Learning to Use Trade Agreements*

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August 30, 2021

Abstract

Free trade or preferential trade areas (PTAs) allow importers who belong to the area to export to each other while paying zero or preferential tariffs as long as Rules of Origin (ROOs) are met. Meeting them is costly not only in terms of production costs, but also in terms of documentation costs. We ask if these fixed costs of documentation change over time with the experience of the firm in obtaining preferential tariffs. We explore this using a unique importer-exporter matched transaction level customs data set on a group of Latin American countries. Our estimating equation is model-based and shows that these fixed costs depend on the history of preference utilization. Most of the effect comes from experience in the same product and same partner, with some spillover to other partners buying the same product. There is little learning from experience in other products and other partners. Learning is also larger for products newly brought into a trade agreement. As facilitating preference use today also makes it easier to use preferences in the future, interventions early on in the life of the FTA to reduce such costs are called for.

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1 Introduction

Recent decades have seen a proliferation of free trade agreements (FTAs).[1] Rules of origin (ROOs) are used to distinguish between products which are eligible for preferential treatment (those originating in the member countries) and those from third countries. Meeting these rules of origin is costly as evidenced by preference utilization rates that are often far below unity.[2] Certainly, marginal costs could rise as firms change their supply chains or production processes so as to meet ROOs. In addition, there are also fixed cost of documentation for each transaction.[3] As explained in more detail below, documentation must be provided that shows that the shipment complies with ROOs. Do these fixed costs of documentation change over time with the experience of the exporting firm in obtaining preferential tariffs? What type of experience, if any, matters?[4] In this paper, we look at data at transaction-level on exports of Argentina and Peru to Colombia to understand this question. We make the case that the probability of using preferences decreases in the fixed costs of using preferences. Fixed costs of using preferences are associated with the documentation costs, which should fall with experience if there is learning. In this case, greater experience of various kinds should increase the probability of using preferences.[5]

Understanding the nature of these fixed costs of ROOs is important from the theoretical, empirical, and policy perspectives. To our knowledge, ours is the first paper to document what these fixed cost depend on by using data on preference usage as a function of history. On the theory side, our empirical results point to the importance of using a dynamic model. Costs that fall with

[1] From 1990 to 2019 they rose from 76 to 443 in number. See Figure 1A in Dinh et al. (2019).

[2] See for example UNCTAD (2018), which shows that utilization rates of EU exporters to countries with FTAs with the EU are only 67% between 2009 to 2013. For an overview of ROOs, see Cornejo and Harris (2007).

[3] These documentation costs include information costs (i.e., firms do not know what to do) as well as pure documentation costs of gathering information needed to fill the form and the sheer difficulty of filling the form.

[4] Since providing documentation regarding origin has to do with production, it falls to the exporter to do so. As a result we do not expect the importer's experience to matter.

[5] We do not differentiate between fixed costs and sunk costs of using preferences. If sunk costs are incurred only when preferences are used for the first time, we should observe an increase in the probability of using preferences only after the first experience. If the probability of using preferences keeps increasing as more experience is gained, as our estimates actually reveal, we argue that fixed costs exist and decrease over experience.

experience make the problem inherently dynamic suggesting that a dynamic setting be employed for modelling, estimation and policy purposes. On the empirical side, such dynamics costs imply a slow take-up of preferences so that the full effects of preferential trade agreements (PTAs) may take some time to materialize. On the policy side, the existence of learning is important because policies which encourage preference use early on can have a huge impact in terms of the efficacy of a free trade area. Of course, to quantify such impacts we need to estimate a full fledged dynamic model. We see this paper as the first step (in a larger research program) that pins down the shape of these costs by looking at their reflection in terms of the choices made by firms at the transaction level, after accounting for their experience history in a flexible manner.

There is a large literature on ROOs, both on the theory and empirical side. Krishna and Krueger (1995) is an early paper that shows how ROOs can provide hidden protection to input suppliers within the FTA. Also see Krishna (2006) for a slightly dated survey of the literature. Cadot et al. (2006) focuses on ROOs and has a number of case studies as well as innovations in terms of measuring the restrictiveness of ROOs. It is standard in the literature to assume that meeting ROOs will raise marginal costs of production. The logic being that forcing a firm to do produce or source in a way it would ordinarily not do so as to get preferences must raise marginal costs. See for example Anson et al. (2005) and Melitz et al. (2021).

Cherkashin et al. (2015) set up and estimate a heterogeneous firm model with a view to evaluating the role of ROOs in Bangladeshi exports in Apparel. They find large predicted effects on Bangladeshi exports of removing or liberalizing ROOs in apparel. More recently, Conconi et al. (2018) look at NAFTA and show that the change in sourcing decisions so as to use NAFTA preferences led to increases in the marginal cost in production.

Anson et al. (2005) argue that ROOs limit the use of preferential market access considerably. They estimate that in NAFTA, compliance costs are on average 6% in ad-valorem terms while administrative costs amount to 47% of the preference margin. Pelkmans-Balaoing and Manchin (2007) show that for the ASEAN FTA, preferential tariffs increase intra-regional imports only

when preference margins are high (over 25 percentage points).[6] This is consistent with high costs of using preferences.

It is also clear that there are also fixed costs of meeting ROOs. These come from having to deal with the verification procedures in effect for showing ROOs are met, like keeping records that would not otherwise have been kept and filling out the required documents.[7] Demidova et al. (2012) show that the patterns in the use of preferences among Bangladeshi exporters are consistent with firms facing both fixed and marginal costs of meeting ROOs.

What are some examples of such costs? In Vietnam, getting origin for the ASEAN Free Trade Area requires a form (form D) be filled out and the products be inspected. Kirk (2007) (page 12, box 1) reproduced here, outlines the steps needed.

> "In Vietnam, the Export-Import Managing Department of the Ministry of Trade is the issuing institution for Form D. An application is submitted to an inspection company authorized by the Ministry of Science to conduct a cost screening to ensure local content of 40 percent or more. VINACONTROL remains the largest inspection firm, but the number of authorized companies has increased over the past few years. This provides for competition. Screening generally takes between one-half to a full day. The applications required for each shipment are submitted to a branch office of the Export-Import Managing Department (9 Branches nationwide) and are accompanied by a certifying letter from the inspection company, a commercial invoice, a Customs declaration form, a bill of lading, and a copy of the exporter's commercial license. Form D is issued within 2 hours."

[6] They define preference margin as MFN tariff minus the preferential tariff divided by the MFN tariff. We use the term just for the difference.

[7] See section 2.1.1 for details on ROOs relevant for Argentinean exports to Colombia. Note that administrative costs do vary across FTAs. For example, the Pan-European scheme requires both self and public certification of rules of origin while self certification is all that is needed in NAFTA and this does not have to be repeated each time. Cadot et al. (2006) estimate that the administrative costs of the Pan-European preference scheme is around 6.8% of the value of trade compared to 1.9% for NAFTA. For details on the forms taken by these ROOs and the procedures involved see Dinh et al. (2019).

A quote from an automobile producer in Thailand gives more details about the costs involved:

> "The preparation of documents for the initial cost screening takes two months and the screening procedures themselves about one month. There are 1,000 to 2,000 parts in a completed vehicle, and we must collect documentation (invoices, Form Ds, etc.) certifying local procurement from each supplier"[8]

The current project infers the shape of costs of meeting ROOs on the basis of how an exporting firm's history in using preferences affects the likelihood of the firm using preferences in the current transaction. In other words, we infer the shape of these costs based on the observed behavior of exporters, conditional on their experience in using preferences. If firms are more likely to use preferences with a particular kind of experience, we infer that such experience must reduce the cost of using ROOs. We ask whether these costs depend only on the total experience of the firm in obtaining preferential tariffs or whether the impact differs with the form of the experience. Is experience in the same product and with the same importer (i.e., importing firm) more valuable than other kinds of experience? Does experience with other importers/products spillover? For example, costs of meeting or documenting ROOs for a particular product could fall once a particular exporter has successfully overcome the hurdles imposed by ROOs. In this case, the experience of the exporter with one importer and product would spill over to other importers of the same product. If some of this experience can be useful with other products, it may even spillover to other products with the same importer or even to other products and other importers. In other words, the nature of these costs casts its shadow on the dynamic patterns in preference usage across suppliers and products. Consequently, the patterns in preference usage are informative about the nature of these costs.

We estimate the probability of using preferences on a particular transaction with a particular importer while controlling for the history of preference use in the same product with the same

[8] Kirk (2007), page 13.

importer, in other products with the same importer, in the same product with other importers and in different products with different importers. We show that spillovers across products and /or importers are not evident, though spillovers within the same product, even with different importers, are present. In other words, experience in obtaining preferences in a particular product does not seem to significantly improve the probability of obtaining preferences in another product, though experience in obtaining preference in a product with a given importer makes it much more likely preferences will be obtained for a transaction with the same or another importer in the same product.

This suggests that costs of meeting preferences should have a product specific component. This is what we could expect given that the ROOs and the required documentation are the same for given product-country pairs as the burden of providing the documentation is on the exporter. There may also be a product importer specific component. This could arise because of buyer-specific customization of the product so that input-suppliers could be buyer specific.

We focus on the exports of Argentina and Peru to Colombia. We choose these countries both for data availability reasons and because Peru and Argentina have different histories in terms of FTAs with Colombia. We have importer exporter customs data (mirrored at both the importing and exporting country) at the transaction level for these countries. This lets us identify the history of preference use for each firm at any point of time.[9] Since the ROOs are bilaterally negotiated, they can differ for the same product across destination countries. As a result, experience in meeting ROOs to one destination need not spillover to another destination. For this reason, we construct our experience variables country by country.

The FTA with Peru is long standing while the one with Argentina is relatively new. Moreover, there is a natural experiment for Argentina as new products are covered after a given point of time. Consistently, we expect and find less learning for Peru and, as there is no previous experience in new goods, we expect and find swifter learning for these products in the case of Argentina.

[9] See the data section for details.

The choice of using preferences is a tradeoff between the costs and benefits of using ROOs. One element of these benefits is the lower tariffs from using preferences, i.e., the difference in the MFN tariff and the preferential tariff times the value of the transaction, what we call "savings". However, savings can be an endogenous variable. Using exchange rate as an instrument, and accounting for some measurement issues, we show that the patterns of learning are unchanged.

We proceed as follows. In Section 2 we first describe the institutional background for the Latin American Countries in the data set. We then describe the data used, present some summary statistics, and shows the data patterns that motivate our estimation strategy. Section 3 lays out a simple model of the choice of using preferences that guides our estimating equation. In Section 4, we show that learning is indeed increasing with overall experience and differs with kinds of experience.[10] In Section 5 we account for possible endogeneity of the saving variable. Section 6 concludes.

2 Institutional Background and Data Patterns

Since we focus on imports of Colombia from Argentina and Peru, we provide a short history of the relevant trade agreements between these countries. This is important because the behavior in terms of preference use comes from both changes in these trade policies and learning by exporters. The details of these treaties can be found in Appendix A.

2.1 Institutional Background

There is a long history of preferential trade agreements in Latin America starting in the late 1950s that involved Colombia, Peru and Argentina. These agreements were deepened over time. By 2000, when our data begins, the situation vis a vis Colombia and Argentina and Colombia and Peru was as follows. Peru and Colombia had a long standing history of preferential trade as they

[10] Our results are robust to the inclusion of fixed effects and across alternative functional form specifications.

were both members of the Andean Pact since the late 1960s and its successor in 1996, the Andean community. Though the aim was to create a customs union, i.e., bring tariffs down to zero and set a common external tariff for members, this goal was not achieved. Nevertheless, the median tariff imposed by Colombia on exports from Peru decreased from 46 percent in 1985, to 10 percent in 1995, and was close to zero by 2000.

Prior to 2000, the PTA with Argentina (Economic Complementary Agreement of Partial Scope 11 — AAP.CE 11 for its name in Spanish) was quite shallow and tariffs were reduced only for a limited number of products. In 2000, (under the AAP.CE 48) Colombia granted fixed preferences on around 1,250 products from Argentina (i.e., less than one quarter of the total number of tariff lines), with the preference margins (defined as the MFN tariff less the preferential one divided by the MFN tariff) averaging 40 percent. In 2005, (under AAP.CE 59) further cuts to tariffs were made and tariffs were reduced further on a group of product so that tariffs reached an average of 10 percent in 2005.

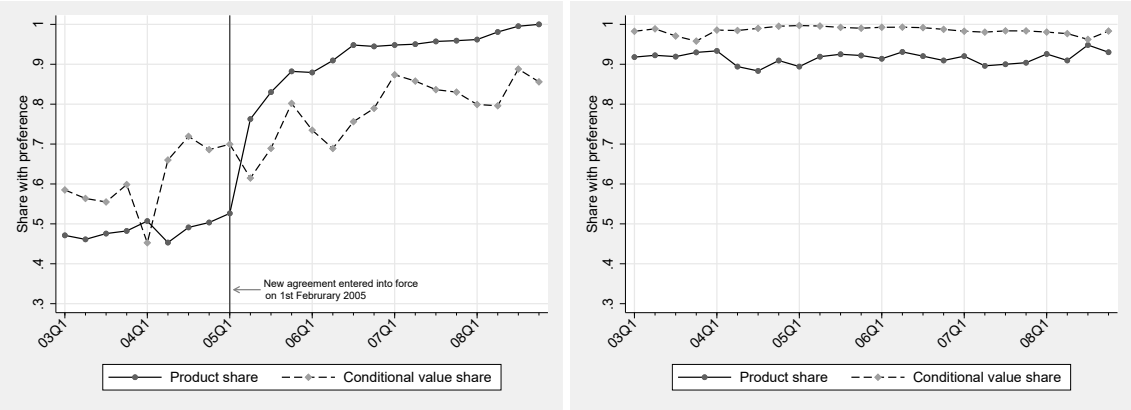
Thus, the trade agreements between Argentina and Colombia were shallow to begin with, but were deepened in 2005. The average preference margin (defined as the value share weighted average of the difference in the MFN and preferential tariff) was 4.7% for Argentina with a bump up after 2005. As a result, the share of products with preferences as well as the value share of transactions using preferences, conditional on the product having preferences, rose after 2005 as depicted in Figure 1.[11] There is a sharp increase in the share of products with preferences in 2005Q2 and a continuing increase until 2006Q3 as products were phased in. Notice that the conditional value share initially falls, which is consistent with exporters being slow to begin using preferences. However it soon starts to rise, which would be expected if firms were learning to use preferences.

In contrast, the PTAs with Peru are long-standing and deep. The average preference margin is

[11] The figures cover the period 2003-2008 as 1998 to 2002 was a period of considerable turmoil in Argentina which adds noise to this figure.

14.4% for Peru and does not change much over time. The share of products covered by preferences is above 90% and value share conditional on having preferences is even higher. These shares are also very stable over time.

Figure 1: Preference utilization over time



(a) Argentina (b) Peru

Note: Product share is the simple average of the share of products covered by preferences. Conditional value share is the simple average of the value share of transactions using preferences, conditional on the product having preferences.

2.1.1 Obtaining Preferences for an Argentinean Exporter under AAP.CE 59

How hard is obtaining the certificate of origin? The certificate of origin, which is the document that certifies that the goods meet the rules of origin established in the agreement, must be issued by the designated responsible authorities (or delegated entities) in the exporting country according to a pre-established template. Specifically, it must include the name and the signature of the authorized official and the stamp of the certifying entity, a description of the good that perfectly matches those of the relevant tariff line code and the commercial bill, be complete, and be neither damaged nor amended.

The commercial bill must be issued by the exporting firm in the origin country of the goods and a sworn declaration signed by the producer when this is also the exporter and by both, producer and exporter, when they are not the same. Firms must report a large amount of information including: (1) name of the producer (and exporter when they are not the same) and the firm's legal repre-

sentative; (2) address as registered with the tax agency; (3) description and tariff line code of the good to be exported; (4) FOB value; (5) information on the value and the tariff line code of each input according to whether it originates in (i) the exporting member country; (ii) other member countries; and (iii) the non-member countries; and (6) a description of the production process.

Their investigative procedures for checking on the veracity of documentation are laid out in article 20 of the document available at SICE webcite.[12] As is evident from this document, suspicious documentation may be investigated and investigation can be very expensive for exporters.

2.2 Data

The data used here is part of a set of administrative data at the Inter American Development Bank (IDB). It consists of three main databases. First, we have highly disaggregated import data for Colombia from the National Tax Agency (Dirección de Impuestos y Aduanas Nacionales -DIAN). These data are reported at the transaction-level and cover all transactions entering Colombia over the period 2000-2011. Specifically, each record includes the importing firm's tax ID, the origin country, the product code (10-digit HS), the foreign seller, the import value in US dollars, the quantity (weight) in kilograms, and the tariff actually paid.

Second, we also have highly disaggregated export data for Argentine and Peru over 2000-2008 and 2000-2011, respectively, from their respective customs agencies (Administración Federal de Ingresos Públicos–AFIP and Superintendencia Nacional de Administración Tributaria-SUNAT). In the export data, each record includes the exporting firm's tax ID and name, the destination country, the product code (10-digit HS), the export value in US dollars, and the quantity (weight) in kilograms. As a result, we are able to match buyers and sellers using the name of the selling companies reported both in the import and export databases. Moreover, as we have data from both the importer and exporter side, we are able to use the two sides to cross check it. This gives us a much more reliable set of data.

[12] `http://www.sice.oas.org/trade/mrcsrac/Anexos/AnexoIV_s.asp`

Third, our data on Colombian imports includes time-specific, product-level MFN tariffs (inferred from tariffs on countries without preferential trade agreements with Colombia) and preference margins applied (inferred from the difference in MFN tariffs and tariff paid). We identify that preferences are used whenever the tariff paid is below the MFN one. In our data we also have information on the value and quantity. The merging of these different datasets is challenging and details of the data cleaning exercise can be found in Appendix B.

Data from the importer side (Colombian import data) may not have the supplier's name, but it does have the buyer's name. By matching the export data from Argentine and Peru (which has information on the supplier side) to the import data from Colombia, we are able to obtain the suppliers name as well for each transaction.

A pattern clearly evident in the data is that preference use becomes more likely when the transaction value rises. This is depicted in Figure 3 for Argentina and Peru separately. The curves depict preference utilization as a function of transaction size. There is a distinct upward slope. This pattern suggests that there are some fixed costs per transaction that must be paid. As discussed above, these could be documentation costs since they have to be filled in for each transaction. The curves are drawn for different levels of experience. It is clear that greater experience raises the likelihood of using preferences for all transaction value levels, conditional on there being preferences that could be used.

Figure 4 looks at the preference use as a function of experience, but distinguishes between the kinds of experience. Note that preference use when total experience of the exporter to Colombia (across all products and importers) is considered is substantially lower than when experience in the same product, conditional on the exporter having no experience in using preferences in other products, is considered.[13] The third curve depicts preference use as a function of experience of the exporter with a given importer and product, conditional on having no experience of preference use in other importer product combinations. This curve is close to the one for a given product.

[13]Note that here experience of the exporter could come from many importers in the given product.

This suggests that experience is likely to be product specific rather than importer product specific. However, to the extent that firms included in the importer-product definition of experience differ from those in the product definition, this may give a biased view of the importance of these two kinds of experience. These kinds of issues are exactly why we use a regression approach below.

Table 1: Summary Statistics: Argentina

		Percentiles								
	Variable	10	20	30	40	50	60	70	80	90
	Utilization rate by product	0.25	0.41	0.50	0.64	0.75	0.90	1.00	1.00	1.00
	Value of transaction	446	870	1558	2743	4511	7255	11400	18973	35550
per Exporter	Utilization rate	0.00	0.00	0.33	0.50	0.73	0.88	1.00	1.00	1.00
	#Products	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	4.0
	#Products per year	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	3.0
	#Importers	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	3.0
	#Importers per year	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5
	#Importers per product	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
	#Importers per product-year	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.3
	#Transactions	1.0	1.0	1.0	1.0	2.0	3.0	5.0	9.0	21.0
	#Transactions per year	1.0	1.0	1.0	1.0	1.5	2.0	2.3	3.5	6.0
	#Transactions per product	1.0	1.0	1.0	1.0	1.0	2.0	3.0	4.0	10.0
	#Transactions per product-year	1.0	1.0	1.0	1.0	1.0	1.0	1.9	2.0	3.5
	Value of transaction	627	1233	2121	3400	5040	7798	11466	17698	31755
	Age distribution in 2008	0	0	0	1	1	2	3	4	6
per Importer	Utilization rate	0.00	0.00	0.00	0.50	0.75	1.00	1.00	1.00	1.00
	#Products	1.0	1.0	1.0	1.0	1.0	1.0	2.0	3.0	5.0
	#Products per year	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	4.0
	#Exporters	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	3.0
	#Exporters per year	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2	1.7
	#Exporters per product	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
	#Importers per product-year	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	#Transactions	1.0	1.0	1.0	1.0	2.0	3.0	5.0	9.0	21.0
	#Transactions per year	1.0	1.0	1.0	1.0	1.3	2.0	2.3	3.5	6.0
	#Transactions per product	1.0	1.0	1.0	1.0	1.0	2.0	2.0	4.0	7.0
	#Transactions per product-year	1.0	1.0	1.0	1.0	1.0	1.0	1.5	2.0	3.0
	Value of transaction	625	1200	2000	3116	4600	6900	10315	16367	26880
	Age distribution in 2008	0	0	2	3	5	7	7	8	8

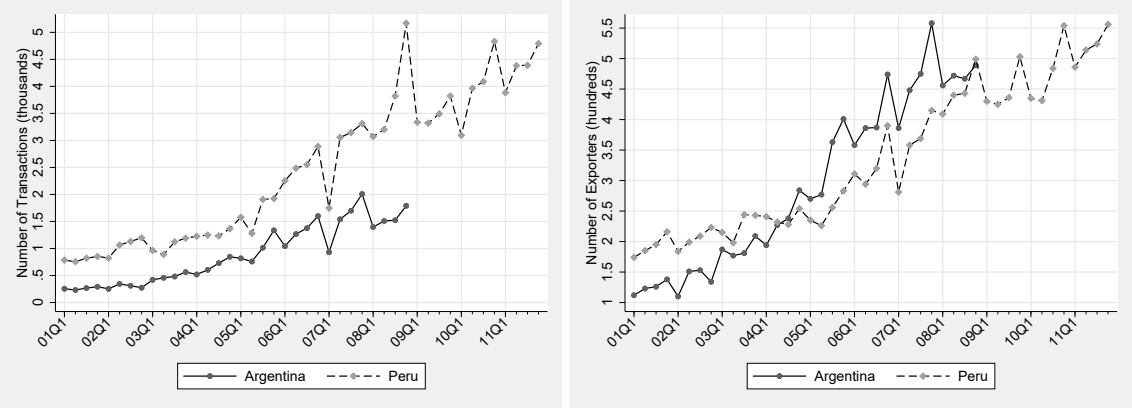
Note: Data for Argentina is from 2000Q4 to 2008Q4.

Table 2: Summary Statistics: Peru

		Percentiles								
	Variable	10	20	30	40	50	60	70	80	90
	Utilization rate by product	0.35	0.67	0.86	0.96	1.00	1.00	1.00	1.00	1.00
	Value of transaction	660	1465	2771	4715	7866	12751	21367	36875	65760
per Exporter	Utilization rate	0.00	0.67	0.95	1.00	1.00	1.00	1.00	1.00	1.00
	#Products	1.0	1.0	1.0	1.0	1.0	2.0	2.0	4.0	6.0
	#Products per year	1.0	1.0	1.0	1.0	1.0	2.0	2.0	3.0	5.0
	#Importers	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0	4.0
	#Importers per year	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.2	2.0
	#Importers per product	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
	#Importers per product-year	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.5
	#Transactions	1.0	1.0	1.0	1.0	2.0	3.0	6.0	13.0	43.0
	#Transactions per year	1.0	1.0	1.0	1.0	1.5	2.0	3.0	5.1	11.0
	#Transactions per product	1.0	1.0	1.0	1.0	1.0	2.0	3.0	6.0	17.0
	#Transactions per product-year	1.0	1.0	1.0	1.0	1.0	1.5	2.0	3.0	6.0
	Value of transaction	700	1348	2400	3662	5580	8745	13791	22977	42028
	Age distribution in 2008	0	0	0	0	0	2	3	6	7
per Importer	Utilization rate	0.00	0.44	0.95	1.00	1.00	1.00	1.00	1.00	1.00
	#Products	1.0	1.0	1.0	1.0	1.0	2.0	3.0	4.0	7.0
	#Products per year	1.0	1.0	1.0	1.0	1.0	2.0	2.0	3.0	5.0
	#Exporters	1.0	1.0	1.0	1.0	1.0	1.0	2.0	2.0	4.0
	#Exporters per year	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.3	2.0
	#Exporters per product	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	2.0
	#Importers per product-year	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.3
	#Transactions	1.0	1.0	1.0	2.0	3.0	5.0	8.0	18.0	47.0
	#Transactions per year	1.0	1.0	1.0	1.0	2.0	2.5	3.5	5.5	10.7
	#Transactions per product	1.0	1.0	1.0	1.0	2.0	2.0	4.0	7.0	16.0
	#Transactions per product-year	1.0	1.0	1.0	1.0	1.0	1.5	2.0	3.0	5.0
	Value of transactions	797	1685	2941	4725	7501	11518	18056	28070	48270
	Age distribution in 2008	0	0	0	2	4	6	7	8	8

Note: Data for Peru is from 2000Q4 to 2011Q4.

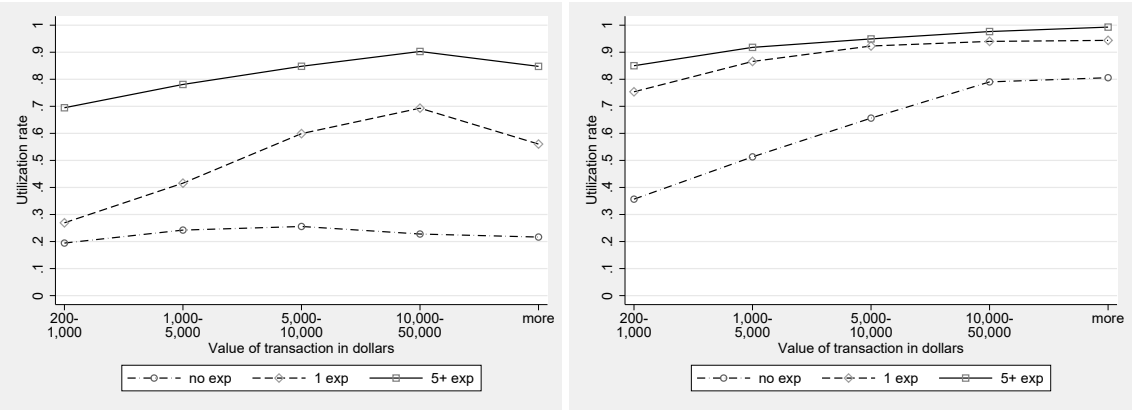
Figure 2: The number of transactions and exporters over time



(a) Transactions (b) Exporters

Note: Data for Argentina is from 2000Q4 to 2008Q4, while for Peru data is from 2000Q4 to 2011Q4.

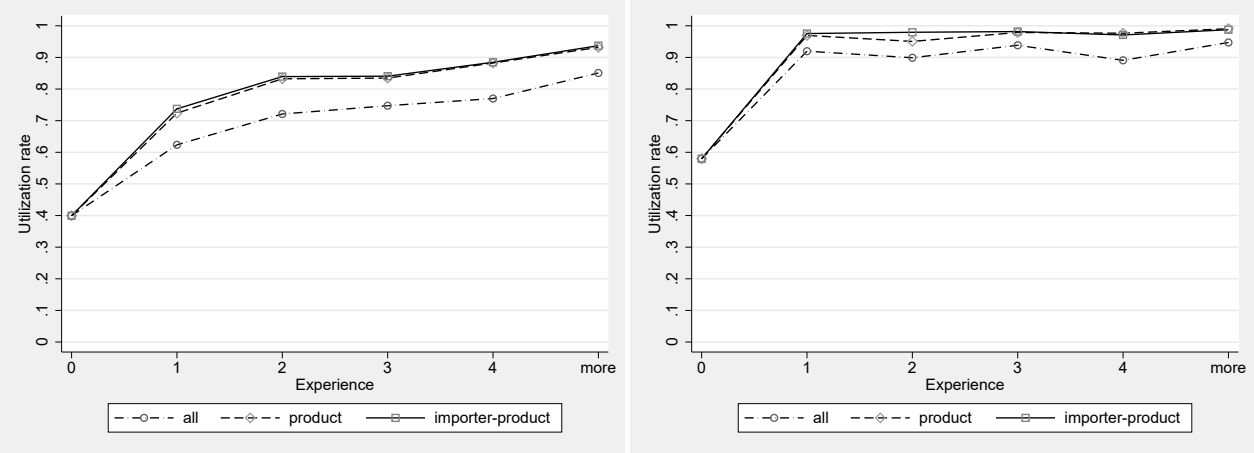
Figure 3: Preference utilization by value of the transaction and experience



(a) Argentina (b) Peru

Note: Preference utilization rate is the ratio of the number of transactions using preferences over the total number of transaction at every value bin of the transactions. *no exp* shows the utilization rates for firms with no experience in using preferences prior to the time of transaction, *1 exp* shows the utilization rates for firms with one experience, and *5+ exp* shows the utilization rates for firms with 5 or more experience.

Figure 4: Preference utilization by type of experience



(a) Argentina (b) Peru

Note: This figure shows the preference utilization rates over transactions at every experience bin. *all* refers to all kinds of experience in using preferences prior to the transaction, *product* refers to all experience in the product, while *importer-product* refers to all experience with the importer in the product.

3 Motivating the Empirical Specification

Choosing to invoke preferences involves comparing the costs and benefits of doing so. On the one hand, the exporter gains from lower tariffs and this gain is larger the larger is the preference margin. On the other hand, its production costs may rise in order to meet Rules of Origin (ROOs). The increase in production costs comes about because the firm has to modify some aspect of its production or supply chain to meet ROOs when it chooses to invoke preferences. It may also have to meet administrative costs of meeting ROOs. To obtain preferences (e.g. due to a FTA), an exporter needs to have a certificate of origin. This requires the exporter to provide documentation that shows their product qualifies for preferences as it meets the relevant rules of origin.[14]

[14]Implementation varies across settings. In some settings, like NAFTA, self certification is enough. Approved exporter authorisation may be required for the exporter to be allowed to issue origin declarations and incorrectness of the issued origin declaration can lead to withdrawal of the authorisation and further consequences applicable under the domestic law. Exporters are also required to keep the needed paperwork to document origin for a certain period of time. Even with self certification therefore, there are considerable documentation costs involved. In other instances, a governmental authority may be charged with this certification and there may be additional bureaucratic or corruption costs involved.

It seems reasonable to have the exporter choose whether to invoke preferences or not as it is the exporter who will need to prove that the products meet origin requirements. Hence, for each transaction in a product, we can think of a supplier who decides whether to use preferences or not depending on whether the costs of doing so, both cost that vary with production (marginal costs) like using higher cost suppliers or inputs and costs that do not (fixed costs) like administrative costs of meeting ROOs or starting a new supply chain, exceed the benefits or not.

Administrative costs can depend on experience in using preferences and age in exporting (the number of years the exporter has been selling to the Colombian market). Experience in providing documentation in past transactions with the same importer and product may help an exporter use preferences when selling the same product to the same buyer. It may also help the exporter to use preferences with other importers of the same product or of other products, i.e., there may be spillovers. If there is no learning, then the probability of using preferences should be unaffected by any history the exporter has in using preferences.

Production costs, in contrast, are likely not to depend on experience in using preferences, but are likely to vary considerably by product as the rules of origin are defined at a very detailed product level.[15] There may also be random costs that make an exporter choose to use preferences or not.

More formally, suppose that exporter e exports a particular product p and faces a constant elasticity of demand from importer i for transaction t.[16] The demand curve is:[17]

$$q_{eit}(a_{eit}) = \left((1+\tau_t^{\text{mfn}})^{1-a_{eit}}(1+\tau_t^{\text{pref}})^{a_{eit}} p_{eit}(a_{eit})\right)^{-\eta} \psi_{eit} \tag{1}$$

where τ_t^k for $k = \text{mfn}, \text{pref}$ is the tariff to pay, a_{eit} is the dummy variable for preference use in the

[15] Price when preferences are utilized does not seem to vary with experience once other factors are controlled for suggesting experience does not drive these costs. Results are available on request.

[16] We suppress p in our notation whenever possible.

[17] The details of the derivations below are to be found in Appendix C

transaction, p_{eit} is the price, and ψ_{eit} is the idiosyncratic demand shifter.[18]

We will assume that the exporter is maximizing the profit of the transaction in terms of dollars.[19] The profit from the transaction for the exporter is

$$\pi_{eit}(a_{eit}) = \left(p_{eit}(a_{eit}) - R^{a_{eit}} c_{et}\right) q_{eit}(a_{eit}) - a_{eit}\varepsilon_{eit} F_{eit} \tag{2}$$

where c_{et} is the marginal cost of production (in dollars) and $R^{a_{it}}$ is the increase of the marginal cost to meet the rules of origin.[20] F_{eit} is the fixed cost of using preferences, and ε_{et} is the idiosyncratic shock in using preference in the transaction.[21] The exporter maximize his profit in two steps. First, the exporter determines the price of the transaction with and without using preferences. Then the exporter chooses to use preferences only if doing so raises his profits. The profit maximizing price of the transaction using preferences or not ($a_{et} = 0$ or 1) is

$$p_{eit}(a_{eit}; c_{et}) = \frac{\eta}{\eta - 1} R_p^{a_{eit}} c_{et} \tag{3}$$

In the Appendix C, we show that we can derive the decision rule as

$$a_{eit} = \mathbb{1}\left\{\pi_{eit}(1) - \pi_{eit}(0) > 0\right\} = \mathbb{1}\left\{\ln s_{eit} - \ln F_{eit} + \chi_t > \epsilon_{eit}\right\} \tag{4}$$

where $s_{eit} \equiv (\tau_t^{\text{mfn}} - \tau_t^{\text{pref}}) r_{it}(0)$ is the tariff savings by invoking preferences, i.e. the preference margin times the value of the transaction if the preferences had not been met. χ_t is a term that is product transaction specific and captures the MFN tariff and the preferential tariff, and the increase

[18] The demand in Colombia is a function of the price in Colombian pesos. Therefore, the relevant price in the demand function is the dollar price times the exchange rate of the importing country vis a vis the dollar. Consequently this time-variant demand shifter can be interpreted as the exchange rate of the importing country. We will use this as the instrument in Section 5.

[19] Transactions between the three countries are mostly denominated in dollars. Gopinath and Stein (2021) explain why firms maximize profits in dollars.

[20] Note that the marginal cost will depend on the exporting country's exchange rate vis a vis the dollar. In addition, this exchange rate could also affect R, as it would if there was a value added share requirement to obtain preferences.

[21] Note that, as pointed out in Section 1, we do not differentiate between fixed costs and sunk costs.

in the marginal cost of production from meeting ROOs. It is proxied for by product year fixed effects in the regression. ϵ_{eit} is the idiosyncratic cost of using preference. Suppose ϵ_{eit} follows a uniform distribution with mean μ and density λ, which gives us a linear specification for probability of using preferences for the transaction as

$$\Pr\left(a_{eit}=1\right)=\lambda\ln s_{eit}-\lambda\ln F_{eit}+\lambda\chi_t+\frac{1}{2}-\lambda\mu \tag{5}$$

Motivated by this equation we estimate a linear probability model.[22] We allow F_{eit} to be a function of experience because, as discussed above, experience could reduce documentation costs in using preferences, i.e., reduce F_{eit}. An increase in the probability of using preferences with experience could therefore be seen as evidence that documentation costs fall with experience.

For exporter e, importer i, product p, and transaction t, we estimate the following equation

$$a_{eipt}=\alpha_1\ln s^*_{eipt}+\sum_{n=1}^{4}\beta_n Exp^n_{et}+\beta_{more}Exp^{more}_{et}+\gamma Age_{et}+\delta_e+\delta_i+\delta_{cpy}+u_{eipt} \tag{6}$$

where the dependent variable is one if the transaction uses preferences of some kind and zero otherwise, and s^*_{eipt} proxies for s_{eipt}. Our focus is on the coefficents of experience.[23] In the data, we cannot observe $r_{it}(0)$ when preferences are used in the transaction. We use $r_{it}(a_{eipt})$ as a proxy for the value of the transaction when preferences are used. This creates measurement error. In Section 6, we show that this measurement error does not invalidate our results.[24]

The variable $Exp^n(ai,ap)$ for $n=1,\ldots,4$ or $more$ is a dummy variable that takes the value 1 if the *exporter* has total experience of exactly n transactions using preferences to date t, across all importers (ai) and all products (ap).[25] We focus on the exporter's experience because the

[22] We prefer to use the linear probability model due to the usual difficulties in using high dimensional fixed effects with non linear model specifications.

[23] We choose to group more than 4 experiences together because we see from Figure 4 the effects of experience flatten out.

[24] Because we know the exact form of the measurement error, we can show that it is not likely to bias the estimates much and that the impact of learning effects on fixed costs can be estimated without bias.

[25] For example, suppose an exporter at time t has invoked preferences three times to date. Then the dummy is equal

exporter needs to provide documentation that shows that goods comply with the relevant ROOs. To validate this hypothesis, we assessed whether the importer's experience matters and found that it did not significantly affect the probability of using preferences.[26] Formally, we use the following alternative forms of experience:

$$Exp^{n}_{et}(ai, ap) = \mathbb{1}\{\underbrace{Exp_{et}(si, ap)}_{\substack{\text{Same Importer (si),}\\ \text{All Products (ap)}}} + \underbrace{Exp_{et}(oi, ap)}_{\substack{\text{Other Importers (oi),}\\ \text{All Products (ap)}}} = n\} \tag{7}$$

$$= \mathbb{1}\{\underbrace{Exp_{et}(ai, sp)}_{\substack{\text{All Importers (ai),}\\ \text{Same Importer (si)}}} + \underbrace{Exp_{et}(ai, op)}_{\substack{\text{All Importers (ai),}\\ \text{Other Products (op)}}} = n\} \tag{8}$$

$$= \mathbb{1}\{\underbrace{Exp_{et}(si, sp)}_{\substack{\text{Same Importer (si),}\\ \text{Same Product (sp)}}} + \underbrace{Exp_{et}(si, op)}_{\substack{\text{Same Importer (si),}\\ \text{Other Products (op)}}} + \underbrace{Exp_{et}(oi, sp)}_{\substack{\text{Other Importers (oi),}\\ \text{Same Product (sp)}}} + \underbrace{Exp_{et}(oi, op)}_{\substack{\text{Other Importers (oi),}\\ \text{Other Products (op)}}} = n\}. \tag{9}$$

Hence, total experience is defined as the sum of experience across the same importer and the same product (si, sp), the same importer and other products (si, op), the other importers and the same product (oi, sp), and other importers and other products (oi, op). This definition allows us to explore the extent to which preference utilization creates positive spillovers across products and/or importers –the possibility that an exporter that learns how to use preferences for a product or with a specific importer might be more likely to use preferences with other products or importers.

We use country-product-year fixed effects (cpy) that absorb variation in fixed costs of meeting ROOs which vary by country, product, and year. Fixed costs of meeting ROOs could also vary by exporter and importer and for this reason we use exporter and importer (e and i) fixed effects and as a robustness check, exporter-importer (ei) fixed effects.[27] The variable Age_{et} is the exporter's age in terms of years he has been in exporting to Colombia. This is meant to capture any effect on fixed

to one for the third experience but 0 for the rest.

[26]These results are available on request.

[27]For example, input sourcing structure may vary across exporters, which can affect the difficulty in meeting the ROOs and hence the probability of using preferences. Exporter fixed effects can account for the average effects of exporters' preexisting heterogeneous sourcing structures on preference utilization.

costs of meeting ROOs that vary by the age of the firm as an exporter in this market at the time of the transaction. Since our data start from 2000, the age variable is potentially truncated from above. This could create mis-measurement in the data. However, in the regression we have a linear specification for age and exporter fixed effects. Consequently, as long as the linear specification is correct, our estimates should not be biased.[28]

Our focus is on how these fixed costs of meeting ROOs vary by the various kinds of experience a firm might have in obtaining preferences. Given our fixed effects, our estimates are driven by variation in meeting preferences for a given importer and exporter from a particular country in a particular product and year. The role of experience of various kinds in meeting preferences would then cast light on how experience of various sorts affects the probability of using preferences. If, for example, using preferences in another product and the same importer in the past has no effect on the likelihood of using preferences in the current transaction, then it must be that costs are not impacted by such experience. In this way, we are able to better understand the shape of the fixed costs of obtaining preferences, something that has not been done to date and which is the focus of this paper.

Given the array of fixed effects used, do we still need to account for other sources of bias? We argue that our fixed effect take care of most of the issues that could arise. Suppose exporters planning to use preferences choose to locate in places with easier access to the physical location of the government agencies in charge of reviewing the documents needed to obtain preferences. If we did not control for location, we would have omitted variable bias. However, importer and exporter fixed effects would soak up such variation.

Country-product-year fixed effects (δ_{ct}) would also capture any macro economic forces at work in the exporting country like changes in its exchange rates, political uncertainty, or boom and recession that might affect the choice of using preferences. If, customs inspectors in Colombia have

[28]The experience variable has a similar problem. This is alleviated by firms entering into exporting. Our results are also robust to using the sub sample of new firms. (Results are available on request). Finally, note that in Section 4.3 where we look at products newly covered by the deepening of the FTA with Argentina, we have no such problem.

instructions one year to very carefully check the paper work for certain products using preferences coming from certain countries, this would also be picked up in country product year fixed effects. The importer and exporter fixed effects, or even more constraining, importer-exporter fixed effects, control for the unobservable heterogeneity across importers and exporters or importer-exporter pairs.

4 Results

In this section, we focus on what kind of experience drives preference use. Does experience across other products and other importers seem to reduce the cost of and encourage the current use of preferences? Or are there no spillovers across products and importers? We then break down experience into two-two way classifications: with the same importer and with other importers as in equation (7), with the same product and with other products as in equation (8). Finally, we look at the four-way classification as in equation (9).

4.1 The Shape of Fixed Costs

Table 3 shows how experience in using preferences affects utilization. In column (1) we use exporter fixed effects while column (2) uses exporter-importer fixed effects. Both have country product year fixed effects. As expected, experience matters with the coefficients increasing with the amount of experience. This would suggest that fixed costs –and not just sunk costs– matter and play a role. If only one time sunk costs exist, the probability of using preferences should not increase over experience. The results are robust to the set of fixed effects used as shown in column (1) and (2).[29]

Tables 4-6 present the estimates of equation (6) using the decomposition of experience we proposed above. In Table 4 we break experience into that coming from the same product and

[29]Results are also robust to a host of other fixed effects as discussed in Appendix D.

from other products. Note that only experience in the same product seems to matter. One reason might be that ROOs are specific for each product and accordingly the specific documents needed to certify origin would differ, which hinders potential spillovers across products.

Table 3: Preference use vs experience in past transactions

	(1)	(2)
$Savings$	0.010***	0.010***
	(0.002)	(0.002)
Age	0.006***	0.006***
	(0.002)	(0.002)
$Exp^1(ai, ap)$	0.013	0.015
	(0.014)	(0.014)
$Exp^2(ai, ap)$	0.037***	0.041***
	(0.014)	(0.014)
$Exp^3(ai, ap)$	0.056***	0.063***
	(0.015)	(0.015)
$Exp^4(ai, ap)$	0.052***	0.056***
	(0.017)	(0.017)
$Exp^{more}(ai, ap)$	0.075***	0.080***
	(0.018)	(0.018)
Observations	128,745	127,745
Fixed Effects:		
Exporter	✓	
Importer	✓	
Exporter-Importer		✓
Country-Product-Year	✓	✓

Importer-exporter clustered standard errors in parentheses. ap refers to all products, while ai refers to all importers. *** p<0.01, ** p<0.05, * p<0.1.

Table 5 shows the results of the estimating equation (6) where we break experience into that coming from the same importer and from other importers. Note that experience with the same importer seems to matter more than experience with other importers.

The results of experience gained through product-importer preference use in the past are presented in Table 6. Panel (a) in this table gives the results when we use Exporter, Importer and Country-Product-Year fixed effects while Panel (b) gives the results when we use Exporter-Importer and Country-Product-Year fixed effects. Note that transactions with the same importer and same product ($si.sp$) have the largest effect. After using preferences once with a given importer and product, the probability of using preferences rises by 5.4%. By the time experience has risen to

Table 4: Preference use vs product-specific experience in past transactions

	(1)	(2)
$Savings$	0.009***	0.009***
	(0.002)	(0.002)
Age	0.003	0.002
	(0.002)	(0.002)
$Exp^1(ai, sp)$	0.055***	0.056***
	(0.012)	(0.012)
$Exp^2(ai, sp)$	0.080***	0.081***
	(0.017)	(0.017)
$Exp^3(ai, sp)$	0.094***	0.094***
	(0.019)	(0.019)
$Exp^4(ai, sp)$	0.093***	0.094***
	(0.021)	(0.021)
$Exp^{more}(ai, sp)$	0.131***	0.132***
	(0.027)	(0.027)
$Exp^1(ai, op)$	0.001	0.002
	(0.011)	(0.011)
$Exp^2(ai, op)$	0.002	0.004
	(0.012)	(0.013)
$Exp^3(ai, op)$	0.019	0.023
	(0.015)	(0.015)
$Exp^4(ai, op)$	0.012	0.016
	(0.016)	(0.017)
$Exp^{more}(ai, op)$	0.018	0.021
	(0.016)	(0.016)
Observations	128,745	127,745
Fixed Effects:		
Exporter	✓	
Importer	✓	
Exporter-Importer		✓
Country-Product-Year	✓	✓

Importer-exporter clustered standard errors in parentheses. sp refers to same products, op refers to other products, while ai refers to all importers. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Preference use vs importer-specific experience in past transactions

	(1)	(2)
$Savings$	0.010***	0.010***
	(0.002)	(0.002)
Age	0.005***	0.005***
	(0.002)	(0.001)
$Exp^1(si, ap)$	0.007	0.006
	(0.007)	(0.007)
$Exp^2(si, ap)$	0.022***	0.020***
	(0.007)	(0.007)
$Exp^3(si, ap)$	0.028***	0.026***
	(0.008)	(0.008)
$Exp^4(si, ap)$	0.024***	0.022**
	(0.008)	(0.009)
$Exp^{more}(si, ap)$	0.038***	0.037***
	(0.010)	(0.010)
$Exp^1(oi, ap)$	-0.043*	-0.044*
	(0.024)	(0.025)
$Exp^2(oi, ap)$	0.017	0.027*
	(0.015)	(0.016)
$Exp^3(oi, ap)$	0.008	0.012
	(0.013)	(0.015)
$Exp^4(oi, ap)$	0.013	0.017
	(0.010)	(0.011)
$Exp^{more}(oi, ap)$	0.015	0.022
	(0.013)	(0.014)
Observations	128,745	127,745
Fixed Effects:		
Exporter	✓	
Importer	✓	
Exporter-Importer		✓
Country-Product-Year	✓	✓

Importer-exporter clustered standard errors in parentheses. ap refers to all products, si refers to same importers, while oi refers to other importers. *** p<0.01, ** p<0.05, * p<0.1.

five or more, this probability has risien to 11.6%, an increase of 6.2%. Experience with other importers in the same product helps but by far less: 1.83% and 4.84% respectively. Experience with the same importer but in other products is mostly not significant. This supports the idea that the product dimension is more important than the importer one. In the case of other products and other importers we find possibly negative and significant effects for the first transaction, but no significant effects otherwise. This negative relation could be the result of constraints on capability. For most firms, carrying out paperwork needed to comply with ROOs with more than a single importer-product could be more than they could handle. [30]

[30] One might be concerned that firms with experience are also those who have survived so that what we are picking up on the effects of experience is really coming from selection. Since we control for age of the firm in exporting as well as exporter or exporter importer fixed effects, we do not think this is a concern. Moreover, if selection was driving the coefficients on experience, there should be no differential effect of different kinds of experience, unlike what we find.

Table 6: Preference use vs product-importer-specific experience in past transactions

	(a)				(b)			
$Savings$		0.009***				0.009***		
		(0.002)				(0.002)		
Age		0.002				0.001		
		(0.002)				(0.002)		
$Exp^1(si,sp)$	0.042***	$Exp^1(oi,sp)$	0.009		$Exp^1(si,sp)$	0.053***	$Exp^1(oi,sp)$	0.011
	(0.010)		(0.010)			(0.002)		(0.010)
$Exp^2(si,sp)$	0.058***	$Exp^2(oi,sp)$	0.014		$Exp^2(si,sp)$	0.059***	$Exp^2(oi,sp)$	0.015
	(0.014)		(0.009)			(0.015)		(0.009)
$Exp^3(si,sp)$	0.067***	$Exp^3(oi,sp)$	0.021*		$Exp^3(si,sp)$	0.068***	$Exp^3(oi,sp)$	0.022*
	(0.016)		(0.011)			(0.016)		(0.012)
$Exp^4(si,sp)$	0.065***	$Exp^4(oi,sp)$	0.032***		$Exp^4(si,sp)$	0.066***	$Exp^4(oi,sp)$	0.033***
	(0.017)		(0.018)			(0.018)		(0.010)
$Exp^{more}(si,sp)$	0.093***	$Exp^{more}(oi,sp)$	0.028***		$Exp^{more}(si,sp)$	0.096***	$Exp^{more}(oi,sp)$	0.028***
	(0.024)		(0.008)			(0.024)		(0.009)
$Exp^1(si,op)$	-0.001	$Exp^1(oi,op)$	-0.046***		$Exp^1(si,op)$	-0.004	$Exp^1(oi,op)$	-0.047**
	(0.007)		(0.018)			(0.007)		(0.019)
$Exp^2(si,op)$	0.000	$Exp^2(oi,op)$	0.003		$Exp^2(si,op)$	-0.003	$Exp^2(oi,op)$	0.006
	(0.008)		(0.014)			(0.009)		(0.015)
$Exp^3(si,op)$	0.001	$Exp^3(oi,op)$	0.010		$Exp^3(si,op)$	-0.001	$Exp^3(oi,op)$	0.011
	(0.010)		(0.013)			(0.011)		(0.013)
$Exp^4(si,op)$	-0.002	$Exp^4(oi,op)$	-0.004		$Exp^4(si,op)$	-0.003	$Exp^4(oi,op)$	-0.002
	(0.011)		(0.012)			(0.012)		(0.013)
$Exp^{more}(si,op)$	-0.003	$Exp^{more}(oi,op)$	0.000		$Exp^{more}(si,op)$	-0.002	$Exp^{more}(oi,op)$	0.003
	(0.011)		(0.013)			(0.012)		(0.014)
Observations		128,745				127,745		
Fixed Effects:								
Exporter		✓						
Importer		✓						
Exporter-Importer							✓	
Country-Product-Year		✓					✓	

Importer-exporter clustered standard errors in parentheses. si=same importer , ai=other importers, sp=same products, op=other products
*** p<0.01, ** p<0.05, * p<0.1

4.2 Is Learning Increasing with Experience?

Table 3-6 show that the coefficients on experience, especially those on experience in the same product/importer are significantly positive and increasing with experience. However, if learning is ongoing, then the coefficients on neighboring experience need to also be significantly different from each other. This is what we turn to next. Figure 5 shows the estimates and their confidence intervals for the regressions run in Tables 3-6. We depict the estimates based on the specification that includes importer and exporter fixed effects. Figure 5 (a) presents the results for Table 3 (total experience). Whenever neighboring coefficients are connected by darker lines, the coefficients are more significantly different. Note that the coefficients on experience are increasing and on the

whole significantly different from their neighboring ones (except for experience 3 and 4). This suggests that learning is reinforced by repetition.

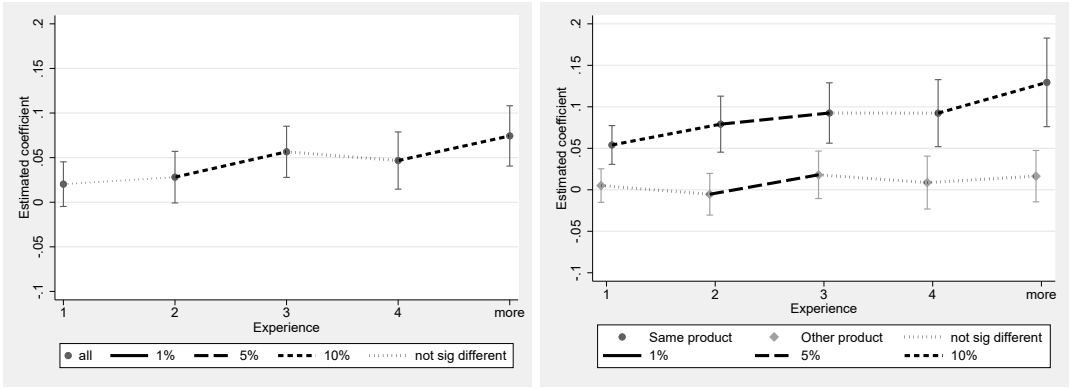
Figure 5 (b) shows that product-specific experience follows a similar pattern as overall experience. Experience coming from other products in contrast is not significantly different from zero or increasing in experience.

The exercise for importer-specific experience (Figure 5 (c)) yields slightly different results. Only experience of 4 and 5 or more are significantly different from each other, though all levels of experience other than the first are significantly different from zero. Experience with other importers is not significantly different from zero for any level of experience.

Finally, the importer-product-specific experience comparisons are presented in Figure 5 (d). As the coefficients on experience of the same importer with other products and other importers with other products are not significantly positive, we will not depict them in Figure 5 (d). The coefficients on experience of the same importer with the same product are significantly above zero. In addition, they are rising and significantly different from their neighbors other than when experience goes from 3 to 4. These coefficients are also higher than those on experience with the same product and other importers. Though the coefficients for experience of other importers with the same product are mostly significantly positive, they are less clearly significantly increasing.

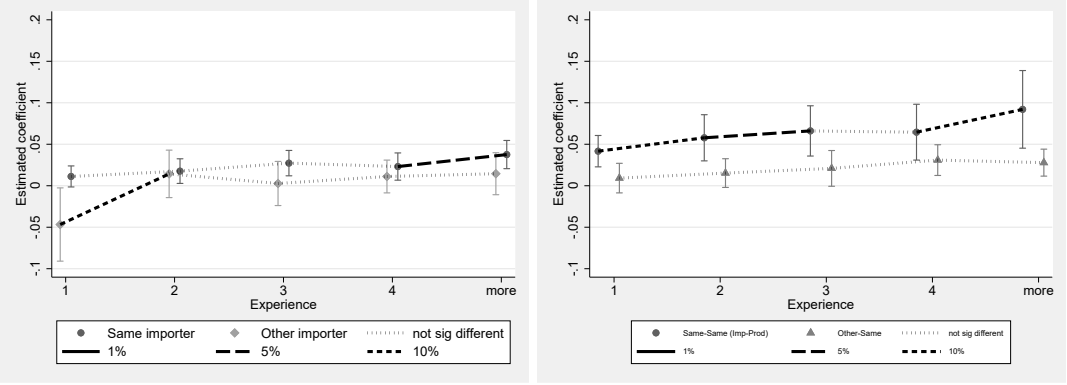
The evidence so far suggests that experience matters for using preferences. Moreover, that experience in a product spills over to other importers, though it does not spill over to other products.

Figure 5: Test of equality of coefficients



(a) Total experience (Table 3)

(b) Product specific (Table 4)



(c) Importer specific (Table 5)

(d) Product-importer specific (Table 6)

Note: For each experience level plotted, point estimates of the coefficient of the regression are depicted with 95% confidence intervals given by the vertical lines. The lines connecting these point estimates indicate the significance level for the null hypothesis that the coefficients are equal. The darker the line is, the more likely coefficients are different from each other.

4.3 Are Exporters Really Learning?

So far we have been looking at the patterns of the coefficients on exporter experience and treating them as estimates of learning. Is there other evidence that we can point to that supports this interpretation? In previous subsections, we have not differentiated between preference use in trade between Colombia and Argentina and Colombia and Peru. We will explore two angles in terms of the differences in the two pairs of countries. First, recall that the FTA with Peru is long standing, while the FTA with Argentina is more recent. As a result, we would expect to see less learning

in Peru than Argentina. Second, the deepening of Colombia's preferential trade with Argentina around 2005 provides us with a natural experiment. As new products are added to the list of those that have preferences, we would expect to see more rapid learning in these new products since all exporters are starting with zero experience. In such a setting, experience with other products may also become important as there is no social learning to draw upon in these newly covered products. Accordingly, we are likely to see spillovers coming from other products in this case.

With regard to the first angle, we see exactly what we expect in Table 7 which is the analogue of Table 6, but at the country level. There is less learning in Peru than in Argentina when we consider the same importer and the same product. Moreover, we see some evidence of positive spillovers from all other kinds of experience for Argentina: coefficients are never negative and significant. However, this is not the case for Peru, where negative and significant coefficients arise for experience from other products. One reason for this might be that there are differences in firm's processing capacity and Argentinian firms can handle more ROOs related paperwork compared to Peruvian firms as Argentina was more developed than Peru in this period.

Now we turn to the second angle. When new products are covered there will be less knowledge about how to meet preferences in the economy as a whole (which would be captured by product year fixed effects) and so exporter would be more reliant on their own knowledge. This would suggest that learning from ones own experience would drive preference use to a greater extent for such newly covered products. Table 8 differs from Table 7 for Argentina in a number of ways. To begin with, it allows the products newly covered in 2005 to behave differently in terms of learning from the products that were covered before 2005. This is done by interacting a dummy "new" with the (si,sp) and (oi,sp) classifications. The dummy new is zero if the product was covered before 2005. From Table 8 it is easy to see that product that are newly covered are where most of the learning is coming from. This helps explain the greater learning we saw in Argentina in Table 7. Note also that the estimates for learning for old products for Argentina are similar to those for

Table 7: Preference use vs product-importer-specific experience in past transactions by country

Argentina								
	(a)				(b)			
$Savings$		0.019***				0.020***		
		(0.004)				(0.004)		
Age		0.013*				0.013**		
		(0.006)				(0.006)		
$Exp^1(si,sp)$	0.042***	$Exp^1(oi,sp)$	0.004		$Exp^1(si,sp)$	0.042***	$Exp^1(oi,sp)$	0.003
	(0.014)		(0.018)			(0.013)		(0.018)
$Exp^2(si,sp)$	0.077***	$Exp^2(oi,sp)$	0.034		$Exp^2(si,sp)$	0.077***	$Exp^2(oi,sp)$	0.040
	(0.017)		(0.025)			(0.017)		(0.025)
$Exp^3(si,sp)$	0.101***	$Exp^3(oi,sp)$	0.048*		$Exp^3(si,sp)$	0.101***	$Exp^3(oi,sp)$	0.060**
	(0.022)		(0.025)			(0.021)		(0.025)
$Exp^4(si,sp)$	0.103***	$Exp^4(oi,sp)$	0.078**		$Exp^4(si,sp)$	0.102***	$Exp^4(oi,sp)$	0.085***
	(0.025)		(0.031)			(0.024)		(0.031)
$Exp^{more}(si,sp)$	0.149***	$Exp^{more}(oi,sp)$	0.052**		$Exp^{more}(si,sp)$	0.148***	$Exp^{more}(oi,sp)$	0.053**
	(0.030)		(0.026)			(0.029)		(0.027)
$Exp^1(si,op)$	0.029	$Exp^1(oi,op)$	-0.004		$Exp^1(si,op)$	0.031	$Exp^1(oi,op)$	-0.003
	(0.020)		(0.027)			(0.020)		(0.026)
$Exp^2(si,op)$	0.045**	$Exp^2(oi,op)$	0.099***		$Exp^2(si,op)$	0.045**	$Exp^2(oi,op)$	0.095***
	(0.023)		(0.032)			(0.023)		(0.030)
$Exp^3(si,op)$	0.081***	$Exp^3(oi,op)$	0.136***		$Exp^3(si,op)$	0.081***	$Exp^3(oi,op)$	0.145***
	(0.027)		(0.042)			(0.026)		(0.041)
$Exp^4(si,op)$	0.093***	$Exp^4(oi,op)$	0.065*		$Exp^4(si,op)$	0.103***	$Exp^4(oi,op)$	0.082**
	(0.032)		(0.036)			(0.032)		(0.034)
$Exp^{more}(si,op)$	0.090***	$Exp^{more}(oi,op)$	0.097**		$Exp^{more}(si,op)$	0.097***	$Exp^{more}(oi,op)$	0.010**
	(0.031)		(0.042)			(0.031)		(0.041)
Observations		25,497				25,263		
Fixed Effects:								
Exporter		✓						
Importer		✓						
Exporter-Importer						✓		
Country-Product-Year		✓				✓		
Peru								
	(a)				(b)			
$Savings$		0.00662***				0.00659***		
		(0.00168)				(0.00166)		
Age		-0.00272**				-0.00313**		
		(0.00137)				(0.00133)		
$Exp^1(si,sp)$	0.041***	$Exp^1(oi,sp)$	0.009		$Exp^1(si,sp)$	0.042***	$Exp^1(oi,sp)$	0.010
	(0.012)		(0.011)			(0.012)		(0.011)
$Exp^2(si,sp)$	0.053***	$Exp^2(oi,sp)$	0.008		$Exp^2(si,sp)$	0.055***	$Exp^2(oi,sp)$	0.008
	(0.018)		(0.009)			(0.018)		(0.010)
$Exp^3(si,sp)$	0.059***	$Exp^3(oi,sp)$	0.013		$Exp^3(si,sp)$	0.061***	$Exp^3(oi,sp)$	0.012
	(0.019)		(0.012)			(0.019)		(0.013)
$Exp^4(si,sp)$	0.057***	$Exp^4(oi,sp)$	0.022**		$Exp^4(si,sp)$	0.059***	$Exp^4(oi,sp)$	0.021**
	(0.021)		(0.010)			(0.021)		(0.010)
$Exp^{more}(si,sp)$	0.082***	$Exp^{more}(oi,sp)$	0.022**		$Exp^{more}(si,sp)$	0.086***	$Exp^{more}(oi,sp)$	0.022**
	(0.029)		(0.009)			(0.030)		(0.010)
$Exp^1(si,op)$	-0.008	$Exp^1(oi,op)$	-0.052***		$Exp^1(si,op)$	-0.015**	$Exp^1(oi,op)$	-0.055***
	(0.006)		(0.020)			(0.006)		(0.020)
$Exp^2(si,op)$	-0.014*	$Exp^2(oi,op)$	-0.026**		$Exp^2(si,op)$	-0.019**	$Exp^2(oi,op)$	-0.022*
	(0.008)		(0.012)			(0.008)		(0.013)
$Exp^3(si,op)$	-0.021**	$Exp^3(oi,op)$	-0.018*		$Exp^3(si,op)$	-0.026**	$Exp^3(oi,op)$	-0.018
	(0.010)		(0.011)			(0.010)		(0.011)
$Exp^4(si,op)$	-0.028***	$Exp^4(oi,op)$	-0.017*		$Exp^4(si,op)$	-0.033***	$Exp^4(oi,op)$	-0.018*
	(0.010)		(0.010)			(0.012)		(0.011)
$Exp^{more}(si,op)$	-0.029**	$Exp^{more}(oi,op)$	-0.018*		$Exp^{more}(si,op)$	-0.033***	$Exp^{more}(oi,op)$	-0.017
	(0.011)		(0.011)			(0.012)		(0.012)
Observations		103,136				102,482		
Fixed Effects:								
Exporter		✓						
Importer		✓						
Exporter-Importer						✓		
Country-Product-Year		✓				✓		

Importer-exporter clustered standard errors in parentheses. sp=same products, op=other goods, si=same importer , oi=other importers
*** p<0.01, ** p<0.05, * p<0.1

Peru.[31]

When we consider experience from other products, we need to further allow for whether the other product is a newly covered product or not.[32] For this reason, We further break experience from other products into experience from other products which were covered before 2005 (other old products) and those that were newly covered in 2005 (other new products). Thus, experience from the same importer and other product is further decomposed into:

$$\underbrace{Exp_{et}(si, op)}_{\substack{\text{Same Importer (si),}\\ \text{Other Products (op)}}} = \underbrace{Exp_{et}(si, op; new)}_{\substack{\text{Same Importer (si),}\\ \text{Other New Products (op; new)}}} + \underbrace{Exp_{et}(si, op; old)}_{\substack{\text{Same Importer (si),}\\ \text{Other Old Products (op; old)}}} \tag{10}$$

We find in Table 8 that experience with the same importer and other products differs across old and newly covered products, but only when the other products are themselves newly covered. In this case, the effect is significantly positive. It is worth noting that for old products for Argentina the coefficients of experience in the same product and the same importer are similar to those for Peru (see Table 7). This is consistent with our argument that experience matters less for Peru because their trade agreement with Colombia is long-standing so that the knowledge of how to use preferences is pervasive, as so is absorbed by the country-product-year fixed effects.[33]

Experience with other importers and the same product is not significantly different between old and newly covered products. Experience with other importers and other products differs across old and newly covered products, but only when the other products are themselves newly covered. In this case, the effect is mostly significantly positive. Experience from other importers and other

[31] In essence, we are running a separate regression for these two kinds of products while constraining the coefficients on all other controls to be the same in the two regressions. The estimated coefficients for the new products are the sum of the coefficients with and without the dummy and the coefficients on the old and new products are significantly different from each other if the coefficient on the interaction is significantly different from zero.

[32] This is clearly not an issue in the case of learning from the same product because we have an interaction with the "new" dummy variable.

[33] It may be argued that exporters are learning about the importer rather than the process of using preferences. Note that there are additional learning effects for the new products covered by the new trade agreement between Argentina and Colombia. These effects cannot be explained by relationship-specific learning, which should be captured by the effects common to both new and old trade agreements.

products is analogously decomposed. There is some evidence of learning from old products but the interactions with new product are not significant.

Table 8: Interaction with post agreement preferences for Argentina

	Same importer				Other importers			
$Savings$	0.020***							
	(0.004)							
Age	0.031***							
	(0.005)							
$Exp^1(si, sp)$	0.060***	$d_{new} \times Exp^1(si, sp)$	0.067**	$Exp^1(oi, sp)$	0.044	$d_{new} \times Exp^1(oi, sp)$	0.018	
	(0.021)		(0.029)		(0.030)		(0.044)	
$Exp^2(si, sp)$	0.069**	$d_{new} \times Exp^2(si, sp)$	0.128***	$Exp^2(oi, sp)$	0.115***	$d_{new} \times Exp^2(oi, sp)$	-0.057	
	(0.027)		(0.036)		(0.040)		(0.053)	
$Exp^3(si, sp)$	0.110***	$d_{new} \times Exp^3(si, sp)$	0.113***	$Exp^3(oi, sp)$	0.106*	$d_{new} \times Exp^3(oi, sp)$	-0.074	
	(0.031)		(0.042)		(0.054)		(0.065)	
$Exp^4(si, sp)$	0.087**	$d_{new} \times Exp^4(si, sp)$	0.136***	$Exp^4(oi, sp)$	0.124**	$d_{new} \times Exp^4(oi, sp)$	-0.094	
	(0.038)		(0.049)		(0.055)		(0.068)	
$Exp^{more}(si, sp)$	0.085**	$d_{new} \times Exp^{more}(si, sp)$	0.190***	$Exp^{more}(oi, sp)$	0.075*	$d_{new} \times Exp^{more}(oi, sp)$	-0.070	
	(0.038)		(0.054)		(0.039)		(0.052)	
$Exp^1(si, op; new)$	-0.119**	$d_{new} \times Exp^1(si, op; new)$	0.252***	$Exp^1(oi, op; new)$	-0.057	$d_{new} \times Exp^1(oi, op; new)$	0.129**	
	(0.061)		(0.065)		(0.058)		(0.065)	
$Exp^2(si, op; new)$	0.009	$d_{new} \times Exp^2(si, op; new)$	0.139***	$Exp^2(oi, op; new)$	0.072	$d_{new} \times Exp^2(oi, op; new)$	0.035	
	(0.043)		(0.047)		(0.048)		(0.057)	
$Exp^3(si, op; new)$	-0.005	$d_{new} \times Exp^3(si, op; new)$	0.150**	$Exp^3(oi, op; new)$	0.102*	$d_{new} \times Exp^3(oi, op; new)$	0.025	
	(0.056)		(0.067)		(0.059)		(0.072)	
$Exp^4(si, op; new)$	-0.044	$d_{new} \times Exp^4(si, op; new)$	0.157*	$Exp^4(oi, op; new)$	0.002	$d_{new} \times Exp^4(oi, op; new)$	0.163**	
	(0.093)		(0.094)		(0.079)		(0.068)	
$Exp^{more}(si, op; new)$	0.053	$d_{new} \times Exp^{more}(si, op; new)$	0.059	$Exp^{more}(oi, op; new)$	-0.017	$d_{new} \times Exp^{more}(oi, op; new)$	0.185***	
	(0.064)		(0.061)		(0.054)		(0.055)	
$Exp^1(si, op; old)$	0.010	$d_{new} \times Exp^1(si, op; old)$	0.006	$Exp^1(oi, op; old)$	0.046	$d_{new} \times Exp^1(oi, op; old)$	-0.059	
	(0.039)		(0.050)		(0.046)		(0.059)	
$Exp^2(si, op; old)$	-0.027	$d_{new} \times Exp^2(si, op; old)$	0.009	$Exp^2(oi, op; old)$	0.072**	$d_{new} \times Exp^2(oi, op; old)$	-0.066	
	(0.041)		(0.047)		(0.035)		(0.077)	
$Exp^3(si, op; old)$	0.009	$d_{new} \times Exp^3(si, op; old)$	-0.043	$Exp^3(oi, op; old)$	0.002	$d_{new} \times Exp^3(oi, op; old)$	-0.015	
	(0.057)		(0.063)		(0.042)		(0.077)	
$Exp^4(si, op; old)$	0.010	$d_{new} \times Exp^4(si, op; old)$	-0.019	$Exp^4(oi, op; old)$	0.129***	$d_{new} \times Exp^4(oi, op; old)$	-0.101	
	(0.038)		(0.048)		(0.048)		(0.089)	
$Exp^{more}(si, op; old)$	-0.021	$d_{new} \times Exp^{more}(si, op; old)$	-0.066	$Exp^{more}(oi, op; old)$	0.061	$d_{new} \times Exp^{more}(oi, op; old)$	-0.090	
	(0.043)		(0.048)		(0.052)		(0.056)	
Fixed Effects:								
Exporter	✓		Observations	26,929				
Importer	✓							
Country-Product-Year	✓							

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

5 IV estimates

Savings could be correlated with the residual for a variety of reasons. For example, we can have reverse causation or omitted variable bias. For example, it may be that savings is not driving preference use. Rather, some omitted variable which is correlated with saving is doing so. We do not take a stand on what the source of the bias is exactly. We know that whatever be the source

of the bias, if we can find a good instrument for savings, we would be able to correct for it. We use the daily dollar-Colombian peso exchange rate as an instrument. We use this exchange rate because it affects the demand for imports and hence the value of the transaction.[34]. We use this high frequency data on exchange rate in order to maximize the variation. We also use 9-week lags in order to capture the relevant exchange rate at the time of the order.[35] Appreciation of the Colombian peso relative to the dollar would raise the willingness to pay for imports, which would raise savings. The reader should note that in what follows we use country-product fixed effects rather than country-product-year fixed effects. We do so because year fixed effects absorb much of the variation in exchange rates and weaken our first stage. In addition, once the size of the transaction becomes large enough, further increases are unlikely to increase the probability of using preferences. To account for this non-linearity, we interact savings with a dummy for large transactions (top 10 percent of transaction in value at the country level). Furthermore, because firms with high levels of experience are likely to use preferences independent of the size of the transaction, we drop observations of transactions when experience of the exporter at the product level exceed 30.

Results for both countries and both stages are presented in Tables 9 and 10. Note that the first stage is valid for both countries. As expected, an increase in the price of the dollar in terms of the Colombian peso (depreciation of the peso) reduces the savings for both exporting countries, though less so for large transactions. From the second stage results, most important thing to note is that in both countries coefficients on savings rise quite dramatically, by roughly ten times for Argentina and twenty times for Peru. This suggests that the residual is negatively correlated with the saving variable. As expected, for large transactions, savings matter less. Savings and the interaction with large transaction are significant in both Argentina and Peru. Note also that coefficients on

[34]Exchange rate of the exporter vis a vis the dollar would also affect the demand through the costs of production. But it would also affect the costs of meeting rules of origin so that this exchange rate would not be exogenous. See footnotes 18 and 20.

[35]We experimented with different lags, and the lag of 9-week used worked best as an instrument.

experience are similar to those without using the IV and present the same pattern for learning.

Table 9: IV: Argentina

	IV			*OLS*			
$Savings$		0.198**			0.025***		
		(0.078))			(0.005)		
$Savings$		-0.026**			-0.004***		
× Large transaction		(0.011)			(0.001)		
Age		0.013			0.038***		
		(0.012)			(0.007)		
$\ln(er_o)$		-0.012			-0.055**		
		(0.028)			(0.023)		
$Exp^1(si, sp)$	0.077***	$Exp^1(oi, sp)$	0.039	$Exp^1(si, sp)$	0.098***	$Exp^1(oi, sp)$	0.059**
	(0.020)		(0.025)		(0.018)		(0.023)
$Exp^2(si, sp)$	0.117***	$Exp^2(oi, sp)$	0.066**	$Exp^2(si, sp)$	0.146***	$Exp^2(oi, sp)$	0.080***
	(0.026)		(0.032)		(0.021)		(0.028)
$Exp^3(si, sp)$	0.152***	$Exp^3(oi, sp)$	0.064*	$Exp^3(si, sp)$	0.172***	$Exp^3(oi, sp)$	0.085***
	(0.029)		(0.035)		(0.024)		(0.030)
$Exp^4(si, sp)$	0.124***	$Exp^4(oi, sp)$	0.054	$Exp^4(si, sp)$	0.160***	$Exp^4(oi, sp)$	0.084**
	(0.036)		(0.041)		(0.029)		(0.033)
$Exp^{more}(si, sp)$	0.149***	$Exp^{more}(oi, sp)$	0.017	$Exp^{more}(si, sp)$	0.182***	$Exp^{more}(oi, sp)$	0.049*
	(0.041)		(0.034)		(0.034)		(0.027)
$Exp^1(si, op)$	0.082**	$Exp^1(oi, op)$	-0.016	$Exp^1(si, op)$	0.051*	$Exp^1(oi, op)$	-0.022
	(0.032)		(0.035)		(0.030)		(0.033)
$Exp^2(si, op)$	0.047	$Exp^2(oi, op)$	0.0619*	$Exp^2(si, op)$	0.048	$Exp^2(oi, op)$	0.031
	(0.029)		(0.035)		(0.032)		(0.030)
$Exp^3(si, op)$	0.056	$Exp^3(oi, op)$	0.048	$Exp^3(si, op)$	0.057*	$Exp^3(oi, op)$	0.034
	(0.037)		(0.071)		(0.035)		(0.071)
$Exp^4(si, op)$	0.130***	$Exp^4(oi, op)$	0.029	$Exp^4(si, op)$	0.107***	$Exp^4(oi, op)$	0.011
	(0.038)		(0.053)		(0.036)		(0.051)
$Exp^{more}(si, op)$	0.109***	$Exp^{more}(oi, op)$	0.114***	$Exp^{more}(si, op)$	0.109***	$Exp^{more}(oi, op)$	0.080*
	(0.036)		(0.044)		(0.036)		(0.045)
Observations		19,827			19,827		
Fixed Effects:							
Exporter		✓			✓		
Importer		✓			✓		
Country-Product		✓			✓		
First stage: $Savings$				*First stage:* $Savings$× *Large transaction*			
2 month lagged $\ln(er_{CO})$		-0.840***					
		(0.130)					
2 month lagged $\ln(er_{CO})$		0.216***			1.615***		
× Large transaction		(0.008)			(0.009)		
F		44.42			1560		

Importer-exporter clustered standard errors in parentheses.
sp=same products, op=other goods, si=same importer, oi=other importers.
*** p<0.01, ** p<0.05, * p<0.1.

Table 10: IV: Peru

	IV				*OLS*			
$Savings$			0.144**				0.011***	
			(0.061)				(0.004)	
$Savings$			-0.014**				0.000	
× Large transaction			(0.006)				0.000	
Age			-0.012**				-0.014**	
			(0.006)				(0.006)	
$\ln(er_o)$			0.196**				0.117	
			(0.095)				(0.071)	
$Exp^1(si, sp)$	0.026***	$Exp^1(oi, sp)$	0.021**		$Exp^1(si, sp)$	0.044***	$Exp^1(oi, sp)$	0.024***
	(0.008)		(0.009)			(0.008)		(0.007)
$Exp^2(si, sp)$	0.032***	$Exp^2(oi, sp)$	0.014		$Exp^2(si, sp)$	0.054***	$Exp^2(oi, sp)$	0.023***
	(0.012)		(0.010)			(0.012)		(0.007)
$Exp^3(si, sp)$	0.036***	$Exp^3(oi, sp)$	0.011		$Exp^3(si, sp)$	0.060***	$Exp^3(oi, sp)$	0.028***
	(0.013)		(0.012)			(0.011)		(0.008)
$Exp^4(si, sp)$	0.032**	$Exp^4(oi, sp)$	0.010		$Exp^4(si, sp)$	0.061***	$Exp^4(oi, sp)$	0.029***
	(0.015)		(0.013)			(0.012)		(0.008)
$Exp^{more}(si, sp)$	0.043**	$Exp^{more}(oi, sp)$	0.007		$Exp^{more}(si, sp)$	0.079***	$Exp^{more}(oi, sp)$	0.026***
	(0.019)		(0.014)			(0.018)		(0.008)
$Exp^1(si, op)$	-0.007	$Exp^1(oi, op)$	-0.091***		$Exp^1(si, op)$	-0.011	$Exp^1(oi, op)$	-0.079***
	(0.008)		(0.026)			(0.007)		(0.018)
$Exp^2(si, op)$	-0.011	$Exp^2(oi, op)$	-0.007		$Exp^2(si, op)$	-0.019**	$Exp^2(oi, op)$	-0.024
	(0.009)		(0.017)			(0.008)		(0.016)
$Exp^3(si, op)$	0.007	$Exp^3(oi, op)$	-0.025		$Exp^3(si, op)$	-0.014	$Exp^3(oi, op)$	-0.032**
	(0.014)		(0.017)			(0.009)		(0.013)
$Exp^4(si, op)$	-0.014	$Exp^4(oi, op)$	-0.021		$Exp^4(si, op)$	-0.027**	$Exp^4(oi, op)$	-0.032*
	(0.014)		(0.019)			(0.011)		(0.016)
$Exp^{more}(si, op)$	0.012	$Exp^{more}(oi, op)$	-0.029		$Exp^{more}(si, op)$	-0.017**	$Exp^{more}(oi, op)$	-0.042**
	(0.017)		(0.021)			(0.008)		(0.020)
Observations			45,258				45,258	
Fixed Effects:								
Exporter			✓				✓	
Importer			✓				✓	
Country-Product			✓				✓	
First stage: $Savings$					*First stage:* $Savings$× *Large transaction*			
2 month lagged $\ln(er_{CO})$			-0.601***					
			(0.156)					
2 month lagged $\ln(er_{CO})$			0.193***				1.859***	
× Large transaction			(0.007)				(0.005)	
F			43.89				8706	

Importer-exporter clustered standard errors in parentheses.
sp=same products, op=other goods, si=same importer, oi=other importers.
*** p<0.01, ** p<0.05, * p<0.1.

6 Measurement Error

In the data, we cannot observe $r_{it}(0)$ if $a_{it} = 1$. We therefore use $r_{it}(1)$ as a proxy to construct the saving variable. However, if the simple model is actually the data generating process, this proxy generates the measurement error bias. Specifically, our saving variable can be expressed as follows

$$\ln s_{it}^{*} = \ln s_{it} + a_{it} \Delta \ln r_{it} \tag{11}$$

where

$$\Delta \ln r_{it} \equiv \ln r_{it}(1) - \ln r_{it}(0) = \ln \left(\left(\frac{\tau_{jt}^{\text{mfn}}}{\tau_{jt}^{\text{pref}}} \right)^{\eta} R_j^{-(\eta-1)} \right) \equiv \frac{\kappa_{jt}}{\gamma} > 0 \tag{12}$$

where the second equality comes from equation (21) in Appendix C. Notice that the gain in the log of revenue from using preferences depends only on product-time specific parameters.

Substituting the definition of our saving variable into equation (33) in Appendix C, we have

$$\Pr(a_{it} = 1 | X_{eijt}) = \gamma \ln s_{it}^{*} - \mathcal{F}_{eijt} + \xi_{jt} - a_{it}\kappa_{jt} \tag{13}$$

where X_{eijt} summarizes $\left(c_{et}, x_{it}, F_{eijt}, \tau_{jt}^{\text{mfn}}, \tau_{jt}^{\text{pref}}, R_j \right)$. Define the difference between the realized and expected values of a_{it} conditional on X_{ejit} as follows

$$u_{it} \equiv a_{it} - E\left[a_{it} | X_{ejit} \right] \tag{14}$$

Note that the conditional expectation of u_{it} is zero ($E\left[u_{it} | X_{ejit} \right] = 0$) and $E\left[a_{it} | X_{ejit} \right] = \Pr(a_{it} = 1 | X_{eijt})$. By substituting equation (14) into (13) and rearranging it, we obtain the empirical speci-

fication we used in the previous sections.

$$a_{it} = \frac{\gamma}{1+\kappa_{jt}} \ln s^*_{it} - \frac{\mathcal{F}_{eijt}}{1+\kappa_{jt}} + \frac{\xi_{jt}}{1+\kappa_{jt}} + \frac{u_{it}}{1+\kappa_{jt}} \tag{15}$$

There are a few implications of equation (15) to highlight here. First, abstracting from endogeneity issues, the estimated coefficients of all the variables have attenuation bias because $\kappa_{jt} > 0$. However, when we look at equation (12), we see κ_{jt} is likely to be small as long as the preference margin is small, the marginal cost of meeting ROOs is small, the demand elasticity is not too large, and the variance of the shock, ε_{it} is large.[36] In this case, the bias is small. Moreover, our interest in the paper is primarily on the coefficients of experience. The ratios of the coefficients are unbiased. Therefore, the coefficients on experience are all biased in the same way and an increasing pattern in the coefficient of the experience variables still indicates falling fixed costs with experience.

Second, in addition to possible endogeneity biases arising from omitted variable biases or reverse causation discussed earlier, we have an endogeneity bias arising because of the measurement error in savings. A good instrument takes care of whatever endogeneity biases exist in savings. Thus, we argue that our IV estimates for the coefficients on savings are if anything conservative (as there might be small attenuation bias because of $\kappa_{jt} > 0$) and our findings that fixed costs of using preferences fall with experience remain.

7 Conclusion

We see this paper as a part of a larger research project on better understanding preferences. The focus of this paper was to cast light on the shape of costs of meeting ROOs, a subject on which there is limited prior work to the best of our knowledge. Our results suggest that costs of using

[36] For example, suppose the tariff ratio is 1.1 (the average preference margin (in level) is 4.7% for Argentina and 14.4% for Peru), R is 1.1 (R needs to be small enough relative to the preference margin for preference use to be profitable), the demand elasticity is 4 (average in the literature), and $\gamma = 0.2$ (recall that γ is the coefficient of saving). In this example, we have $\kappa \approx 0.02$.

preferences fall with greater experience. As a result, policies that are targeted to new exporters with little or no experience in using ROOs should have large payoffs in terms of preference utilization and exports. Not only would their current use rise, but so would their future use as their choices are interlinked over time. In addition, as larger firms are more likely to have experience as well as larger orders, they are likely to be the ones to use preferences. This means that FTAs might tend to advantage them relative to smaller firms and through this channel negatively impact competition.

Our results also mean that the use of preferences is a dynamic problem, not a static one. In other words, the presence of these spillovers make the decision to invoke preferences into a dynamic problem as long as firms are forward looking, i.e., do not completely discount the future. In ongoing work we build on these results from our static model and develop a simple dynamic model of preference use with spillovers, estimate it and use it to do some policy counterfactuals.

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A Details of the Trade Agreements

Integration initiatives among Latin American countries go back to the late 1950s and early 1960s. The first formal agreement, the Latin American Free Trade Association (LAFTA — ALALC for its name in Spanish), was signed in Montevideo in 1960 and involved the South American countries and Mexico.[37] Consistent with the import substitution strategy prevailing at the time, and different from their more recent counterparts, LAFTA was in fact an agreement on a framework to conduct bilateral negotiations to liberalize trade in products based on positive lists of tariffs concessions. Given that these lists had to be discussed and agreed line-by-line, the process resulted in a high degree of selectivity and complexity and the progress towards intra-regional free trade was consequently limited (see Devlin and Estevadeordal (2001)).

At the end of the 1960s and unsatisfied with this initiative, Bolivia, Chile, Colombia, Ecuador, and Peru signed the Cartagena Treaty to establish the Andean Pact in 1969 to accelerate and deepen the integration and ultimately create a common market among them.[38] Unlike LAFTA, the trade liberalization program defined in this agreement included a list of products subject to automatic tariff reductions that covered half of the universe of tariff lines and was scheduled to be implemented gradually to reach zero tariffs within a ten years period and established that tariffs corresponding to the common lists agreed under LAFTA had to be entirely eliminated within six months after the scheme entered into force.[39] Moreover, a common external tariff was to be in place by the end of 1980. While neither the full removal of internal tariffs nor the complete adoption of the common external tariff were achieved due to mounting disagreements among countries along the process, implementation problems, and non-compliance, trade barriers decreased significantly after 1969. More precisely, average tariffs between Colombia and Peru decreased from 92% in

[37] The Montevideo Treaty was initially signed by Argentina, Brazil, Chile, Mexico, Paraguay, Peru, and Uruguay. In subsequent years, Colombia (1961), Ecuador (1961), Venezuela (1966), and Bolivia (1967) joined the agreement.

[38] Venezuela joined in 1973 whereas Chile left the agreement in 1976.

[39] The remaining products primarily corresponded to general exceptions or those related to industrial development plans. The agreement granted preferential treatment to Bolivia and Ecuador in accounting for their lower development level, in general, more flexibility to implement the liberalization schedule, in particular.

1969 to 10% in 1978 for the products included in the liberalization program and 25% of the lines were free from tariffs (see Devlin and Estevadeordal (2001)). More recently, the Andean Pact was relaunched in 1992 to complete the free trade area and became the Andean Community in 1996 (see Mesquita Moreira et al. (2018)). As a consequence, the movement towards deeper regional integration gained renewed impetus and non-zero preferential tariffs were further reduced on an automatic basis across the board. Thus, the median tariff imposed by Colombia on exports from Peru decreased from 46% in 1985, to 10% in 1995, and 0% in 2005 (see Ludema et al. (2021)). The LAFTA was replaced by the Latin American Integration Association (LAIA — ALADI for its name in Spanish), which was established in 1980 through the Treaty of Montevideo. Argentina, Colombia, and Peru were among the founding members. In the framework of the LAIA, Argentina and Colombia signed a first agreement in 1988 to reduce bilateral tariffs on a limited number of products (Economic Complementary Agreement of Partial Scope 11 — AAP.CE 11 for its name in Spanish). This agreement was replaced by the AAP.CE 48 in 2000, which aimed at becoming a building block to create a free trade zone between the members of the Andean Community at that time—i.e., Bolivia, Colombia, Ecuador, Peru, and Venezuela— and the members of the MERCOSUR —i.e., Argentina, Brazil, Paraguay, and Uruguay— as formally agreed by these countries in 1998. Under the AAP.CE 48, Colombia granted fixed preferences on around 1,250 products from Argentina (i.e., less than one quarter of the total number of tariff lines), with the preference margins (defined as the MFN tariff less the preferential one divided by the MFN tariff) averaging 40% and ranging from 10% to 100%. Median tariffs applied by Colombia on products coming from Argentina consequently reached 10% in 2005.

This agreement was superseded by the AAP.CE 59, which established a free trade zone between Colombia, Ecuador, and Venezuela, on one side, and Argentina, Brazil, Paraguay, and Uruguay, on the other side. This new agreement, which was signed in 2004 and entered into force in 2005, included a trade liberalization program consisting of automatic tariff phasing-out to reach 100% preference margin within different time horizons depending on the products: immediately, in 4-12

years for products not covered in previous agreement, and in 12-15 years for the so-called sensitive products. According to data from ALADI, as of 2020, approximately 97% of the tariff lines are subject to preferences and such preferences average 99% for the trade between Argentina and Colombia.[40]

B Construction of the Dataset

B.1 Data Matching

As explained in Subsection 2.2, the Colombian import database reports both the importing firm's tax ID and name and the exporting firm's name, whereas the Argentinean and Peruvian export databases include the exporting firm's tax ID and name, also for each transaction. Hence, the exporting and importing sides must be merged. We do so primarily using the exporting firms' names, supplemented with information on the dates, the origin/destination country, the product (code), the value, and the weight.

Firms' names generally differ in both databases. This could be due to the type of business structure or due to spelling. In the first case, a firm could appear, for instance, as an S.R.L. (Sociedad de Responsabilidad Limitada –the equivalent of a Limited Liability Company in the U.S.-) in one database and as a S.A. (Sociedad Anonima –the equivalent of publicly traded company in the U.S.-) in the other database. In the second case, data can be subject to typos, abbreviations, or missing words in one or both datasets. To address this issue, we first harmonized firms' names in each dataset separately. Specifically, we removed special and punctuation characters and conjunctions, we then replaced business structures by their acronyms, and finally we abbreviated common words in firms (e.g., Exportadora –Exporter- o Exportaciones –Exports- are replaced by EXP) before eliminating them.

Second, we resorted to a fuzzy matching algorithm (i.e., probabilistic linking) to compare

[40] A new agreement, the AAP.CE 72 was firmed between Colombia and MERCOSUR countries in 2017.

and match the harmonized firms' names in both pairs of databases (i.e., considering the specific origin/destination countries). This algorithm found the best match (or group of matches) in the standardized data, up to a similarity score of 85%. In the final step we performed a manual review to validate the matches that are a 100% similar and to decide on the matches that are in a range of 85% to 99% of similarity, using, in addition the data on the dates, the product (code), the value, and the weight.

The match is very good. For Argentina, we are able to match 95.1% of exporting firms, 98.9% of transactions, and 99.3% of the value of the transactions. For Peru, we are able to match 94.9% of exporting firms, 99.7% of transactions, and 99.9% of the value of the transactions.

B.2 Data Cleaning

The challenge in the data comes from the absence of clear information on the MFN tariff relevant for the transaction. In order to construct two key variables used in the regressions, namely savings and the preference utilization dummy, we need information on both the MFN tariff and the preferential tariff as well as whether preferences were invoked. There is no field that gives us the MFN tariff. However for each transaction we do know the tariff applied. Hence, we imputed the MFN tariff to be the tariff applied in the given month of the transaction on the same product at HS 10 digit level on Colombia's imports from countries that do not have trade agreements with it at that time. If no such transaction exists, we use the tariff paid on the previous transaction. In the data, some products have more than one MFN tariff in a given month. Since MFN tariffs are very slow to change, we treat these observations as suspect and drop all observations on these products. This loses us 0.19% of the data.

In addition, as transactions with a size below "the de minimis level" are exempt from paying tariffs. We drop all transactions below 200 dollars, which was the de minimis level for Colombia in 2016.[41] This loses us 11.6% of the data.

[41] See `https://global-express.org/assets/files/Customs%20Committee/de-minimis/`

After these two cleaning processes, we construct a preference utilization dummy by comparing the tariff paid to the MFN rate. If the tariff paid is below the MFN rate, we infer that preferences were used in the transaction. By definition, all members of the WTO are given MFN status so that any tariff below the MFN tariff must come from preferenctial trade agreements. There is a field for the trade agreement used in the transaction, but this field is missing for 84.9% of the data. For this reason we could not use this variable. The preferential tariff for a given product exported by a given country is constructed as the most recent tariff paid below the MFN tariff to date on the 10 digit product by exporters from the particular country.

Once we know when preferences were used, we can construct for each exporter a history of experience in using preferences in past transactions. These experiences can also be broken down into four categories used in the paper. The preference margin is defined as the difference in the MFN tariff and the preferential tariff. This allows us to contract the savings variable as the preference margin times the FOB value of the transaction. Perceptive readers might be concerned about the products where preferences exist but are not utilized. In our construction, this would show up as the MFN tariff being equal to the tariff paid in all transactions of the product for a particular year and constructed preference margin would be zero, while the true margin could be positive. But this does not matter because we control country-product-year fixed effects.

We also drop observations for which tariff paid exceeded the MFN tariff. This can happen if, for example, anti-dumping or countervailing tariffs were being imposed. Since these instances occur when other forces are in play, we dropped these transactions. This loses us 2.6% of the data.

Preferential tariffs are usually phased in over time, in other words, they are negotiated to fall over the period until they reach the negotiated level. As a result, when we see preferential tariffs that rise over a period, we are concerned. To be cautious, we drop the products in the entirety from the data. This loses us 31.1% of the data. Note however that as the histories were constructed before dropping these observations, we are not concerned about this affecting our experience vari-

GEA-overview-on-de-minimis_April-2016.pdf.

ables.

C A Simple Model

Suppose an exporter and an importer meet randomly at period t. Importer i has the following constant elasticity demand system

$$q_{it} = \left((\tau_{jt}^{\text{pref}})^{a_{it}} (\tau_{jt}^{\text{mfn}})^{1-a_{it}} p_{it} \right)^{-\eta} x_{it} \tag{16}$$

where $j = j(i,t)$ is the product of the transaction, a_{it} is the dummy variable which is equal to one if preference is applied in the transaction, τ_{jt}^{h} for $h = \text{pref}, \text{mfn}$ summarizes one plus the tariff to pay with and without preferences, p_{it} is the price of the transaction, x_{it} is the demand shock of the importer, and η is the constant elasticity of demand.

Exporter e maximizes the profit of the transaction by choosing price and determines if preferences are used or not in the transaction. The profit of the transaction is

$$\pi_{eit} = \left(p_{it} - R_j^{a_{it}} c_{et} \right) q_{eit} - a_{it} \varepsilon_{it} F_{eijt} \tag{17}$$

Using preferences is costly in two ways. Fist, the exporter needs to meet the rules of origin that may increase the marginal costs of production $R_j \geq 1$. Second, the exporter needs to pay the fixed costs of documentation for the certificate of origin, $F_{eijt} > 0$. This fixed cost may depend on their experience in using preferences in the past transactions. We also assume that this costs includes some shocks $\varepsilon_{it} > 0$, which rationalizes why some transactions with large value do not apply preference.

Assume that exporters solve the problem in two stages. In the first stage, exporters decide whether they use preferences or not. In the second stage, they set the price. We can solve the problem backwards. Given the preference application, the exporter sets the price that maximizes

equation (17). The first order condition implies

$$p_{it}(a_{it}) = \frac{\eta}{\eta - 1} R_j^{a_{it}} c_{et} \tag{18}$$

Substituting this into equation (17), we can derive the profit as a function of preference application

$$\pi_{it}(a_{it}) = \frac{1}{\eta} r_{it}(a_{it}) - a_{it}\varepsilon_{it} F_{eijt} \tag{19}$$

where $r_{it}(a_{it})$ is the value of the transaction

$$r_{it}(a_{it}) = \left(\left(\frac{\tau_{jt}^{\text{mfn}}}{\tau_{jt}^{\text{pref}}} \right)^{\eta} R_j^{-(\eta-1)} \right)^{a_{it}} \left(\tau_{jt}^{\text{mfn}}\right)^{-\eta} \left(\frac{\eta}{\eta - 1} c_{et} \right)^{1-\eta} x_{it} \tag{20}$$

$$= \left(\left(\frac{\tau_{jt}^{\text{mfn}}}{\tau_{jt}^{\text{pref}}} \right)^{\eta} R_j^{-(\eta-1)} \right)^{a_{it}} r_{it}(0) \tag{21}$$

$$\equiv B_{jt}^{a_{it}} r_{it}(0) \tag{22}$$

where $B_{jt}^{a_{it}}$ is the benefits of using preferences, which we assume to be more than one. Given the profits with and without the preference, the exporter chooses to use the preference if the profit with preference is larger than the other

$$a_{it} = \mathbb{1}\left\{ \pi_{it}(1) - \pi_{it}(0) > 0 \right\} \tag{23}$$

$$= \mathbb{1}\left\{ \frac{1}{\eta} \left(r_{it}(1) - r_{it}(0) \right) > \varepsilon_{it} F_{eijt} \right\} \tag{24}$$

We can then rewrite the problem as follows[42]

$$a_{it} = \mathbb{1}\left\{\ln\left(\left(\frac{\tau_{jt}^{\text{mfn}}}{\tau_{jt}^{\text{pref}}}\right)^{\eta} R_j^{-(\eta-1)} - 1\right) + \ln r_{it}(0) - \ln\eta > \ln\varepsilon_{it} + \ln F_{eijt}\right\} \tag{25}$$

$$= \mathbb{1}\left\{\ln(\tau_{jt}^{\text{mfn}} - \tau_{jt}^{\text{pref}}) r_{it}(0) - \ln F_{eijt} + \ln\left(\frac{\left(\frac{\tau_{jt}^{\text{mfn}}}{\tau_{jt}^{\text{pref}}}\right)^{\eta} R_j^{-(\eta-1)} - 1}{\tau_{jt}^{\text{mfn}} - \tau_{jt}^{\text{pref}}}\right) - \ln\eta > \ln\varepsilon_{it}\right\} \tag{26}$$

$$= \mathbb{1}\left\{\ln s_{it} - \ln F_{eijt} + \chi_{jt} > \ln\varepsilon_{it}\right\} \tag{27}$$

where

$$s_{it} \equiv (\tau_{jt}^{\text{mfn}} - \tau_{jt}^{\text{pref}}) r_{it}(0) \tag{28}$$

$$\chi_{jt} \equiv \ln\left(\frac{\left(\frac{\tau_{jt}^{\text{mfn}}}{\tau_{jt}^{\text{pref}}}\right)^{\eta} R_j^{-(\eta-1)} - 1}{\tau_{jt}^{\text{mfn}} - \tau_{jt}^{\text{pref}}}\right) - \ln\eta \tag{29}$$

Let $\ln\varepsilon_{it}$ be independently drawn from a distribution $G(\cdot)$. Then we have

$$\Pr(a_{it} = 1 | X_{eijt}) = G(\ln s_{it} - \ln F_{eijt} + \chi_{jt}) \tag{30}$$

where X_{eijt} summarizes $\left(c_{et}, x_{it}, F_{eijt}, \tau_{jt}^{\text{mfn}}, \tau_{jt}^{\text{pref}}, R_j\right)$. Suppose $G(\cdot)$ is a uniform distribution with mean μ and density γ

$$G(x) \equiv \gamma\left(x + \frac{1}{2\gamma} - \mu\right) \tag{31}$$

Then we can derive the probability of using preference conditional on the saving from the transac-

[42]Both sides of equation (24) are positive so that we can take logs. We have already assumed that ε_{it}, F_{eijt}, and $r_{it}(1) - r_{it}(0) = (B_{jt} - 1) r_{it}(0)$ are positive.

tion, fixed cost, and product-time specific parameter as

$$\Pr(a_{it} = 1|X_{eijt}) = \gamma \ln s_{it} - \gamma \ln F_{eijt} + \gamma \chi_{jt} + \frac{1}{2} - \gamma \mu \tag{32}$$

which can be summarized as

$$\Pr(a_{it} = 1|X_{eijt}) = \gamma \ln s_{it} - \mathcal{F}_{eijt} + \xi_{jt}. \tag{33}$$

D Linear Probability Model vs Logit

To understand how much our results change between a LPM and a Logit specification we estimate Equation (6) without any fixed effects using both methods and report the results in Table 3. Overall, the results are qualitatively similar; coefficients for experience are positive and significant, so is the coefficient for savings, while the one for age (in exporting to Colombia) is negative and significant. Preferences are also more likely to be used in Peru than in Argentina, as might be expected given the longer history of the trade agreements with Peru. In terms of magnitude, we find that Logit gives lower marginal effects at the mean compared to the LPM for every level of experience below five. This might be the result of non-linearity in the relationship between experience and the probability of utilizing preferences. Notice that the LPM coefficients associated with experience suggest that more experienced firms have a higher probability of using preferences. In particular, firms with experience using preferences of one to five or more transactions have an increase in the probability of using preferences of 24%, 36.3%, 37.6%, 38%, and 49.7% respectively compared to inexperienced firms. Fixed effects are useful to refine our estimation to potential threats but implementation of fixed effects in Logit is cumbersome so that the LPM is what we use from here on.

In Table 12, we use total experience of an exporter in all products and with all importers. The coefficient on $Savings$ is positive and significant across all eight columns with value of 0.0218

Table 11: LPM vs. Logit

	(1) LPM	(2) Logit	(3) Marginal effect at the mean
$Savings$	0.040***	0.462***	0.034***
	(0.005)	(0.028)	(0.006)
Age	-0.013***	-0.158***	-0.012***
	(0.00361)	(0.044)	(0.004)
$Exp^1(ai, ap)$	0.274***	1.374***	0.061***
	(0.030)	(0.133)	(0.009)
$Exp^2(ai, ap)$	0.378***	1.964***	0.071***
	(0.021)	(0.141)	(0.010)
$Exp^3(ai, ap)$	0.392***	2.059***	0.071***
	(0.022)	(0.166)	(0.011)
$Exp^4(ai, ap)$	0.388***	2.024***	0.071***
	(0.026)	(0.196)	(0.011)
$Exp^{more}(ai, ap)$	0.494***	3.165***	0.498***
	(0.018)	(0.208)	(0.039)
$Peru$	0.139***	1.054***	0.102***
	(0.020)	(0.195)	(0.016)
$Constant$	-0.096**	-5.732***	
	(0.044)	(0.266)	
Observations	136,094	136,094	136,094

Importer-exporter clustered standard errors in parentheses. ap refers to all products, while ai refers to all importers. *** p<0.01, ** p<0.05, * p<0.1.

in our most demanding specification column (8) with exporter-importer and country-product-year fixed effects. In other words, the probability of using preferences rises by 2.18% when the size of the order doubles. The variable Age (which measures years of experience in exporting to Colombia) also has a positive, significant coefficient in column (7) and (8), which are the chosen specifications in the body of the paper. The results also suggest that more experience increases the probability of using preferences. The coefficients are significant and increasing even in our most constraining specification in Column (8).

Finally, since ROOs and preference margins with Argentina and Peru were negotiated bilaterally, and in some cases phased in, they differ by country, product and over time. Fixed effects for country-product-year control for this feature. In columns 1 to 8 of Table 12, we use a variety of fixed effects. The coefficients on experience are surprisingly stable in terms of their sign. The

Table 12: Preference use vs experience in past transactions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$Savings$	0.023***	0.033***	0.037***	0.022***	0.012***	0.021***	0.010***	0.010***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Age	-0.001	-0.005	-0.008***	-0.001	0.002	0.005*	0.006***	0.006***
	(0.003)	(0.003)	(0.002)	(0.004)	(0.002)	(0.003)	(0.002)	(0.002)
$Exp^1(ai, ap)$	0.078***	0.139***	0.236***	0.066***	0.065***	-0.004	0.013	0.015
	(0.018)	(0.017)	(0.017)	(0.020)	(0.019)	(0.013)	(0.014)	(0.014)
$Exp^2(ai, ap)$	0.127***	0.193***	0.311***	0.120***	0.109***	0.005	0.037***	0.041***
	(0.018)	(0.016)	(0.015)	(0.020)	(0.018)	(0.014)	(0.014)	(0.014)
$Exp^3(ai, ap)$	0.141***	0.214***	0.305***	0.130***	0.113***	0.018	0.056***	0.063***
	(0.020)	(0.017)	(0.020)	(0.022)	(0.020)	(0.015)	(0.015)	(0.015)
$Exp^4(ai, ap)$	0.145***	0.226***	0.323***	0.141***	0.119***	0.020	0.052***	0.056***
	(0.020)	(0.018)	(0.020)	(0.023)	(0.021)	(0.016)	(0.017)	(0.017)
$Exp^{more}(ai, ap)$	0.209***	0.295***	0.411***	0.197***	0.169***	0.030*	0.075***	0.080***
	(0.023)	(0.017)	(0.015)	(0.027)	(0.023)	(0.017)	(0.018)	(0.018)
Observations	133,570	133,939	135,802	131,332	127,776	129,335	128,745	127,745
Fixed Effects:								
Exporter	✓						✓	
Importer		✓					✓	
Product			✓					
Exporter-Importer				✓		✓		✓
Exporter-Product					✓			
Exporter-Year						✓		
Country-Product-Year							✓	✓

Importer-exporter clustered standard errors in parentheses. ap refers to all products, while ai refers to all importers.
*** p<0.01, ** p<0.05, * p<0.1

lower significance in column 6 can be explained by the fact that most exporters have very few transactions in a given year. As a result we lose a lot of variation in the data. Note that even with the rigorous fixed effects used in column 7 and 8 experience matters, especially after the first time. From here on, we will use the equivalent of column 7 and 8 in our regressions.