.	.	.
2003	22086	12465	9621	4694
2004	24853	15711	9142	6375
2005	27840	17745	10095	7108
2006	29259	19459	9800	8381
2007	30384	20527	9857	8732
2008	31485	21493	9992	8891
2009	29334	20892	8442	10593
2010	31707	21468	10239	7866
2011	32372	23015	9357	8692
2012	30348	22073	8275	10299

Importers count the number of active markets for the firms in year t. Continuers are firm-markets for which the firms imported in $t-1$ and also import in t. Exiters are firm-markets that imported in $t-1$, but not in t. Entrants represent the number of markets from which the firms never imported and start to import in t.

A.2 Theoretical Framework Appendix

A.2.1 Most of the firms import a given product (hs6 digits) from only one source

Figure A1: Most of the firms import a given product from only one source



A.2.2 Do firms internalize the effect of exporting on importing?

The main prediction of a model in which we let firms anticipate the effect is that the cutoff to start exporting to a market would be lower. Given that exporting has indirect gains through possible import costs savings in the future, firms might find profitable to enter to a market with lower revenues.

To test this, we compare export values when a firm start to export to a market for two types of firms. By comparing these two types of firms, we assess whether firms internalize the effect of exports on the probability of importing. The first group are firms that start exporting to a market from where they haven't imported. The second group are firms that start exporting to a market where they already import. Intuitively, for the first group start exporting to market j increases the probability of importing from there in the future. In contrast, the second group has no indirect gains from exporting. Therefore, if firms anticipate that exporting might lead to importing, we expect the ammount of exports to market j at the moment of entry to be lower for the first group. Results are reported in Table A3. We demeaned the variables by market-year-industry and include

different combinations of fixed effects in order to compare amount of exports to market j at the moment of entry: a) across firms with similar characteristics (column 1); b) within a firm, across markets and years (column 2); and c) within a firm-year, across markets (column 3). Throughout all specifications, we find no conclusive evidence of firms changing their export decisions in order to internalize the effect on the probability of importing in the future.

Table A3: Do firms anticipate the effect of exporting on importing?

	(1)	(2)	(3)	(4)
		$log(Exports)_{ijt-1}$		
$Imported\ Before_{ijt-1}$	-0.113*	-0.125*	-0.094	-0.164
	(0.066)	(0.067)	(0.063)	(0.162)
$log(labor)_{it-1}$		0.168***	-0.107***	
		(0.038)	(0.035)	
$log(Imports)_{it-1}$			-0.003	
			(0.004)	
$log(Exports)_{it-1}$			0.536***	
			(0.014)	
Observations	32,429	32,058	32,058	10,256
R-squared	0.707	0.708	0.737	0.896
Firm-Market FE	yes	yes	yes	yes
Market-Year FE	yes	yes	yes	yes
Firm-Year FE	no	no	no	yes
Conditional $Export\ Entry_{ijt-1}$	yes	yes	yes	yes

A.2.3 Proofs

Proof: proposition 1.1.A Assume a fixed costs draw $\kappa = \{\kappa_d, \kappa_1, ..., \kappa_{j^*}, ..., \kappa_m\}$ such that the firm optimal sourcing strategy (Ω_{-j^*}) does not include market j^*. Also assume that the optimal export strategy does not include j^* ($\Omega^X_{-j^*}$).

By definition, we know that the optimal sourcing strategy (Ω_{-j^*}) yields higher benefits than Ω_{j^*} for any strategy that contains j^* as a sourcing market. This implies:

$$\frac{R(\Omega_{-j^*}, \varphi, \Omega^{X*}_{-j^*})}{\sigma}\left\{\left[\frac{c(\Omega_{-j*})}{c(\Omega_{j^*})}\right]^{\sigma-1} - 1\right\} < \sum_{(j,k)\in\Omega_{j^*}} \kappa_{jk} g(h_{ij}) - \sum_{(j,k)\in\Omega_{-j^*}} \kappa_{jk} g(h_{ij})$$

Now assume a shock to μ_{ij} that induces export entry to j. If $g'(h_{ij^*}) < 0$, then the right-hand side becomes smaller for every sourcing strategy Ω that includes j^*. Therefore, it is now more likely that the firm chooses a sourcing strategy that includes source j^*. ■

Proof: proposition 1.1.B Assume a fixed costs draw $\kappa = \{\kappa_d, \kappa_1, ..., \kappa_{j^*}, ..., \kappa_m\}$ such that the firm optimal sourcing strategy (Ω_{-j^*}) does not include market j^*. Also assume that the optimal export strategy does not include j^* $(\Omega^X_{-j^*})$.

Now assume export entry into j; such that fixed costs of the firm are now given by $\hat{F} = \{\kappa_d, \kappa_1, ..., \kappa_j, g(h_{ij^*} + \Delta h_{ij^*})\kappa_{j^*}, ..., g(h_{im}\kappa_m\}$. Given $g'(.) < 0$, fixed costs of importing from j^* are now lower, while fixed costs of importing from other markets remain unchanged. Now consider a different optimal sourcing strategy that still does not include j^*: Ω'_{-j^*}. This implies that for old fixed costs we have:

$$\frac{R(\Omega'_{-j^*}, \varphi, \Omega^{X*})}{\sigma}\left\{\left[\frac{c(\Omega'_{-j^*})}{c(\Omega_{-j^*})}\right]^{\sigma-1} - 1\right\} \leq \sum_{(j,k)\in\Omega'_{-j}} g(h_{ij})\kappa_{jk} - \sum_{(j,k)\in\Omega_{-j^*}} g(h_{ij})\kappa_{jk},$$

and for new fixed costs we have,

$$\frac{R(\Omega'_{-j^*}, \varphi, \Omega^{X*})}{\sigma}\left\{\left[\frac{c(\Omega'_{-j^*})}{c(\Omega_{-j^*})}\right]^{\sigma-1} - 1\right\} \geq \sum_{(j,k)\in\Omega'_{-j}} g(h_{ij})\kappa_{jk} - \sum_{(j,k)\in\Omega_{-j^*}} g(h_{ij})\kappa_{jk}.$$

Since $j^* \notin \Omega_{-j^*}$ and $j^* \notin \Omega'_{-j^*}$, and since there is a unique profit maximizing strategy, the two inequalities above holds only if $\Omega_{-j^*} = \Omega'_{-j^*}$. Then, if the firm does not import from j^* after export entry, it does not change its sourcing strategy at all. ■

Proof: Proposition 1.2.A Assume two different draws of productivity $\varphi\prime > \varphi$. Consider two sourcing strategies Ω and $\hat{\Omega}$. Assume that Ω is optimal for a firm with productivity φ. Then, the extensive margin condition (5) implies:

$$\varphi_i^{(\sigma-1)} B_i(\Omega^{X*})\left\{\left[\frac{c(\Omega)}{c(\hat{\Omega})}\right]^{\sigma-1} - 1\right\} < \sum_{(j,k)\in\hat{\Omega}} g(h_{ij})\kappa_{jk} - \sum_{(j,k)\in\Omega} g(h_{ij})\kappa_{jk}$$

Now Consider a shock that increases the productivity from φ to $\varphi\prime$. In order to prove the proposition, we will proceed in two steps. First, we will show that the cost function is decreasing in productivity. Second, we will show that productivity directly increase the LHS of equation above.

Step 1: Assume that $c(\hat{\Omega}) > c(\Omega)$. From equation above, we can see that, all else equal, the LHS becomes decreasing in productivity, since $\left\{\left[\frac{c(\Omega)}{c(\hat{\Omega})}\right]^{\sigma-1} - 1\right\} < 0$. Therefore, if a sourcing

strategy $\hat{\Omega}$ has higher marginal costs and is not optimal for φ, then it is not optimal for higher productivity φ' either.

Step 2: it is straight-forward to see that there is a direct positive effect on the LHS from higher productivity.

Step 3: Therefore, higher productivity implies higher LHS directly and even higher LHS through changes in the sourcing strategy towards a lower cost function. Hence, higher productivity can induce the firm to select a new sourcing strategy $\hat{\Omega}$, increasing the probability of observing new imports from any different markets.

Note that it is straight-forward to show that the response of a firm to a any scale shock ($B_i(.)$) is qualitatively equivalent to the response of a firm to a productivity shock. ■

Proof: proposition 2.A Consider a firm with productivity φ and a vector of fixed costs $\kappa = \left\{\kappa_d, g(h_{ij'})\kappa_{j'}, ..., g(h_{im})\kappa_m\right\}$ that optimally chooses sourcing strategy Ω. It can be shown that firm's optimal output is given by: $y = c(\Omega)^{-\sigma}\varphi^{\sigma}B_i(\Omega^X)^{\frac{\sigma-1}{\sigma}}$. Plugging y into intensive margin equation (3), the total amount of imports from market j' is then given by:

$$\sum_{j'k\in\Omega} p_{j'k}z_{j'k} = \frac{\varphi^{\sigma-1}}{c(\Omega)^{\sigma-\theta}} \sum_{j'k\in\Omega} \left(\frac{\eta_{j'k}}{p_{j'k}}\right)^{\theta-1} B_i(\Omega^X)\frac{\sigma-1}{\sigma}$$

.

Now assume export entry to j such that $\hat{F_i^M} = \{\kappa_d, g(h_{ij} + \Delta h_{ij})\hat{\kappa_j}, ..., g(h_{im})\kappa_m\}$. Note that $g'(h_{ij}) < 0 \Rightarrow g(h_{ij} + \Delta h_{ij})\kappa_j < g(h_{ij})\kappa_j$. Assume that the fixed costs of importing from other markets remain unchanged.

> It is straight-forward to show that, holding constant productivity, scale and the sourcing strategy (Ω), the equation above remains unchanged with the new configuration of fixed costs. Therefore, if export entry is associated with fixed costs savings, the amounts of imports of active sources should be unaffected if the firm does not start importing from market j after export entry to j.

■

Proof: proposition 2.B Consider a firm with productivity φ and a vector of fixed costs $\kappa = \left\{\kappa_d, g(h_{ij'})\kappa_{j'}, ..., g(h_{im})\kappa_m\right\}$ that optimally chooses sourcing strategy Ω. It can be shown that firm's optimal output is given by: $y = c(\Omega)^{-\sigma}\varphi^{\sigma}B_i(\Omega^X)^{\frac{\sigma-1}{\sigma}}$. Plugging y into intensive margin equation 3, the total amount of imports from market j' is then given by:

$$\sum_{j'k\in\Omega} p_{j'k} z_{j'k} = \frac{\varphi^{\sigma-1}}{c(\Omega)^{\sigma-\theta}} \sum_{j'k\in\Omega} \left(\frac{\eta_{j'k}}{p_{j'k}}\right)^{\theta-1} B_i(\Omega^X) \frac{\sigma-1}{\sigma}$$

.

Holding constant the sourcing strategy (Ω), provided $\sigma > 1$, it is straightforward to derive from equation above that:

$$\frac{\partial log\left(\sum_{j'k\in\Omega} p_{j'k} z_{j'k}\right)}{\partial log \varphi} = \sigma - 1 > 0, \qquad \forall (j', k) \in \Omega.$$

■

A.3 Appendix to Empirical Analysis 3

A.3.1 Other robustness checks

In Table A4 we check the robustness of our results to other proxies for productivity and to the inclusion of sector-market-year fixed effects. In columns (2) we include the growth rate of total employment, total exports, and total imports of the firm. In column (3), we include levels and growth rate of the variables. Column (4) adds firm-year fixed effects. Column (5) adds sector-market-year fixed effects to our preferred specification. These fixed effects also remove shocks specific to a sector-market in a given year such as a country demand increasing in a particular sector. We observe that results remain qualitatively unchanged. Furthermore, the coefficient remains remarkably stable throughout the specifications.

Table A4: Robustness check: other proxies for productivity and sector-market trends

	(1)	(2)	(3)	(4)	(5)
	$NewOrigin_{ijt}$				
$Export\ Entry_{ijt-1}$	0.008***	0.009***	0.008***	0.007***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
$log(Labor)_{it}$	0.003***		0.003***		
	(0.000)		(0.000)		
$log(Exports)_{it}$	0.000***		0.000***		
	(0.000)		(0.000)		
$log(Imports)_{it}$	0.002***		0.002***		
	(0.000)		(0.000)		
$\Delta log(Imports)_{it}$		0.001***	-0.000***		
		(0.000)	(0.000)		
$\Delta log(Exports)_{it}$		0.000***	-0.000**		
		(0.000)	(0.000)		
$\Delta log(Labor)_{it}$		0.002***	0.000		
		(0.000)	(0.000)		
Observations	7,097,564	7,000,700	7,000,700	7,097,559	7,067,900
R-squared	0.326	0.324	0.326	0.350	0.369
Firm-Market FE	yes	yes	yes	yes	yes
Market-Year FE	yes	yes	yes	yes	yes
Firm-Year FE	no	no	no	yes	yes
Market-Year-Sector FE	yes	yes	yes	yes	yes
Mean dep variable	0.0110	0.0110	0.0110	0.0110	0.0110
N Clusters	18975	18809	18809	18975	18891

Standard errors in parenthesis are clustered at the firm level. ***,** and * indicates significance at the level 1%, 5%, and 10% respectively.

In table A5 we check the robustness of our results once we condition to the sub-sample of firms that were already exporters in 2002 (to at least one destination). Again, the effect remains qualitatively unchanged.

Table A5: Probability of importing from a new destination: sub-sample of already exporters in 2002

	(1) $NewOrigin_{ijt}$	(2) $NewOrigin_{ijt}$	(3) $NewOrigin_{ijt}$	(4) $NewOrigin_{ijt}$
$Export\ Entry_{ijt-1}$	0.008***	0.008***	0.008***	0.007***
	(0.001)	(0.001)	(0.001)	(0.001)
$log(Exports)_{it}$	0.000***		0.000***	
	(0.000)		(0.000)	
$log(Imports)_{it}$	0.002***		0.002***	
	(0.000)		(0.000)	
$log(Labor)_{it}$		0.008***	0.005***	
		(0.000)	(0.000)	
Observations	2,214,724	2,214,724	2,214,724	2,214,719
R-squared	0.336	0.334	0.336	0.364
Firm FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Market FE	yes	yes	yes	yes
Firm-Market FE	yes	yes	yes	yes
Market-Year FE	yes	yes	yes	yes
Firm-Year FE	no	no	no	yes
Mean dep variable	0.0110	0.0110	0.0110	0.0110
N Clusters	5539	5539	5539	5539

Robust standard errors in parentheses

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

Standard errors in parenthesis are clustered at the firm level. ***,** and * indicates significance at the level 1%, 5%, and 10% respectively.

A.3.2 Does new imports trigger export entry within the following year?

If the observed relationship between export entry and new sourcing is driven by common operational costs, there is no reason to think that there is a particular order in this sequence of activities. If a firm starts sourcing from j the cost of exporting there fall and we should observe exporting after importing. If the driver was learning about suppliers, it is hard to establish ex-ante whether importing inputs should reveal relevant information about exporting to the new source country. Our theory is silent about what to expect regarding how importing to a market affect export entry to that market in the following year. Therefore, this is an empirical question that we test

for completeness. We estimate the probability of a firm starting to export to a new destination ($ExportEntry_{ij,t}$) on a indicator variable $NewOrigin_{ij,t-1}$ that takes the value of 1 if the firm started to source from market j in the previous year, and our battery of fixed effects. As reported in Table A6, the effect of sourcing from a new market on the probability of exporting is about one fourth of importing after exporting. In addition, in our preferred specifications in column (5), after including firm-year fixed effects, the coefficient indicates that the relationship es near zero.

Table A6: Exporting does not follow importing

	(1)	(2)	(3)	(4)
		$ExportEntry_{ijt}$		
$New\ Origin_{ijt-1}$	0.003***	0.003***	0.002**	0.000
	(0.001)	(0.001)	(0.001)	(0.001)
$log(Exports)_{it}$	-0.000***		-0.000***	
	(0.000)		(0.000)	
$log(Imports)_{it}$	0.000***		0.000***	
	(0.000)		(0.000)	
$log(Labor)_{it}$		0.002***	0.002***	
		(0.000)	(0.000)	
Observations	6,022,621	6,022,621	6,022,621	6,022,595
R-squared	0.278	0.278	0.278	0.303
Firm FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Market FE	yes	yes	yes	yes
Firm-Market FE	yes	yes	yes	yes
Market-Year FE	yes	yes	yes	yes
Firm-Year FE	no	no	no	yes
N Clusters	18612	18612	18612	18611

Standard errors in parenthesis are clustered at the firm level. ***,** and * indicates significance at the level 1%, 5% and 10% respectively.

A.4 Appendix to Section 6

Table A7: Difference in revenues at entry to import market

	(1)
	$\Delta Revenues_{it}$
$ExportEntry_{ijt-1}$	-0.136**
	(0.137)
Observations	14,773
R-squared	0.844
Firm FE	yes
Year-Market-Sector FE	yes

Estimations conditional on $NewOrigin_{ijt} = 1$. Clustered standard errors at the firm level in parentheses
*** p<0.01, ** p<0.05, * p<0.1