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On the heterogeneous effects of market-access barriers: Evidence from small and large Peruvian exporters

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ABSTRACT

We examine the extent to which market-access barriers in Latin America affect small and large Peruvian exporters to the region. Using a dataset that allows us to distinguish between tariffs and different types of non-tariff measures introduced by Latin American countries between 2000 and 2014, we find that large Peruvian exporters benefit rather than lose from the introduction of tariffs and non-tariff measures in their destination markets. Their export value increases and the probability that they exit the export sector decreases as they face new market-access barriers abroad. The reverse is true for small exporters, which are hurt by more stringent market-access barriers.

JEL Classification: F13.

Keywords: Non-Tariff Measures, Tariffs, Firm heterogeneity.

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1 Introduction

We combine data on tariffs and Non-Tariff Measures (NTMs) imposed by Latin American importers with firm-level export data from Peruvian customs during the period 2000-2014 to examine the impact of market-access barriers in Latin America on Peruvian exporters. We found that the average impact varies depending on the type of trade barrier. Some market-access barriers, such as tariffs and Technical Barriers to Trade (TBTs), hurt the average exporter more than other measures, such as price controls. We also found that the impact of market-access barriers is not homogeneous across exporters. Small exporters are affected by market-access barriers more negatively than large exporters are. Interestingly, very large exporters tend to benefit, rather than lose, from the imposition of more restrictive market-access barriers in destination markets.

These results are important for at least three reasons. First, they show that market-access barriers can lead to more concentrated world markets in which the prevalence of small firms declines while large firms consolidate their market share. Our results therefore suggest that "fat cats" benefit not from globalization, but from protectionism.[1] Indeed, our results seem to suggest that a more open trade regime would result in a more equal distribution of market shares among small and large firms. Because small firms tend to be relatively more unskilled-intensive than large firms (Hamermesh, 1980, Brown and Medoff, 1989, and Cruz et al., 2017), the redistribution of market shares towards smaller exporters is also likely to reduce wage inequality within the exporting country.

A second reason these results are important is that they show that a heterogeneous impact is observed not only for tariffs, but also for some non-tariff measures (NTMs) such as technical barriers to trade (TBTs).[2] This is important because, as tariffs tend to decline worldwide through unilateral reforms or multilateral negotiations, the importance of NTMs has increased. Some studies argue that the rise in NTMs undermines the progress made so far in liberalizing tariffs (Evenett and Fritz, 2015; Jensen and Keyser, 2012).[3] In partic-

[1] Irish singer Bono once referred to the World Economic Forum meeting, which gathers CEOs and other representatives of many large multinational corporations in wintry Davos, Switzerland, as "fat cats in the snow."

[2] Broadly defined, NTMs include all trade-related policy costs incurred from production to final consumer, with the exclusion of tariffs.

[3] Others argue that the impact of NTMs on trade flows remains ambiguous, depending on the magnitude

ular, technical measures (Technical Barriers to Trade, TBTs; Sanitary and Phytosanitary measures, SPS, and Pre-Shipment Inspections, PSIs) have become a prominent feature in the regulation of international trade. While technical regulations were imposed on almost 37 percent of tariff lines in 1999, the equivalent figure for 2015 was more than 60 percent (UNCTAD, 2015). This shift from tariffs to NTMs thus does not seem to change the fact that small firms are hurt by market-access barriers, whereas large exporters benefit when facing the same barriers.

A third reason these results are important is that NTMs can take many different forms, and understanding the impact these different types of NTMs have on exporters should be important for trade negotiators. For practical purposes, NTMs are categorized according to their scope and/or design and are broadly distinguished from technical measures (e.g., SPS; TBTs; and PSIs) and non-technical measures. The latter are further distinguished from hard measures (e.g., price and quantity control measures), threat measures (e.g., anti-dumping and safeguards), and other measures such as trade-related finance, anti-competitive, and investment measures. In practice, NTMs are measures that have the potential to distort international trade, whether they are meant to be protectionist or not. Measures such as quality standards, for example, although generally imposed without protectionist intent, may be of particular concern to poor countries whose producers are often ill-equipped to comply with them. On the other hand, quality standards, signaling product quality, might help in information exchanges between buyers and sellers, which may thus reduce transaction costs and facilitate trade. Non-technical measures vary considerably by intent and scope. Their effect on trade, however, is generally better understood and easier to quantify. The effects of price control measures are relatively simple to measure, especially anti-dumping and safeguard measures. Quantity control instruments have been extensively examined in the analysis of quotas, tariff rate quotas, and their administration (see Boughner, de Gorter, and Sheldon, 2000). Para-tariff measures can be analyzed as conventional tax instruments and their incidence is straightforward to perceive. Finance, anti-competitive, and trade-related investment measures have indirect effects on trade, but their actual impact is more

of their cost-raising effects (Chen and Mattoo, 2008; Maertens and Swinnen, 2009). Finally, although it is outside the scope of this paper, if welfare considerations are taken into account, negative trade effects may very well be associated with positive welfare effects (Disdier and Marette, 2010).

difficult to assess. To our knowledge, this is the first study to try to disentangle the impact of these different types of NTMs on exporters. Our finding that technical measures, and in particular technical barriers to trade, are relatively more constraining than other measures should be of interest to negotiators and policy makers.

The case of Peruvian exports to other Latin American Integration Association (LAIA) partners[4] is interesting because of two apparently contradicting trends. While the share of Peruvian exports directed to LAIA countries has been growing since 2000, the number of Peruvian exporters to the region has been declining during the same period. While the intensification of exports to LAIA countries could be associated with the economic and trade integration process at work in the region over the last fifteen years,[5] the increasing concentration of firms in the export sector is puzzling. The explanation this paper provides to this puzzle is that while tariffs were being bilaterally reduced within LAIA, there was a growing implementation of NTMs, and in particular technical regulations, which hurt small Peruvian exporters, while benefitting large exporters to the region.

The main challenge we face when trying to measure the impact of NTMs is to obtain a comprehensive and consistent dataset of NTMs across importing countries. Existing information is either cross-sectional (with the reference year usually varying across countries) or restricted to some specific type of NTMs (e.g., SPS measures or TBTs) when pluri-annual. The dataset in this paper provides consistent data on NTMs during the period 2000-2014 for all LAIA members. The NTM dataset is a non-negligible contribution of our paper. The dataset offers fifteen-(consecutive)-year coverage of exhaustive NTMs regulations that have been applied by a set of twelve countries. This allows for a neat identification strategy that relies on changes in NTMs rather than their presence or absence. It also allows for the inclusion within the same empirical set-up of different types of NTMs. Because of an almost nonexistent overlap of NTMs, it allows for a clear identification of the impact of each type of NTM on exporters.

We are not the first to examine the heterogeneous impact of tariffs or NTMs across firm

[4]LAIA country-members are Argentina, Bolivia, Brazil, Chile, Colombia, Cuba, Ecuador, Mexico, Paraguay, Peru, Uruguay, and Venezuela.

[5]Fugazza and McLaren (2014) show that a fifth of the increase of Peruvian exports directed to Mercosur countries is due to improvement in preference margins.

size, but evidence remains scarce. A major contribution is Fontagné et al. (2015). They consider the heterogeneous trade effects of restrictive SPS measures on French exporters of different sizes, along with the channels through which aggregate exports fall. In order to do so, they matched a detailed panel of French firm exports to a recent database of SPS regulatory measures that have been raised as concerns in the dedicated committees of the World Trade Organization (WTO). Specific trade concerns refer to standards that are perceived essentially as trade barriers. They analyze their effects on three trade-related outcomes: (i) the probability of exporting and of exiting the export market (the firm-product extensive margin), (ii) the value exported (the firm-product intensive margin), and (iii) export prices. The results suggest that SPS concerns discourage the presence of exporters in SPS-imposing foreign markets. They also negatively affect the intensive margins of trade. An important result is that the negative effects of SPS regulatory measures are attenuated in larger firms. Our paper differs from Fontagné et al. (2015) in that it considers not only the impact of SPS on exporters, but also the impact of a large set of other market-access barriers thanks to the rich LAIA dataset on NTMs. An important difference is that Fontagné et al. (2015) obtain their SPS information from the WTO's Specific Trade Concerns Database, which is built based on complaints by WTO members about barriers imposed by their trading partners. Our dataset is based on the existing trade legislation in every trading partner-country. This may be important if different types of trade barriers affect exporters of various sizes differently. In particular, we may not observe the impact of measures that help rather than hurt large and well-connected exporters in the Specific Trade Concerns Database. This may explain why Fontagné et al. (2015) do not find that large French exporters benefit from market-access barriers.

Another important contribution is Fernandes et al. (2015). They focus on the impact of pesticide standards on firm exports of agricultural products across countries and time. Their results show that pesticide standards significantly influence the foreign market access of affected products. More restrictive standards in the importing country, relative to the exporting country, lower the probability that firms will export as well as their export values and quantities. Like us, they find evidence of heterogeneous effects among exporters. Smaller exporting firms are more negatively affected than larger ones, in their market entry and exit

decisions, by the relative stringency of standards. Again, the main difference with our study is that we focus on a comprehensive set of NTMs, and on a particular exporter. In short, we have a broader focus in terms of NTMs, but a narrower approach in terms of exporting countries.

Fontagné et al. (2016) focus on the heterogeneous impact across French exporters of different types of trade facilitation measures. They find that better information procedures tend to benefit firms that are relatively smaller, whereas the simplification of procedures and automation benefit firms that are relatively larger. They argue that this is consistent with trade facilitation measures that reduce the fixed cost of exporting and therefore favor smaller firms, whereas other measures make corruption less likely and therefore encourage larger firms to engage in those markets. The main difference with our work is the focus on trade facilitation rather than on NTMs, and the fact that the cross-sectional nature of their trade facilitation dataset does not allow for an identification strategy that relies on the imposition and withdrawal of trade measures.

Disdier et al. (2016) show that the introduction of SPS and TBT measures in foreign markets increase the probability of exporting, as well as the value of exports, of the most productive French exporters, while reducing the exporting probability of the least productive French firms. These results are consistent with what we found for Peruvian exporters. The difference lies on the identification of the impact of SPS and TBTs. Disdier et al. (2016) rely on a cross-section of SPS and TBT measures imposed by France's trading partners, but because of the richness of our dataset we are able to identify the impact using the introduction and withdrawal of NTM measures.

We do not test for any specific theoretical mechanism to explain the heterogeneous impact of market-access barriers. But the existing theoretical literature provides several avenues based on the standard heterogeneous firm trade model à la Melitz (2003) or Chaney (2008). One major contribution is Spearot (2013). He shows that if import demand elasticities vary across product varieties, then liberalization of a common tariff is found to have a heterogeneous effect on different types of products. More precisely, the liberalization of a common tariff disproportionately increases imports of low revenue varieties, and in some cases, this increase comes at the expense of high revenue varieties within a wide class of

demand systems that are consistent with empirical evidence. In other words, countries are less responsive to trade shocks when their exporting firms are relatively large. A major implication of this result is that the liberalization of a common ad-valorem tariffs need not increase bilateral imports of all product varieties.

A second theoretical justification is provided by Arkolakis (2010). He presents a framework based on market penetration costs that are endogenous in the sense that paying higher costs allows firms to reach an increasing number of consumers in a country. An important new prediction of the model is that a significant amount of new trade in the event of trade liberalization comes from previously small, rather than new, exporters. In other words the model generates a larger response to trade liberalization by low revenue varieties produced by relatively smaller firms.

Finally, Gagné and Larue (2016) introduce vertical differentiation in a model of trade with heterogeneous firms and monopolistic competition. They show that market and exporter concentration increases as quality standards become more stringent in the home market. Indeed, as quality standards increase, fewer productive domestic and foreign firms exit from the market, which leads to a reallocation of demand towards more productive foreign firms. Additionally, if low-quality foreign firms are producing in the same location as high-quality foreign firms, the reduction in factor demand by the low-quality foreign firms will also benefit the high-quality foreign firms.

The rest of the paper is organized as follows. Section 2 presents stylized facts regarding Peruvian exporters and market-access barriers faced by Peruvian exporters in LAIA during the period 20002014. Section 3 introduces the empirical strategy used to identify the heterogeneous impact of market-access barriers on different Peruvian exporter margins. The results are shown in section 4. The last section provides some concluding remarks.

2 Stylized facts

Before diving into our empirical exercise, we review a series of stylized facts on tariffs and NTMs in LAIA countries faced by Peruvian exporters by combining three datasets. The first dataset contains information on tariffs and is provided by UNCTAD's Trains. The second

dataset contains information on NTMs imposed by LAIA members and comes from the LAIA secretariat and UNCTAD. The third firm-level dataset of Peruvian exporters comes from Peruvian customs. All datasets cover the period 2000-2014.[6]

2.1 Trade barriers in LAIA countries

Tariff applied by LAIA countries on Peruvian exporters tend to differ from their Most-Favored-Nation (MFN) tariffs negotiated in the WTO because of a large numbers of preferential agreements between Peru and other Latin American Countries. This is particularly true in the second half of the period under examination, as can be seen from Table 1. The average tariff applied to Peruvian exporters is below 2 percent in 2014 whereas the average MFN tariff in these same countries is around 14 percent. It is important to note that these difference was significantly smaller at the beginning of the period, when there existed a much smaller number of preferential trade agreements between Peru and the rest of Latin American countries in our sample. Thus, applied tariffs on Peruvian exporters decline steeply during the period, but this has taken place as a result of preferential trade agreements.[7]

Regarding NTMs, the dataset contains 4,451 regulations. Among those 4,451 regulations, 3,145 (70%) were introduced between 2000 and 2014 and are in vigor in 2014; 502 (12%) were introduced and then abolished between 2000 and 2014; 694 (15%) regulations were implemented before 2000 and are still in place in 2014; 140 (3%) were implemented before 2000 and abolished before 2014. Table 2 reports the corresponding figures for each LAIA member. Except for Uruguay, Paraguay and Chile, the majority of regulations in vigor in 2014 were implemented after 2000. This provides us with sufficient variation to estimate the impact of NTMs on Peruvian exports using an identification strategy based on the introduction and withdrawal of NTMs.

Table 3 reports the distribution of implemented regulations across LAIA countries since 2000. The most frequent users of NTMs during this period are Brazil, Ecuador, Peru, Chile, and Argentina. Half (49 percent) of regulations in vigor in 2014 were implemented in the

[6]For more information on these two datasets, see the Data Appendix.

[7]The lack of a successful round of trade negotiations at the multilateral level during this period partly explains the difference in trends between MFN and applied tariffs faced by Peruvian exporters in the region.

sub-period starting in 2010. Bolivia, Colombia and Venezuela are noticeable exceptions to this pattern.

In terms of composition, 83 percent of regulations effective in 2014 refer to technical measures (45 percent to SPS measures, 35 percent to TBTs, and 3 percent to PSIs). Table 4 shows the number of regulations active in 2014 and refers to the three types of technical measures respectively. Technical regulations reported in 2014 are essentially implemented after 2000. For the whole sample, this is the case for 85 percent of SPS measures, 75 percent of TBTs and 76 percent of PSIs. Brazil and Ecuador have implemented more than 90 percent of their SPS measures and TBTs since 2000. Given the prominence of technical measures, the empirical section will focus on the effect of SPS, TBTs and PSIs measures.

Although the number of regulations in place and the relative importance of each type of applied measure already serve as indicators of NTM incidence, a better appreciation of the latter is obtained by considering the number of products affected by the various regulations if they had to be produced and imported. Table 5 reports those figures. Argentina is characterized by the highest product coverage: about 83 percent of products that could be produced and imported at the HS 6-digit level are affected by at least one SPS measure and 87 percent by at least one TBT. At the other extreme, Bolivia has the lowest product coverage with 25 percent of products affected by at least one SPS measure and less than 2 percent by a TBT, while controlling for the impact of non-technical measures.

2.2 Peruvian exports

Table 6 shows the overall evolution of Peruvian exports (first row) between 2000 and 2014 and their geographical composition, focusing on 4 major destination-country groups: namely EU28 countries, LAIA countries, MERCOSUR countries[8] and NAFTA countries (Canada, Mexico, and the United States). Exports reached a peak in 2012 and declined since then, a decline driven, to a large extent, by the collapse of oil prices. Nevertheless, exports increased more than fourfold between 2000 and 2014. In terms of destinations, LAIA countries have become the second most important destination market for Peruvian exports surpassing EU28

[8]Member countries of this sub-regional bloc are Argentina, Brazil, Paraguay, Uruguay, and Venezuela. Other countries in the region participate as associate countries, but are not considered in these calculations.

countries in 2012. Although NAFTA countries and, in particular, the USA, remain the major destination of Peruvian exports, their importance has significantly decreased since 2000.

Given that the NTM data is available for LAIA countries, the focus of the paper is on Peruvian exports to LAIA countries. Thus, the following set of tables investigate how export margins have evolved taking LAIA countries as destination. Table 7 reveals that the number of firms exporting to LAIA countries has increased significantly over the period under investigation. It reaches a peak in 2011 and then falls steadily until 2014. Column 2 shows the share of firms exporting to LAIA countries in the total number of exporting firms. Column 3 reports the share of firms among those exporting to some LAIA countries that export exclusively to LAIA countries. We observe that both the number and the corresponding share of firms exporting to LAIA countries have increased until 2010-2011 to decrease significantly afterwards. At the same time, the share of firms exporting exclusively to LAIA countries has increased steadily over the whole period. It was equal to 58 percent in 2000 and grew to 76 percent in 2013-2014, indicating a geographical specialization process that started around 2005.

Figure 1 represents the evolution of mean (left panel) and median (right panel) export values by firm from 2000 to 2014, with mineral products excluded. Both overall and LAIA-specific figures are represented. General trends are positive in all cases, but with an inflexion point for average figures around the years 2010-2011 and a slowing down for median figures around the years 2011-2012. We observe a rise in median figures and a slight decline in average figures for LAIA destinations in recent years. This essentially reflects an increase in the number of relatively small firms failing to survive on LAIA product markets.

Table 8 shows statistics regarding the number of products exported on average by firms. On average, the number of products exported by firms exporting to LAIA countries is lower than the overall corresponding figure. The former figure oscillates between 5.3 in 2000 and 8.2 in 2012, while the latter ranges between 7.7 in 2000 and 9.4 in 2007. Although differences are less pronounced, median figures confirm a similar pattern in most years. Maximum figures are also comparable and go up to 353 in 2008 for both samples. In other words, large firms appear to operate in all markets, but most firms export a limited number of products and smaller figures are obtained for LAIA countries.

These patterns are echoed by the number of destinations reached by Peruvian firms, as shown in Table 9. Average figures can be expected by construction to be larger when considering the whole world than when focusing on LAIA countries. This is verified as columns 2 and 3 show, although the difference is not that striking. As far as maximum values are concerned, this difference is more remarkable, as could have been easily anticipated. The maximum of LAIA destinations is 11 compared to 60 plus for the rest of the world. The most interesting figure, however, is the median. It is equal to one for both the subsample of LAIA exporters and for the whole sample during the entire period under investigation.

2.3 NTMs in LAIA countries and Peruvian firms

We now combine NTM and firms export data to assess the incidence on Peruvian exporters of NTMs applied by LAIA countries. The focus is on technical regulations, because they are the most commonly used type of NTM as discussed above.

Figure 2 illustrates the extent to which Peruvian exporters faced NTMs in LAIA markets. We define an exporter as being fully exposed (upper part of the bars) if they face at least one NTM on all their export relationships. Firms are only partially exposed (middle part of the bars) if at least one of their export relationships is not affected by an NTM. The last group is made of firms whose exports do not face any NTM. The relative importance of these three groups of firms may be biased by the incidence of multi-product, multi-destination firms. However, as suggested by the previous analysis, the incidence of multi-product, multi-destination firms remains relatively stable during the period of interest. As a general observation, it can be stated that the prevalence of NTMs has become stronger. More firms are concerned by NTMs and more extensively as represented by an increased share of firms with full exposure.

Another important, related issue is overlap of NTMs. If two or more different types of NTMs apply to the same product, it may be difficult to isolate their respective effects. Indeed, the effect of one specific NTM may absorb the effect of any other. The classical example refers to the situation in which both an import quota and a TBT are applied. A firm may be able to cope with TBT requirements, but, because of the quota imposed at the destination, it might not be able to export to that destination. The impact of the

TBT is altered by the presence of the quota. Overlap may also occur when two or more measures of the same type (e.g., two SPS measures) are implemented for the same product. This, however, is less of a concern, since the scope of our empirical assessment is to identify the average effect of the presence of broad categories of NTMs, rather than the impact of some specific regulation. Table 10, moreover, reveals that even at the measure level overlap in our sample is extremely limited. In almost every year, only about 2 percent of trade relationships at the product (HS6 level) are affected by more than one measure. Given the limited overlap our empirical strategy should be able to clearly identify the impact of each measure on Peruvian exports.

3 Empirical Strategy

The empirical strategy aims at explaining exporters behavior in terms of export value, participation in export markets, and market positioning (price range) as a function of newly implemented NTMs, tariff changes, and firm characteristics. To investigate whether market-access barriers have heterogeneous effects on exporters, we include an interaction term between firm size (total exports) and variables capturing market-access barriers (tariffs and technical regulations). We also include a set of fixed effects to control for a number of unobservable factors that may possibly affect exports:

$$
\begin{aligned}
y_{i,p,j,t} \;=\; & \sum_{l \in L_0 (L_0 \subset L_1)} \beta_{1,l} NTM^{l}_{p,j,t} + \beta_2 \ln size_{i,t-1} + \sum_{l \in L_1} \beta_{3,l} NTM^{l}_{p,j,t} \times \ln size_{i,t-1} \\
& + \beta_4 \ln(1 + tariff_{p,j,t}) + \beta_7 \ln(totalimports_{p,j,t}) + \sum_{l \in L_1} \beta_{8,l} DomesNTM^{l}_{p,t} \\
& + \beta_5 \ln(1 + tariff_{p,j,t}) \times \ln(size_{i,t-1}) + \beta_6 BIGS_{i,p,t} + \eta_i + \phi_{p,j} + \delta_{j,t} + \epsilon_{i,p,j,t}
\end{aligned} \tag{1}
$$

We consider four distinct dependent variables represented in equation (1) by $y_{i,p,j,t}$: (i) the natural log of firm i's export value of product p (HS 6-digit) to country j at time t, to capture the intensive margin of trade; (ii) a dummy variable for positive trade flows at time t into a certain product-destination market combination p-j to capture the (firm-product)

extensive margin of trade, or participation; (iii) a dummy variable for the firm exiting at time t a certain product-market *p*-*j* (a dummy equal to one for the firm not exporting in the current year, but having exported the year before, and zero if the firm continues exporting); and (iv) the price of exported good p (in logs) by firm i to country j at time t, proxied by export unit-values.

Despite the dichotomous nature of two of our dependent variables, all specifications are estimated using OLS techniques. The choice of using linear probability models (LPM) rather than nonlinear probit (or logit) is motivated by the desirability of avoiding the incidental parameter problem due to the sizable set of fixed effects we include in all regressions. In addition, LPMs provide simple direct estimates of the sample average marginal effect.

$NTM^{l}_{p,j,t}$ is a dummy variable that indicates the presence of an NTM of type l applied on product p by country j at time t. Two sets of NTMs are considered. The first set L_0 includes all NTMs reported in the LAIA NTM data: namely, SPS measures, TBTs, PSIs, quantity control measures, price-control measures, and finance measures. The second set L_1, which is a subset of L_0, includes technical regulations exclusively (SPS, TBT, and PSIs). We only explore the heterogeneous impact of tariffs and technical regulations included in L_1 by interacting firm size with tariffs, SPS, TBTs and PSIs imposed by partner countries on Peruvian exporters.

Variable $BIGS_{i,p,t}$ is a dummy variable that indicates whether firm i also exports product p to an OECD country at time t. The fact that a firm is able to export to some of these markets may have some positive repercussions on its capacity and performance on any other market.

We further include some control for demand conditions at the product level prevailing at destination. These are proxied by the natural log of $totalimports_{p,j,t}$, which represents total imports of product p in country j at time t. The latter variable is thus expected to reflect the time-varying elements, business cycles and import-demand shocks. The set of dummies $DomesNTM^{l}_{p,t}$ allows the identification at the product level (HS 6-digit) of cases where an NTM similar to the one faced in a specific destination market is applied domestically. Finally, we add three sets of fixed effects. We control for firm-specific and time invariant characteristics that can affect trade performance by including a set of firm fixed

effects, η_i. We control for country-HS6-level time invariant factors that may affect trade, such as product market regulatory and operational frameworks by including a set of two-way fixed effects (HS6-Destination) $\phi_{p,j}$. The last set of fixed effects $\delta_{j,t}$ captures time-varying conditions specific to each LAIA country. In other words, it controls for destination and time-specific shocks.

The use of firm-level exports and technical regulation information observed at the HS6 level for 15 years does not necessarily guarantee an infallible identification of impacts. As we are working with exporting firms only, our sample may suffer from some form of selection bias. The imposition of technical regulations in a destination market may prevent some firms from entering the external sector, meaning that they would not appear in our dataset. This may create some sample bias that we are unable to eliminate fully because we only have access to customs data and do not observe firms' domestic sales. By including two-way product-destination fixed effects, however, our identification relies on changes in tariffs and the introduction or withdrawal of NTMs. This implies that the estimation of the extensive margin equations will be affected to a lesser extent than the regressions on the intensive margin and unit prices.

4 Results

This section presents our core results. A series of robustness checks is also discussed.

4.1 Market-access barriers and the intensive margin of trade

The impact of market-access barriers on the intensive margin of exporters is expected to be negative on average, but heterogeneous across firm size. As in the existing empirical literature, one should expect a larger negative effect for small firms. But as discussed earlier a positive impact could also be obtained for large exporters as demand is redirected towards large exporters when small exporters are priced out of the market with more stringent market-access barriers.

Column (1) of Table 11 reports results without interacting the market-access variables with exporter size. Column (2) provides the results when we include interaction terms

between market-access barriers and exporter size to examine the heterogeneity of the impact of market-access barriers. In column (3) we also control for the presence of such non-technical measures as price controls and finance measures, as well as other control variables (e.g., the presence of domestic technical barriers in Peru). In column (4), our preferred specification, we report results obtained based on a sample in which various types of NTMs never overlap at the trade relationship level. Not surprisingly, differences between columns (3) and (4) are only marginal as the number of trade relationships facing multiple types of NTMs remains limited.

The results reported in Table 11 suggest that accounting for firms' heterogeneity is crucial in assessing the impact of market-access barriers. SPS measures and TBTs are found to significantly and positively affect export values when we do not include interaction terms with size, as shown in column (1). When including interaction terms, as reported in column (2), the primary effects appear to be negative and statistically significant for TBT measures, while they appear statistically insignificant for SPS measures and PSIs. These drastic changes are observed only for NTM variables estimates. The impact of tariff barriers is negative and statistically significant regardless of whether we include the interactions with firm size.

More interestingly, the interaction of exporter size with TBTs and tariffs is always positive and statistically significant in columns (2) to (4). This implies that foreign TBTs and tariffs have heterogeneous effects on exporting firms, depending on their size. More precisely, the negative effect of tariffs and TBTs fades away as firm size becomes larger. Figures 3a to 3d graph the marginal effect of tariffs, SPS, TBTs and PSI measures on Peruvian firms' export value as a function of lagged firm size. Dotted lines represent the lower and upper bound estimates of the 95-percent confidence interval. Vertical lines correspond to the median firm size and the size of the firm at the 75th percentile of the firm-size distribution, respectively. In the case of tariffs, TBTs and PSI measures large Peruvian exporters benefit when market-access barriers become more stringent in destination markets, whereas small exporters tend to be negatively affected by these same barriers to export. For SPS measures the impact is statistically insignificant throughout the size distribution.

As for other controls, their estimated coefficients have the expected sign when statistically significant. Firm size positively affects export values as well as demand conditions at

destination. Exporting to OECD countries appears to be positively related to export values. This is not necessarily surprising, considering that firms exporting to OECD countries are relatively larger, on average. Non-technical regulations, when significant, which is the case with finance measures, are associated with lower export values, as expected. The existence of some domestic regulation does not seem to affect export values.

4.2 Market-access barriers and the extensive margin of trade

Models with heterogeneous firms would naturally predict a negative effect of market-access barriers on the extensive margin of trade, as measured by firms' participation in the external sector. Participation reflects both the creation and the continuation of a trade relationship. Larger firms, however, may be able to more easily overcome the fixed or variable costs needed to comply with a new technical measure in the importing country or a higher tariff.

The empirical results shown in Table 12 are mostly in line with theoretical predictions, as far as foreign tariffs, TBTs, and PSI formalities are concerned. Tariffs have a negative and statistically significant impact for firms below the median of the size distribution. They have a positive and statistically significant impact for exporters in the 75th percentile of the firm-size distribution, as shown in Figure 4a. The impact of TBTs increases with firm size, but the impact is never statistically different from zero throughout the entire firm-size distribution. Nevertheless, estimates are positive for firms above the 75th quintile of firm-size distribution as shown in Figure 4c. The impact of PSI measures is strictly negative for small firms and strictly positive and statistically significant for firms above the 75th percentile of the size distribution as shown in Figure 4d. SPS measures, on the other hand, are not found to affect firms' participation, and firm size does not seem to affect the impact of SPS measures, as shown in figure 4b.

Demand conditions at destination positively affect the extensive margin, signalling that the likelihood of exporting is larger in larger markets. This can be synonymous of easier or more transparent entry conditions in larger markets. On the other hand being an exporter to one of the big OECD markets leads to a lower probability of exporting to the region, signaling perhaps the stronger attractiveness of these destination markets. Non-technical regulations, when significant, as with finance measures, have a negative effect on the extensive margin.

The existence of domestic NTMs affects positively the extensive margin only in the case of domestic TBTs. This suggests that having in place domestic measures makes it easy for domestic exporters to enter foreign markets.

4.3 Market-access barriers and the probability of exit

We expect a positive impact of the implementation of new NTMs or tariff increases on exit probabilities. New or more stringent market-access barriers increase fixed and variable costs and therefore force the least productive firm to terminate their trade relationships. Once again, larger firms may be able to more easily overcome additional costs imposed by new technical regulations.

The results reported in Table 13 validate these predictions. Focusing on column (4), the effects on the probability of exit of the average Peruvian exporter of foreign tariffs, TBTs, and Pre-Shipment formalities are positive, but their overall effect depends on firm size. SPS measures do not seem to affect the probability of exit of the average Peruvian exporter, although the impact seems to decline with firm size. As shown in Figures 5a to 5d, larger firms once again appear to be more at ease in coping with costs imposed by the implementation of new or more stringent market-access barriers, in terms of foreign tariffs, TBTs, and PSIs. Indeed, the impact of these three market-access barriers on exit probability is negative and statistically significant for firms whose size is above the 75th percentile. Larger firms thus take advantage of new or more constraining market-access barriers and their exit probability falls. The effects of SPS measures on exit probabilities is not statistically significant throughout the entire firm-size distribution.

Neither non-technical regulations or the presence of domestic technical barriers seem to affect the probability of exit. Demand conditions at destination negatively affect the probability of exit as the larger the destination market the lower the probability of exit. Similarly, if the exporter also exports to one of the large OECD markets, this reduces the probability that it will exit an export market.

4.4 Market-access barriers and firms' product unit-values

The impact of market-access barriers on unit values can be ambiguous. On the one hand, large firms may be able to charge higher prices because small firms drop out of the market when market-access barriers are raised. On the other hand, large firms may also be able to adjust to new regulations at a lower cost and therefore charge relatively lower prices.

The empirical results reported in Table 14 tend to suggest that the first effect dominates in the case of tariffs. Indeed, the impact of foreign tariffs on Peruvian exporters is negative, on average, but the effect tends to increase with firm size, as can be seen in Figure 6a. The impact is positive and statistically different from zero at the top of the firm-size distribution. As can be seen for Figures 6b to 6d none of the technical regulations seem to have a statistical significant impact on unit values.

As for the remaining controls, larger firms are found to be associated with larger unit values. This may simply reflect some higher quality of products exported by possibly more productive firms. Or this can also reflect the effect of some stronger market power as firms expand. Demand conditions at destination positively affect unit values as one could have expected. Exporting to some OECD country does not affect unit values. The regulatory homogeneity coefficient as captured by our variables for domestic NTMs is significant at the 5-percent level only for TBTs. The negative sign suggests that having TBTs imposed domestically lowers the cost associated with the implementation of measures of a similar type imposed abroad, and therefore allows exporting at lower prices. Among non-technical regulations, only foreign finance measures are found, again, to have a significant effect, and the effect is positive, as expected.

4.5 Robustness checks

We undertook several robustness checks. The first addresses endogeneity concerns about omitted variable bias. To control for this, all specifications previously reported in this section included three sets of fixed effects: firm fixed effects, product-destination fixed effects, and time fixed effects. We are confident that this strategy considerably reduces any omitted variable bias. Still, we re-ran our core specifications by including some alternative sets of

fixed effects. The results are reported in Tables 15, 16, 17, and 18. First, we include firm fixed effects together with sector (i.e. HS 4-digit categories)-destination country-year fixed effects and find that our core results are not affected. Signs and amplitude are maintained for most controls' coefficients and, in particular, for those of tariffs and technical regulations, which are the trade barriers for which we obtained more consistent results. Second, we dropped firm fixed effects from our core set of specifications in order to verify that our results do not exclusively reflect within-firm variation in size. We also re-ran our core specifications using a sub-sample that does not include non-switcher firms. The reason for dropping non-switcher firms relates to the possible downward bias their presence would create on coefficients of NTMs categories (technical regulations variables, in particular). Finally, we remove from the sample firms that export to both LAIA and OECD countries. We do this in order to eliminate any possible bias in identifying the impact of firm size, given that firms exporting to the OECD also tend to be larger. The results are pretty much in line with benchmark results.

Reverse causality could be another source of an endogeneity bias. Such bias would exist if exports from certain Peruvian firms could affect trade policy decisions in other LAIA countries. If exports from a Peruvian firm represent a threat to a domestic market (on either the production or the consumption side, or both) in some LAIA country, the latter may decide to implement an NTM in order to limit the volume of goods imported from that specific firm. However, as trade flows among LAIA's members are regulated by, *inter alia*, an agreement established in 1998 on the use of TBTs, it is unlikely that the protectionist measures were motivated by retaliation. Peruvian exporters, moreover, only represent a very small share of their destination markets, which makes it unlikely that foreign governments are changing trade barriers due to changes in Peruvian firms' export behavior. These arguments are reinforced by the fact that not a single special trade concern has been raised by an LAIA member against Peru at the WTO. Nevertheless, we tested the robustness of our results by including our technical and non-technical regulations variables, lagged by one year. We could expect that the use of an NTM at time t-1 is essentially exogenous to firms' exports at time t. The results obtained with lagged regulation variables, as shown in Table 19, are in line with our baseline regressions.

To control for any potential measurement error on firm size that could result from the fact that we do not observe Peruvian firms' domestic sales, we also consider a discrete partition of firm-size distribution as an alternative. We run a fully-saturated version of our core set of regressions, in which firm size and its interaction with technical regulations variables are binned. We estimate two alternative versions. We first split the sample distribution of firm size into two bins, taking the median size as the dividing threshold. We then split it into 4 bins; that is, into quartiles. The results are shown in Tables 20, 21, 22, and 23. They are again consistent with baseline estimations.

Finally, our variables of primary interest are the interaction terms. The latter, like our dependent variables, vary at the firm-HS6-destination-year level. Therefore, clustering should not be necessary. Still, as a robustness check, we re-ran our core specifications with standard errors clustered at the HS6-destination-year level. The results continue to hold, although estimates, as expected, lose part of their statistical significance. When interaction terms are significant, however, it is always above the 5-percent level.

5 Conclusion

We examine the impact on Peruvian exporters of a large set of market-access barriers imposed by their Latin American trading partners during the period 2000-2014. The empirical set-up is rather exceptional because it allows for a precise identification of the impact on different trade margins of different types of NTMs within the same specification. Unlike many of the existing studies of the impact of NTMs, the panel structure allows for the identification of their impact based on the introduction or withdrawal of NTMs rather than their simple presence or absence.

We find robust empirical evidence of heterogeneous trade effects of tariffs and technical regulations on exporters of various sizes. Tariffs and technical regulations tend to negatively affect small exporters, while they tend to benefit the export performance of large firms. Firms above the 75th percentile of the size distribution see their export value and probability of exporting increase, and see their probability of exiting export markets decline as market-access barriers become more restrictive. This is particularly so for tariffs, TBTs and PSI

measures, whereas SPS measures imposed in destination markets do not seem to have a significant impact on Peruvian exporters.

These findings suggest that foreign trade barriers have a tendency to benefit large firms at the expense of small firms. As trade protectionism spreads, therefore, we are more likely to observe a more concentrated market structure in the rest of the world. The decline in tariffs observed in recent decades as a result of unilateral and multilateral reforms has helped curb the market power of large firms. However, the simultaneous increase in introduction of NTMs, and in particular technical regulations, has had the opposite effect.

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Data Appendix

The empirical investigation is based on two distinct core datasets. The first contains information on tariffs and NTMs applied by LAIA countries on their imports during the period 2000-2014. The second contains information on exports transactions collected by the Peruvian customs during the same period.

NTM data are collected by the LAIA/LAIA secretariat for its 12 core members. This is an exhaustive set of regulations and includes also regulations implemented before the period under investigation. Due to the change in the classification of NTMs as proposed by UNCTAD and other MAST member agencies,[9] 2 sub-periods had to be considered (the 2000-2010 sub-period and the 2011-2014 sub-period) and the two respective NTMs classifications reconciled. The pre-2012 UNCTAD classification focused on the distinction between core and non-core NTMs. The post-2012 UNCTAD/MAST classification is based on the distinction between technical and non-technical NTMs. No official correspondence exists between the two classifications and no such correspondence could be easily established without getting into the details of each measure that is digging into all official regulation texts since the year 2000. However, the LAIA/LAIA secretariat collected NTMs data for the years 2011 and 2012 using both classifications allowing for the definition of a correspondence table. Some random verification indicates that this handmade correspondence is reliable especially at the chapter level. We used the new classification as the reference one and measures collected between 2000 and 2010 were thus reclassified at the chapter level (e.g. SPS measures versus TBTs).

Data on annual exports are from Peruvian Customs and the period of coverage corresponds to that of NTM data. Information on transactions involving exporting Peruvian firms is reported by product and by destination. Information on export values is expressed in $US and is FOB (free on board). Corresponding exported quantities (supplementary quantity WCO units- and net weight) are also reported meaning that unit values can be computed

[9]The Multi-Agency Support Team (MAST) was established in 2006 to work on the taxonomy of Non-Tariff Measures (NTMs) and it is composed of 8 international organizations: Food and Agriculture Organization of the United Nations, the International Monetary Fund, the International Trade Centre, the Organization for Economic Cooperation and Development, the United Nations Conference on Trade and Development, the United Nations Industrial Development Organization, the World Bank, and the World Trade Organization. Jointly with other experts, the MAST group continues its work to further develop the NTMs classification.

in principle.

Both NTM data and Peruvian firm exports data are collected at the national tariff line (NTL, up to 10 digits). The information could be used at that level of disaggregation if NTL classifications would be easily reconcilable across countries. However, this is far from being the case and as we consider exports to various destinations our two datasets cannot be satisfactorily merged at that level. As a consequence, NTM and firm exports data are first aggregated at the HS 6-digit level and then merged. Attrition remains limited. Moving from 10 to 6-digit classification implies a reduction of about 6 percent in the number of observations included in our reference sample.

Our reference sample is populated by firms that exported some product to some LAIA destination at least four years during the time period under investigation. The main motivation for selecting such sub-sample is to minimize any bias from firms exporting only occasionally and from companies whose rationale for entering and exiting a destination would be purely driven by competition at destination.

Table 1: Simple average tariff (applied and MFN) to Peruvian exports in LAIA countries

Applying country	Tariffs	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
ARG	Applied	16.7	13.4	14.2	16.2	10.9	10.5	6.5	5.3	4.0	3.1	1.7	0.9	0.0	0.0	0.0
	MFN	16.7	13.4	14.2	16.2	15.2	13.2	14.3	13.9	14.1	16.9	17.0	17.0	18.0	18.6	19.0
BOL	Applied	9.5	9.5	10.1	9.6	9.4	9.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MFN	9.5	9.5	10.1	9.6	9.6	9.1	8.8	8.7	8.7	10.9	12.5	12.4	12.5	13.8	13.8
BRA	Applied	15.8	14.3	14.3	13.4	7.2	6.7	4.4	3.4	3.7	2.7	1.7	0.9	0.0	0.0	0.0
	MFN	15.8	14.3	14.3	13.4	13.3	12.6	13.1	12.7	16.4	16.4	16.8	18.2	18.8	17.5	17.4
CHL	Applied	9.0	8.0	7.0	6.0	5.7	5.4	4.9	4.4	4.3	4.3	4.1	3.9	3.8	3.7	3.5
	MFN	9.0	8.0	7.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
COL	Applied	10.7	14.3	14.7	14.4	14.3	14.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MFN	14.0	14.3	14.7	14.4	14.6	14.7	14.9	14.6	14.7	14.5	14.8	9.2	8.3	8.6	8.1
CUB	Applied	16.5	12.1	10.5	10.9	11.1	8.6	11.0	11.0	10.9	11.5	10.2	11.5	12.5	10.3	10.2
	MFN	16.5	12.1	10.5	10.9	12.8	11.8	12.7	12.7	12.7	13.0	13.0	13.6	14.3	11.9	12.2
ECU	Applied	12.6	13.6	12.8	12.9	13.3	13.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MFN	12.6	13.6	12.8	12.9	13.5	13.1	13.3	13.4	13.2	11.6	11.5	10.8	10.2	10.2	10.8
MEX	Applied	19.7	20.2	21.1	20.7	15.4	10.6	13.9	16.6	12.5	10.6	7.0	10.0	9.1	8.2	1.9
	MFN	19.7	20.2	21.1	20.7	20.9	16.9	17.8	16.6	15.3	13.2	10.7	10.0	9.1	8.2	8.6
PRY	Applied	15.0	14.8	11.8	11.7	13.9	9.6	9.5	7.7	9.9	7.4	6.3	4.7	2.6	1.6	1.3
	MFN	15.0	14.8	11.8	11.7	14.3	10.3	11.9	11.9	15.2	13.3	14.5	14.9	14.7	14.7	13.5
URY	Applied	18.4	17.2	15.0	14.8	14.6	13.4	8.6	7.5	7.3	5.7	5.2	5.2	4.8	4.0	4.0
	MFN	18.4	17.2	15.0	14.9	15.2	13.7	14.7	14.8	14.4	13.9	14.8	14.6	14.6	14.7	14.7
VEN	Applied	15.2	15.5	15.9	15.2	15.3	11.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	MFN	15.2	15.5	15.9	15.2	15.4	15.2	17.5	17.7	18.0	18.1	17.7	17.6	17.6	17.6	17.3

Source: WTO/ITC database.

Table 2: Non-Tariff Measures "turnover"

Group	ARG	BOL	BRA	CHL	COL	CUB	ECU	MEX	PER	PRY	URY	VEN	Total
pre_2000_end	0.05	0.00	0.05	0.02	0.00	0.00	0.01	0.02	0.02	0.00	0.01	0.00	0.03
pre_2000_act	0.32	0.29	0.17	0.57	0.14	0.33	0.19	0.08	0.20	0.57	0.60	0.16	0.15
post_2000_end	0.02	0.00	0.04	0.01	0.12	0.00	0.08	0.11	0.07	0.01	0.01	0.01	0.12
post_2000_act	0.61	0.71	0.74	0.41	0.74	0.67	0.72	0.80	0.71	0.42	0.37	0.83	0.70

Source: LAIA/UNCTAD NTM database.

Note: Prefixes pre_2000 and post_2000 refer to the period during which measures have been implemented and suffixes end and act refers to regulation status in 2014 i.e. abolished or active.)

Table 3: Regulations implemented since 2000 and effective in 2014

	ARG	BOL	BRA	CHL	COL	CUB	ECU	MEX	PER	PRY	URY	VEN	Total
2000	13	1	17	11	1	1	3	14	11	3	2	7	84
2001	17	3	35	22	7	2	4	2	5	1	11	3	112
2002	24	2	37	15	12	1	3	4	7	5	14	11	135
2003	13	5	31	23	9	2	3	13	11	1	4	1	116
2004	18	6	44	31	21	8	10	11	20	10	11	6	196
2005	19	6	38	19	13	0	2	12	32	2	6	3	152
2006	14	3	37	28	25	3	13	10	15	3	6	8	165
2007	7	0	53	26	10	0	11	5	20	1	17	7	157
2008	19	9	54	17	12	3	35	7	45	1	14	2	218
2009	16	14	58	17	19	1	42	4	87	6	13	2	279
2010	19	3	37	16	17	0	27	11	56	4	6	5	201
2011	32	1	53	12	5	0	11	8	49	1	12	0	184
2012	39	4	64	42	27	0	75	45	58	10	28	0	392
2013	32	3	48	42	37	2	88	31	51	6	44	4	388
2014	22	0	79	25	18	1	123	35	45	0	15	3	366
Total	304	60	685	346	233	24	450	212	512	54	203	62	3145

Source: LAIA/UNCTAD NTM database.

Table 4: Regulations implemented since 2000 and effective in 2014

	SPS measures		TBTs		Pre-Ship. Inspections	
	2014	Since 2000	2014	Since 2000	2014	Since 2000
ARG	199	68%	191	52%	14	79%
BOL	44	91%	21	57%	1	100%
BRA	405	95%	340	85%	5	100%
CHL	311	80%	152	68%	4	25%
COL	102	79%	144	76%	9	78%
CUB	7	57%	15	80%	0	
ECU	158	91%	313	90%	6	83%
MEX	65	69%	86	88%	1	100%
PER	468	97%	64	69%	2	100%
PRY	32	56%	38	66%	2	50%
URY	121	78%	128	68%	7	100%
VEN	41	49%	51	47%	4	25%
Total	1'953	85%	1'543	75%	55	76%

Source: LAIA/UNCTAD NTM database.

Table 5: Number (share) of products affected by at least one measure in vigor in 2014

	Technical	Non-technical
ARG	4'469 (83)	4'712 (87)
BOL	1'354 (25)	89 (2)
BRA	3'439 (64)	737 (14)
CHL	3'222 (60)	139 (3)
COL	2'871 (53)	3'166 (58)
CUB	557 (10)	4'625 (86)
ECU	2'745 (51)	230 (5)
MEX	3'039 (56)	949 (17)
PER	1'531 (28)	401 (7)
PRY	1'483 (27)	205 (4)
URY	2'943 (55)	336 (6)
VEN	1'704 (32)	4'773 (88)

Source: LAIA/UNCTAD NTM database.
Note: The total number of products at the HS 6-digit level is 5'394 (HS Combined).

Table 6: Peruvian exports (2000 base) and selected destinations (share in total exports)

	2000	2005	2007	2008	2009	2010	2011	2012	2013	2014
World	1.00	2.49	4.09	4.56	3.89	5.13	6.65	6.69	6.1	5.53
EU28	0.22	0.17	0.18	0.18	0.16	0.18	0.18	0.17	0.16	0.17
LAIA	0.17	0.2	0.19	0.2	0.14	0.16	0.17	0.18	0.19	0.21
MERCOSUR	0.05	0.05	0.07	0.07	0.05	0.05	0.05	0.06	0.06	0.06
NAFTA	0.32	0.39	0.27	0.26	0.27	0.27	0.23	0.23	0.25	0.25

Source: Authors' calculation based on Peruvian customs data.

Table 7: Number of exporting firms and destination markets

	Exporters to LAIA	Share in total	LAIA only
2000	1'627	55%	58%
2005	2'370	53%	64%
2006	2'608	54%	66%
2007	2'854	56%	66%
2008	3'200	57%	67%
2009	3'550	59%	71%
2010	3'582	60%	72%
2011	3'748	58%	72%
2012	3'346	49%	74%
2013	2'984	43%	76%
2014	2'669	39%	76%

Source: Authors' calculation based on Peruvian customs data.

Table 8: Number of exported products per firm

	Mean		Median		Max	
	LAIA	ALL	LAIA	ALL	LAIA	ALL
2000	5.3	7.7	2	3	185	185
2005	6.6	9.1	2	3	239	296
2006	7.5	9.3	3	3	302	302
2007	7.6	9.4	3	3	325	325
2008	7.4	8.8	3	3	353	353
2009	7.0	8.4	2	3	245	245
2010	7.7	8.9	2	3	259	267
2011	7.6	8.9	3	3	209	215
2012	8.2	9.2	3	3	282	282
2013	7.4	8.5	3	3	318	318
2014	6.8	8.0	2	3	250	254

Source: Authors' calculation based on Peruvian customs data.

Table 9: Number of destinations per firm

	Mean		Median		Max	
	LAIA	ALL	LAIA	ALL	LAIA	ALL
2000	1.9	3.4	1	1	10	69
2005	1.8	3.1	1	1	11	54
2006	1.8	3.1	1	1	10	69
2007	1.8	3.1	1	1	11	65
2008	1.8	3.1	1	1	11	59
2009	1.7	3.0	1	1	11	57
2010	1.8	3.0	1	1	11	58
2011	1.8	3.1	1	1	11	62
2012	1.7	3.0	1	1	11	60
2013	1.7	2.9	1	1	11	56
2014	1.7	3.0	1	1	11	62

Source: Authors' calculation based on Peruvian customs data.

Table 10: NTMs overlap (selected years) at the product-destination level

# NTMs	2000	2005	2007	2008	2009	2010	2011	2012	2013	2014	Pooled
1	0.977	0.984	0.985	0.986	0.987	0.986	0.983	0.987	0.981	0.98	0.983
2	0.018	0.012	0.012	0.01	0.008	0.01	0.012	0.009	0.013	0.015	0.012
3	0.005	0.003	0.002	0.004	0.003	0.004	0.003	0.003	0.004	0.004	0.004
4	0.000	0.001	0.000	0.001	0.001	0.000	0.001	0.001	0.002	0.002	0.001
5	0.000	0.000	0.000	0.000	0.001	0.000	0.000	0.000	0.001	0.001	0.000

Source: Authors' calculation based on LAIA/UNCTAD Secretariat and Peruvian customs data.

Table 11: Intensive-margin estimations

	(1)	(2)	(3)	(4)
Firm size (lag)	0.0840a	0.0779a	0.0778a	0.0778a
	(0.00516)	(0.00538)	(0.00538)	(0.00538)
Ln(1+Tariff)	-0.509a	-2.269a	-2.274a	-2.268a
	(0.127)	(0.441)	(0.441)	(0.441)
SPS	0.0670b	0.00661	0.0122	0.0156
	(0.0304)	(0.0844)	(0.0847)	(0.0848)
TBT	0.0346	-0.289a	-0.292a	-0.292a
	(0.0276)	(0.0930)	(0.0931)	(0.0933)
Pre-Shipment	0.147a	-0.0201	-0.0487	-0.0491
	(0.0311)	(0.129)	(0.130)	(0.130)
Ln(1+Tariff)*Firm size(lag)		0.128a	0.128a	0.127a
		(0.0315)	(0.0315)	(0.0315)
SPS*Firm size(lag)		0.00445	0.00426	0.00421
		(0.00576)	(0.00577)	(0.00578)
TBT*Firm size(lag)		0.0231a	0.0229a	0.0229a
		(0.00646)	(0.00647)	(0.00648)
Pre-Ship.*Firm size(lag)		0.0122	0.0125	0.0125
		(0.00918)	(0.00918)	(0.00920)
Ln(tot HS6 imports in j) destination)	0.0897a	0.0898a	0.0899a	0.0900a
	(0.00549)	(0.00548)	(0.00549)	(0.00549)
BIGS			0.0370a	0.0372a
			(0.0136)	(0.0136)
Quantity Control			-0.0564	-0.0572
			(0.0427)	(0.0428)
Price Control			0.0302	0.0333
			(0.0685)	(0.0688)
Finance Measures			-0.0638c	-0.0636c
			(0.0354)	(0.0355)
Domestic SPS			0.0430	0.0427
			(0.0287)	(0.0288)
Domestic TBT			-0.0227	-0.0230
			(0.0300)	(0.0301)
Domestic Pre_Ship.			-0.0184	-0.0183
			(0.0279)	(0.0280)
Observations	279377	279377	279377	279268
R^2	0.601	0.601	0.601	0.601
Adjusted R^2	0.567	0.567	0.567	0.567

Robust standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.
Column (1) has no interactions and other control variables; Column (2) includes interactions; Column (3) is column (2) + control variables; Column (4) is column (3) without observations with overlap of NTMs.

Table 12: Extensive-margin estimations

	(1)	(2)	(3)	(4)
Firm size (lag)	0.00619a	-0.00690a	-0.00690a	-0.00689a
	(0.000748)	(0.000848)	(0.000848)	(0.000848)
Ln(1+Tariff)	-0.410a	-2.646a	-2.646a	-2.639a
	(0.0200)	(0.0676)	(0.0676)	(0.0677)
SPS	0.0122b	0.0119	0.0123	0.00954
	(0.00497)	(0.0137)	(0.0138)	(0.0138)
TBT	0.00173	-0.0279c	-0.0264c	-0.0284c
	(0.00431)	(0.0144)	(0.0144)	(0.0145)
Pre-Shipment	-0.00161	-0.0625a	-0.0669a	-0.0670a
	(0.00535)	(0.0233)	(0.0236)	(0.0237)
Ln(1+Tariff)*Firm size(lag)		0.162a	0.162a	0.161a
		(0.00476)	(0.00476)	(0.00476)
SPS*Firm size(lag)		0.000191	0.000156	0.000361
		(0.000927)	(0.000928)	(0.000931)
TBT*Firm size(lag)		0.00190c	0.00191c	0.00203b
		(0.000987)	(0.000987)	(0.000991)
Pre-Ship.*Firm size(lag)		0.00550a	0.00556a	0.00563a
		(0.00165)	(0.00165)	(0.00165)
Ln(HS6 imports at destination)	0.0203a	0.0220a	0.0220a	0.0220a
	(0.000779)	(0.000820)	(0.000819)	(0.000821)
BIGS			-0.0238a	-0.0235a
			(0.00232)	(0.00232)
Quantity Control			0.00269	0.00342
			(0.00747)	(0.00754)
Price Control			0.00179	0.00122
			(0.0120)	(0.0122)
Finance Measures			-0.0108c	-0.0112c
			(0.00634)	(0.00640)
Domestic SPS			-0.00748	-0.00663
			(0.00510)	(0.00513)
Domestic TBT			0.00957c	0.00884c
			(0.00521)	(0.00524)
Domestic Pre_Ship.			-0.00486	-0.00483
			(0.00491)	(0.00493)
Observations	580960	530465	530465	529817
R^2	0.129	0.115	0.115	0.116
Adjusted R^2	0.078	0.064	0.064	0.065

Robust standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.
Column (1) has no interactions and other control variables; Column (2) includes interactions; Column (3) is column (2) + control variables; Column (4) is column (3) without observations with overlap of NTMs.

Table 13: Exit probability estimations

	(1)	(2)	(3)	(4)
Firm size (lag)	0.0326a	0.0488a	0.0488a	0.0488a
	(0.000641)	(0.000681)	(0.000681)	(0.000681)
Ln(1+Tariff)	0.215a	2.176a	2.177a	2.174a
	(0.0177)	(0.0607)	(0.0607)	(0.0607)
SPS	-0.00119	0.0115	0.0118	0.0150
	(0.00433)	(0.0114)	(0.0114)	(0.0114)
TBT	-0.00593	0.0636a	0.0630a	0.0662a
	(0.00379)	(0.0122)	(0.0122)	(0.0122)
Pre-Shipment	0.0114b	0.0603a	0.0586a	0.0598a
	(0.00468)	(0.0193)	(0.0196)	(0.0197)
Ln(1+Tariff)*Firm size(lag)		-0.143a	-0.143a	-0.143a
		(0.00423)	(0.00423)	(0.00423)
SPS*Firm size(lag)		-0.00113	-0.00112	-0.00132c
		(0.000764)	(0.000765)	(0.000767)
TBT*Firm size(lag)		-0.00483a	-0.00481a	-0.00501a
		(0.000832)	(0.000832)	(0.000835)
Pre-Ship.*Firm size(lag)		-0.00473a	-0.00472a	-0.00486a
		(0.00137)	(0.00137)	(0.00138)
Ln(HS6 imports at destination)	-0.0119a	-0.0131a	-0.0132a	-0.0132a
	(0.000711)	(0.000733)	(0.000732)	(0.000734)
BIGS			-0.0224a	-0.0222a
			(0.00192)	(0.00192)
Quantity Control			0.000310	0.0000713
			(0.00638)	(0.00643)
Price Control			0.00921	0.00937
			(0.0105)	(0.0106)
Finance Measures			0.00279	0.00294
			(0.00556)	(0.00561)
Domestic SPS			0.00374	0.00300
			(0.00432)	(0.00435)
Domestic TBT			0.000486	0.00163
			(0.00441)	(0.00444)
Domestic Pre_Ship.			-0.00161	-0.00215
			(0.00413)	(0.00414)
Observations	580960	530465	530465	529817
R^2	0.216	0.146	0.147	0.147
Adjusted R^2	0.171	0.097	0.098	0.098

Robust standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.
Column (1) has no interactions and other control variables; Column (2) includes interactions; Column (3) is column (2) + control variables; Column (4) is column (3) without observations with overlap of NTMs.

Table 14: Trade unit-Value estimations

	(1)	(2)	(3)	(4)
Firm size (lag)	0.0158a	0.0154a	0.0154a	0.0154a
	(0.00232)	(0.00243)	(0.00243)	(0.00243)
Ln(1+Tariff)	0.0571	-0.653a	-0.652a	-0.650a
	(0.0490)	(0.171)	(0.171)	(0.171)
SPS	0.00368	-0.0117	-0.0111	-0.0108
	(0.0113)	(0.0325)	(0.0326)	(0.0327)
TBT	0.0128	0.0678c	0.0682c	0.0666
	(0.0115)	(0.0410)	(0.0410)	(0.0411)
Pre-Shipment	-0.00774	0.0408	0.0696c	0.0697c
	(0.00840)	(0.0405)	(0.0412)	(0.0413)
Ln(1+Tariff)*Firm size(lag)		0.0515a	0.0516a	0.0513a
		(0.0119)	(0.0119)	(0.0119)
SPS*Firm size(lag)		0.00107	0.00125	0.00126
		(0.00220)	(0.00220)	(0.00220)
TBT*Firm size(lag)		-0.00391	-0.00373	-0.00361
		(0.00282)	(0.00283)	(0.00283)
Pre-Ship.*Firm size(lag)		-0.00352	-0.00395	-0.00393
		(0.00290)	(0.00290)	(0.00290)
Ln(HS6 imports at destination)	0.0125a	0.0125a	0.0126a	0.0124a
	(0.00197)	(0.00197)	(0.00197)	(0.00197)
BIGS			-0.00152	-0.00143
			(0.00519)	(0.00519)
Quantity Control			0.0147	0.0148
			(0.0168)	(0.0168)
Price Control			0.00311	0.00474
			(0.0239)	(0.0240)
Finance Measures			0.0613a	0.0615a
			(0.0109)	(0.0109)
Domestic SPS			-0.00186	-0.00120
			(0.00944)	(0.00946)
Domestic TBT			-0.0197b	-0.0212b
			(0.00997)	(0.00998)
Domestic Pre_Ship.			0.0149	0.0156
			(0.00951)	(0.00952)
Observations	279369	279369	279369	279260
R^2	0.801	0.801	0.801	0.801
Adjusted R^2	0.784	0.784	0.784	0.784

Robust standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.
Column (1) has no interactions and other control variables; Column (2) includes interactions; Column (3) is column (2) + control variables; Column (4) is column (3) without observations with overlap of NTMs.

Table 15: Robustness checks - Intensive-margin estimations

	(1)	(2)	(3)	(4)
Firm size (lag)	0.0643a	0.167a	0.171a	0.0753a
	(0.00592)	(0.00314)	(0.00332)	(0.00574)
Ln(1+Tariff)	-2.969a	-8.875a	-7.023a	-2.162a
	(0.476)	(0.416)	(0.443)	(0.478)
SPS	-0.190b	-0.771a	-0.861a	0.0404
	(0.0770)	(0.0838)	(0.0900)	(0.0911)
TBT	-0.316a	-0.448a	-0.467a	-0.266a
	(0.0846)	(0.0987)	(0.105)	(0.0985)
Pre-Shipment	-0.231c	-0.461a	-0.597a	-0.0273
	(0.126)	(0.133)	(0.147)	(0.138)
Ln(1+Tariff)*Firm size(lag)	0.0462	0.585a	0.454a	0.123a
	(0.0341)	(0.0293)	(0.0309)	(0.0341)
SPS*Firm size(lag)	0.00603	0.0607a	0.0653a	0.00117
	(0.00575)	(0.00560)	(0.00596)	(0.00624)
TBT*Firm size(lag)	0.0246a	0.0340a	0.0356a	0.0222a
	(0.00633)	(0.00681)	(0.00719)	(0.00687)
Pre-Ship.*Firm size(lag)	0.0214b	0.0415a	0.0487a	0.0128
	(0.00928)	(0.00929)	(0.0102)	(0.00981)
Ln(HS6 imports at destination)	0.0543a	0.108a	0.108a	0.0821a
	(0.00180)	(0.00595)	(0.00642)	(0.00601)
BIGS	0.259a	0.0430a	0.0373b	
	(0.0152)	(0.0148)	(0.0155)	
Quantity Control	-0.0811b	-0.0446	-0.0317	-0.0481
	(0.0320)	(0.0460)	(0.0475)	(0.0460)
Price Control	-0.416a	0.0143	-0.0000196	-0.0215
	(0.0420)	(0.0732)	(0.0753)	(0.0741)
Finance Measures	0.0821b	-0.0615	-0.0408	-0.0789b
	(0.0329)	(0.0391)	(0.0430)	(0.0378)
Domestic SPS	0.222a	0.104a	0.110a	0.0204
	(0.0224)	(0.0310)	(0.0330)	(0.0310)
Domestic TBT	0.0730a	-0.0428	-0.0634c	-0.00158
	(0.0239)	(0.0322)	(0.0341)	(0.0322)
Domestic Pre_Ship.	-0.0599b	-0.0622b	-0.0497	-0.0260
	(0.0238)	(0.0299)	(0.0318)	(0.0302)
Observations	283417	280729	255855	245568
R^2	0.479	0.478	0.482	0.594
Adjusted R^2	0.447	0.448	0.450	0.556

Robust standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.
Column (1) HS4-country-year fixed effects; Column (2) no firms fixed effects;
Column (3) non-switchers removed; Column (4) no exporters to BIGS.

Table 16: Robustness checks - Extensive-margin estimations

	(1)	(2)	(3)	(4)
Firm size (lag)	-0.00794a	-0.00117a	0.00134a	-0.00726a
	(0.000838)	(0.000449)	(0.000471)	(0.000906)
Ln(1+Tariff)	-2.434a	-2.555a	-2.344a	-2.740a
	(0.0655)	(0.0592)	(0.0637)	(0.0728)
SPS	-0.0189	-0.00417	0.00741	0.0175
	(0.0118)	(0.0126)	(0.0134)	(0.0149)
TBT	-0.0237c	-0.0488a	-0.0516a	-0.0212
	(0.0123)	(0.0140)	(0.0148)	(0.0155)
Pre-Shipment	-0.0754a	-0.0768a	-0.0753a	-0.0697a
	(0.0216)	(0.0222)	(0.0242)	(0.0252)
Ln(1+Tariff)*Firm size(lag)	0.133a	0.158a	0.139a	0.166a
	(0.00462)	(0.00412)	(0.00441)	(0.00513)
SPS*Firm size(lag)	0.00108	0.00107	0.000372	-0.000185
	(0.000852)	(0.000838)	(0.000884)	(0.00100)
TBT*Firm size(lag)	0.00107	0.00344a	0.00371a	0.00181c
	(0.000891)	(0.000955)	(0.000999)	(0.00106)
Pre-Ship.*Firm size(lag)	0.00552a	0.00621a	0.00622a	0.00562a
	(0.00156)	(0.00155)	(0.00168)	(0.00177)
Ln(HS6 imports at destination)	0.00633a	0.0213a	0.0227a	0.0223a
	(0.000238)	(0.000812)	(0.000852)	(0.000921)
BIGS	-0.00258	-0.0231a	-0.0257a	
	(0.00225)	(0.00233)	(0.00243)	
Quantity Control	-0.00325	0.00167	-0.00164	0.00335
	(0.00464)	(0.00748)	(0.00774)	(0.00807)
Price Control	-0.0394a	-0.00244	0.00251	0.000933
	(0.00676)	(0.0123)	(0.0128)	(0.0131)
Finance Measures	-0.00216	-0.0169a	-0.0144b	-0.00877
	(0.00526)	(0.00641)	(0.00700)	(0.00679)
Domestic SPS	0.0211a	-0.00653	-0.00888	-0.00721
	(0.00367)	(0.00513)	(0.00545)	(0.00555)
Domestic TBT	0.00450	0.00780	0.0101c	0.00865
	(0.00378)	(0.00523)	(0.00553)	(0.00566)
Domestic Pre_Ship.	-0.00522	-0.000282	-0.00128	-0.00609
	(0.00371)	(0.00492)	(0.00522)	(0.00539)
Observations	530614	530656	486095	467028
R^2	0.107	0.071	0.073	0.118
Adjusted R^2	0.075	0.033	0.032	0.062

Standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.

Column (1) HS4-country-year fixed effects; Column (2) no firms fixed effects;

Column (3) non-switchers removed; Column (4) no exporters to BIGS.

Table 17: Robustness checks - Exit probability estimations

	(1)	(2)	(3)	(4)
Firm size (lag)	0.0473a	0.0124a	0.0109a	0.0490a
	(0.000675)	(0.000379)	(0.000394)	(0.000728)
Ln(1+Tariff)	2.094a	3.363a	2.973a	2.267a
	(0.0586)	(0.0544)	(0.0576)	(0.0655)
SPS	0.0229b	0.0240b	0.0195c	0.00667
	(0.00960)	(0.0107)	(0.0112)	(0.0124)
TBT	0.0470a	0.0899a	0.0884a	0.0634a
	(0.0103)	(0.0120)	(0.0125)	(0.0131)
Pre-Shipment	0.0541a	0.0518a	0.0477b	0.0652a
	(0.0178)	(0.0190)	(0.0202)	(0.0209)
Ln(1+Tariff)*Firm size(lag)	-0.130a	-0.231a	-0.199a	-0.150a
	(0.00408)	(0.00375)	(0.00395)	(0.00457)
SPS*Firm size(lag)	-0.00139b	-0.00187a	-0.00160b	-0.000928
	(0.000696)	(0.000706)	(0.000732)	(0.000830)
TBT*Firm size(lag)	-0.00316a	-0.00642a	-0.00648a	-0.00501a
	(0.000743)	(0.000814)	(0.000843)	(0.000896)
Pre-Ship.*Firm size(lag)	-0.00418a	-0.00519a	-0.00483a	-0.00493a
	(0.00128)	(0.00133)	(0.00140)	(0.00147)
Ln(HS6 imports at destination)	-0.00364a	-0.0132a	-0.0137a	-0.0139a
	(0.000203)	(0.000738)	(0.000765)	(0.000820)
BIGS	-0.0331a	-0.0237a	-0.0240a	
	(0.00183)	(0.00197)	(0.00202)	
Quantity Control	-0.000994	-0.000429	0.00242	-0.000656
	(0.00396)	(0.00652)	(0.00666)	(0.00690)
Price Control	0.0312a	0.00705	0.00221	0.0146
	(0.00599)	(0.0109)	(0.0114)	(0.0114)
Finance Measures	0.00467	0.0121b	0.00663	0.000693
	(0.00464)	(0.00576)	(0.00620)	(0.00595)
Domestic SPS	-0.0125a	0.000963	0.00468	0.00242
	(0.00314)	(0.00446)	(0.00466)	(0.00471)
Domestic TBT	0.000853	0.00297	-0.0000252	-0.000458
	(0.00321)	(0.00455)	(0.00473)	(0.00479)
Domestic Pre_Ship.	0.00146	-0.00918b	-0.00880b	0.00224
	(0.00315)	(0.00425)	(0.00443)	(0.00455)
Observations	530614	530656	486095	467028
R^2	0.146	0.066	0.063	0.153
Adjusted R^2	0.115	0.028	0.022	0.100

Robust standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.
Column (1) HS4-country-year fixed effects; Column (2) no firms fixed effects;
Column (3) non-switchers removed; Column (4) no exporters to BIGS.

Table 18: Robustness checks - Trade unit-value estimations

	(1)	(2)	(3)	(4)
Firm size (lag)	0.0186a	0.0160a	0.0169a	0.0165a
	(0.00268)	(0.00160)	(0.00169)	(0.00260)
Ln(1+Tariff)	-0.812a	-2.762a	-2.049a	-0.622a
	(0.187)	(0.192)	(0.204)	(0.187)
SPS	0.0337	-0.814a	-0.981a	-0.00894
	(0.0292)	(0.0401)	(0.0429)	(0.0354)
TBT	0.156a	-0.147a	-0.156a	0.0963b
	(0.0372)	(0.0498)	(0.0531)	(0.0440)
Pre-Shipment	0.0917b	0.244a	0.186a	0.0934b
	(0.0406)	(0.0560)	(0.0618)	(0.0441)
Ln(1+Tariff)*Firm size(lag)	0.0408a	0.207a	0.153a	0.0483a
	(0.0131)	(0.0131)	(0.0138)	(0.0130)
SPS*Firm size(lag)	-0.00372c	0.0615a	0.0720a	0.000379
	(0.00214)	(0.00265)	(0.00281)	(0.00240)
TBT*Firm size(lag)	-0.0102a	0.0110a	0.0119a	-0.00519c
	(0.00275)	(0.00337)	(0.00356)	(0.00305)
Pre-Ship.*Firm size(lag)	-0.00593b	-0.0164a	-0.0113a	-0.00509
	(0.00295)	(0.00386)	(0.00424)	(0.00313)
Ln(HS6 imports at destination)	-0.00226a	0.0167a	0.0157a	0.0128a
	(0.000790)	(0.00246)	(0.00257)	(0.00223)
BIGS	0.0199a	-0.000902	0.000000652	
	(0.00564)	(0.00686)	(0.00714)	
Quantity Control	0.0518a	0.0657a	0.0776a	0.0204
	(0.0130)	(0.0220)	(0.0226)	(0.0184)
Price Control	-0.0104	0.0320	0.0544	0.0177
	(0.0133)	(0.0330)	(0.0349)	(0.0262)
Finance Measures	-0.0303a	0.0907a	0.0838a	0.0616a
	(0.00973)	(0.0165)	(0.0175)	(0.0116)
Domestic SPS	0.000668	0.0437a	0.0422a	-0.0107
	(0.00737)	(0.0134)	(0.0141)	(0.0103)
Domestic TBT	-0.0260a	-0.0400a	-0.0467a	-0.0194c
	(0.00803)	(0.0140)	(0.0145)	(0.0109)
Domestic Pre_Ship.	0.0385a	-0.0360a	-0.0239c	0.0172
	(0.00813)	(0.0128)	(0.0135)	(0.0105)
Observations	283647	280721	255847	245564
R^2	0.751	0.630	0.628	0.796
Adjusted R^2	0.737	0.609	0.605	0.777

Robust standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.
Column (1) HS4-country-year fixed effects; Column (2) no firms fixed effects;
Column (3) non-switchers removed; Column (4) no exporters to BIGS.

Table 19: Estimations with lagged regulations

	(1)	(2)	(3)	(4)
Firm size (lag)	0.0812a	0.0506a	-0.0555a	0.0164a
	(0.00549)	(0.000916)	(0.000957)	(0.00249)
Ln(1+Tariff)	-1.886a	2.808a	-2.954a	-0.915a
	(0.454)	(0.0741)	(0.0768)	(0.174)
SPS(lag)	0.0914	0.00214	-0.00493	0.0289
	(0.0869)	(0.0145)	(0.0151)	(0.0336)
TBT(lag)	-0.178c	0.0628a	-0.0628a	0.0774c
	(0.100)	(0.0159)	(0.0166)	(0.0443)
Pre-Shipment(lag)	0.244c	0.0538b	-0.0457c	0.0453
	(0.137)	(0.0248)	(0.0259)	(0.0441)
Ln(1+Tariff)*Firm size(lag)	0.0969a	-0.179a	0.184a	0.0709a
	(0.0324)	(0.00518)	(0.00540)	(0.0121)
SPS(lag)*Firm size(lag)	-0.00235	-0.000565	0.000722	-0.00212
	(0.00591)	(0.000962)	(0.00101)	(0.00224)
TBT(lag)*Firm size(lag)	0.0160b	-0.00565a	0.00536a	-0.00667b
	(0.00688)	(0.00107)	(0.00112)	(0.00301)
Pre-Ship.(lag)*Firm size(lag)	-0.00956	-0.00490a	0.00441b	-0.00354
	(0.00969)	(0.00173)	(0.00181)	(0.00313)
Ln(HS6 imports at destination)	0.0885a	-0.0182a	0.0201a	0.0119a
	(0.00571)	(0.000926)	(0.000962)	(0.00203)
BIGS	0.0334b	-0.00734a	0.00273	-0.00157
	(0.0139)	(0.00238)	(0.00254)	(0.00532)
Quantity Control(lag)	-0.0378	0.000166	-0.000783	-0.0325c
	(0.0451)	(0.00818)	(0.00858)	(0.0172)
Price Control(lag)	-0.00385	0.0139	-0.0132	-0.00588
	(0.0675)	(0.0131)	(0.0135)	(0.0220)
Finance Measures(lag)	-0.0645c	-0.00809	0.00444	0.0354a
	(0.0368)	(0.00665)	(0.00691)	(0.0112)
L.Domestic SPS	0.0751b	0.000306	-0.00151	0.00952
	(0.0292)	(0.00525)	(0.00552)	(0.00939)
L.Domestic TBT	-0.0494	0.00899c	-0.00995c	-0.0198b
	(0.0309)	(0.00541)	(0.00569)	(0.00999)
L.Domestic Pre_Ship.	-0.0153	0.000762	0.00247	0.0156
	(0.0289)	(0.00508)	(0.00535)	(0.00979)
Observations	269419	418230	418230	269411
R^2	0.602	0.162	0.137	0.802
Adjusted R^2	0.567	0.104	0.077	0.785

Robust standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.
Column(1) Intensive-margin; Column(2) Extensive-margin; Column(3) Exit Probability; Column(4) Trade unit-value.

Table 20: Binned size variable - Intensive-margin estimations

	(1)		(2)			
	Small vs Large firms		Quartiles by firm size			
	Small	Large	Q1	Q2	Q3	Q4
Ln(1+Tariff)	-0.0398	-0.493a	-0.0109	0.312b	-0.361a	-0.576a
	(0.124)	(0.114)	(0.148)	(0.146)	(0.139)	(0.125)
SPS	0.0534c	0.0543c	0.0153	0.00149	0.0958a	0.0512c
	(0.0310)	(0.0296)	(0.0338)	(0.0271)	(0.0336)	(0.0303)
TBT	-0.00628	0.0607b	-0.0466	-0.0544	0.104a	0.0568c
	(0.0315)	(0.0288)	(0.0363)	(0.0381)	(0.0364)	(0.0310)
Pre-Shipment	0.127a	0.179a	0.0483	0.0113	0.183a	0.216a
	(0.0371)	(0.0328)	(0.0491)	(0.0398)	(0.0385)	(0.0341)
Ln(HS6 imports at destination)	0.0876a		0.0877a			
	(0.00490)		(0.00490)			
BIGS	0.0430a		0.0431a			
	(0.0124)		(0.0124)			
Quantity Control	-0.0358		-0.031			
	(0.0406)		(0.0240)			
Price Control	0.0734		0.0701			
	(0.0618)		(0.0620)			
Finance Measures Measures	-0.112a		-0.101a			
	(0.0298)		(0.0301)			
Domestic SPS	0.0410		0.0315			
	(0.0254)		(0.0251)			
Domestic TBT	-0.0280		-0.0225			
	(0.0269)		(0.0268)			
Domestic Pre-Ship.	0.00335		-0.00820			
	(0.0249)		(0.0246)			
Observations	343315		343315			
R^2	0.60		0.60			
Adjusted R^2	0.566		0.566			

Robust standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.
Column (1) 2 size bins; Column(2) 4 size bins.

Table 21: Binned size variable - Extensive-margin estimations

	(1)		(2)			
	Small vs Large firms		Quartiles by firm size			
	Small	Large	Q1	Q2	Q3	Q4
Ln(1+Tariff)	-0.402a	-0.398a	-0.480a	0.0163	-0.349a	-0.424a
	(0.0195)	(0.0175)	(0.0233)	(0.0237)	(0.0221)	(0.0187)
SPS	0.00157	0.00913b	-0.0042	-0.00790c	0.0143a	0.00819c
	(0.00493)	(0.00461)	(0.00545)	(0.00472)	(0.00547)	(0.00468)
TBT	-0.0189a	0.00543	-0.0340a	0.00345	-0.00573	0.0108a
	(0.00475)	(0.00403)	(0.00549)	(0.00615)	(0.00557)	(0.00416)
Pre-Shipment	0.00074	0.0114b	-0.0141	0.00441	0.00523	0.0179a
	(0.00629)	(0.00519)	(0.00861)	(0.00701)	(0.00643)	(0.0053)
Ln(HS6 imports at destination)	0.0132a			0.0132a		
	(0.000461)			(0.00046)		
BIGS	-0.0271a			-0.0271a		
	(0.00199)			(0.00199)		
Quantity Control	0.00214			0.00214		
	(0.0064)			(0.0064)		
Price Control	0.00789			0.00769		
	(0.00789)			(0.00688)		
Finance Measures Measures	-0.00886c			-0.00876c		
	(0.00485)			(0.00481)		
Domestic SPS	-0.00840b			-0.00825b		
	(0.00389)			(0.00386)		
Domestic TBT	0.00796b			0.00777c		
	(0.00402)			(0.00402)		
Domestic Pre-Ship.	0.00332			0.00264		
	(0.00372)			(0.0037)		
Observations	771705			771705		
R^2	0.115			0.115		
Adjusted R^2	0.072			0.072		

Robust standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.
Column (1) 2 size bins; Column(2) 4 size bins.

Table 22: Binned size variable - Exit probability estimations

	(1)		(2)			
	Small vs Large firms		Quartiles by firm size			
	Small	Large	Q1	Q2	Q3	Q4
Ln(1+Tariff)	0.744a	-0.176a	0.747a	0.183a	0.582a	-0.572a
	(0.0170)	(0.0145)	(0.0201)	(0.0210)	(0.0192)	(0.0149)
SPS	0.103a	-0.0581a	0.105a	0.0389a	0.0564a	-0.103a
	(0.00417)	(0.00382)	(0.00460)	(0.00416)	(0.00465)	(0.00378)
TBT	0.0747a	-0.0608a	0.0876a	0.0385a	0.0320a	-0.0938a
	(0.00411)	(0.00339)	(0.00476)	(0.00541)	(0.00484)	(0.00339)
Pre-Shipment	0.0905a	-0.0283a	0.115a	-0.00415	0.0895a	-0.0803a
	(0.00535)	(0.00420)	(0.00741)	(0.00611)	(0.00543)	(0.00404)
Ln(HS6 imports at destination)	-0.00575a			-0.00578a		
	(0.000402)			(0.000398)		
BIGS	-0.0247a			-0.0238a		
	(0.00160)			(0.00159)		
Quantity Control	-0.00324			-0.00347		
	(0.00549)			(0.00534)		
Price Control	0.00742			0.00744		
	(0.00804)			(0.00894)		
Finance Measures	-0.0286a			-0.0269a		
	(0.00400)			(0.0037)		
Domestic SPS	0.00353			0.00402		
	(0.00317)			(0.00310)		
Domestic TBT	0.00360			-0.00231		
	(0.00330)			(0.00326)		
Domestic Pre-Ship.	0.000320			-0.00151		
	(0.00303)			(0.00298)		
Observations	771705			771705		
R^2	0.258			0.270		
Adjusted R^2	0.222			0.235		

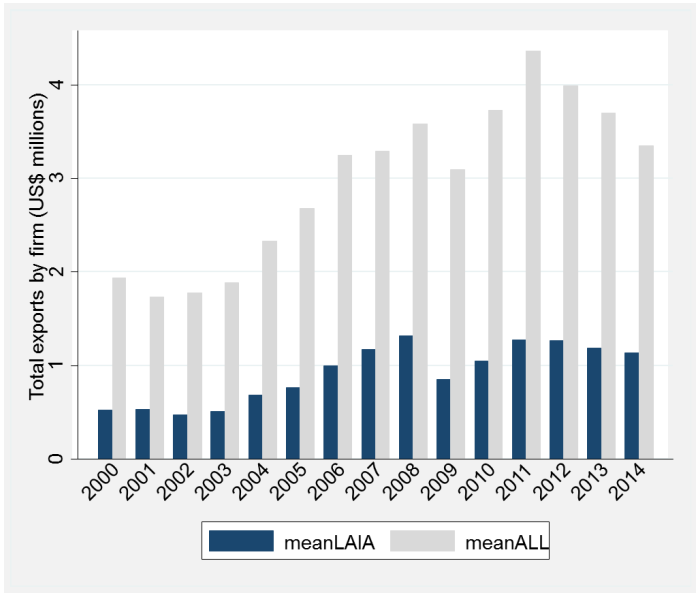
Robust standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.
Column (1) 2 size bins; Column(2) 4 size bins.

Table 23: Binned size variable - Trade unit-value estimations

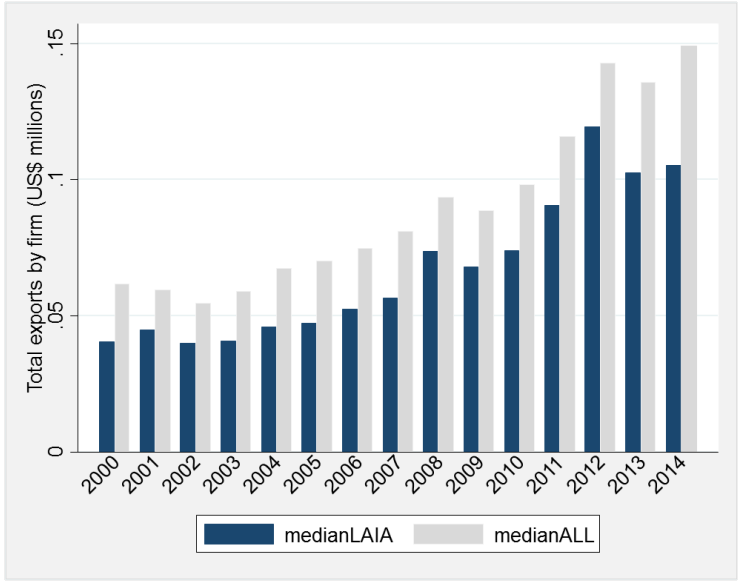
	(1)		(2)			
	Small vs Large firms		Quartiles by firm size			
	Small	Large	Q1	Q2	Q3	Q4
Ln(1+Tariff)	0.0379	-0.0000243	0.0696	0.0482	-0.0264	0.0146
	(0.0481)	(0.0432)	(0.0588)	(0.0496)	(0.0507)	(0.0463)
SPS	0.00774	0.0115	-0.0284b	0.0109	0.0192	0.00281
	(0.0118)	(0.0111)	(0.0129)	(0.00921)	(0.0122)	(0.0112)
TBT	0.00721	0.0106	-0.0285c	-0.0112	0.0457a	-0.0122
	(0.0133)	(0.0118)	(0.0158)	(0.0157)	(0.015)	(0.0124)
Pre-Shipment	0.0240b	-0.00882	0.0290c	0.00776	0.00422	-0.0296a
	(0.0109)	(0.00955)	(0.0155)	(0.00957)	(0.0104)	(0.00959)
Ln(HS6 imports at destination)	0.0132a			0.0132a		
	(0.00175)			(0.00175)		
BIGS	-0.00281			-0.00284		
	(0.00468)			(0.00468)		
Quantity Control	0.0175			0.0159		
	(0.0158)			(0.0146)		
Price Control	-0.00948			-0.00948		
	(0.0203)			(0.0226)		
Finance Measures	0.0347a			0.0344a		
	(0.00916)			(0.00933)		
Domestic SPS	0.00369			0.00745		
	(0.00833)			(0.00816)		
Domestic TBT	-0.0183b			-0.0201b		
	(0.00898)			(0.00897)		
Domestic Pre-Ship.	0.00834			0.0121		
	(0.00847)			(0.00835)		
Observations	343307			343307		
R^2	0.813			0.813		
Adjusted R^2	0.798			0.798		

Robust standard errors in parentheses. c: $p < 0.10$, b: $p < 0.05$, a: $p < 0.01$.
Column (1) 2 size bins; Column(2) 4 size bins.

Figure 1: Firm exports (mineral products are excluded), selected statistics



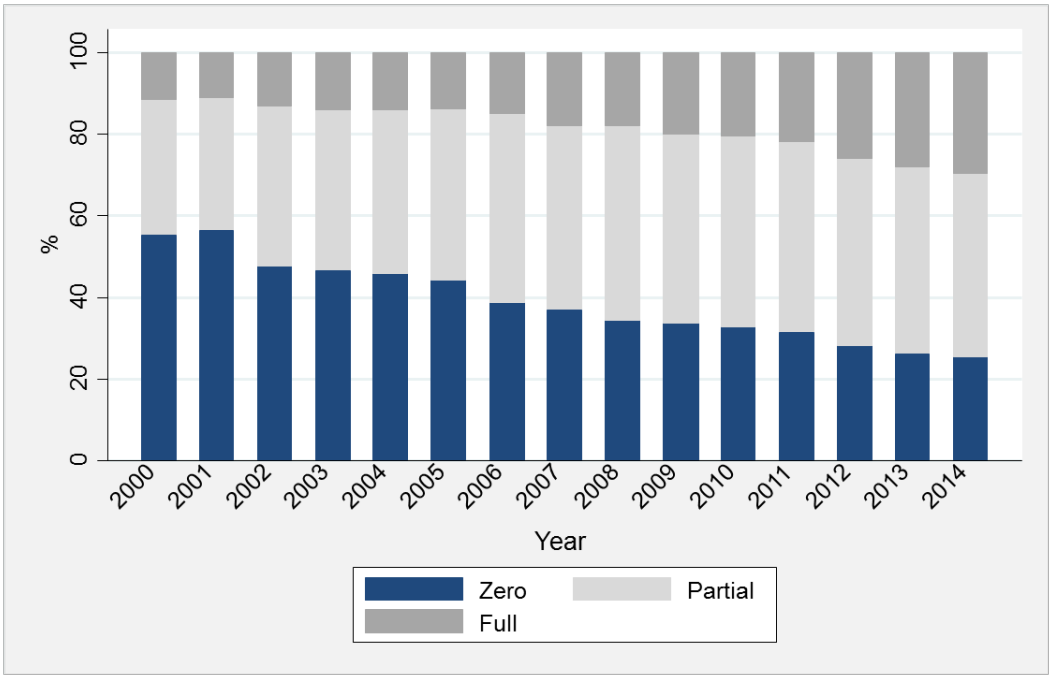
(a) Mean



(b) Median

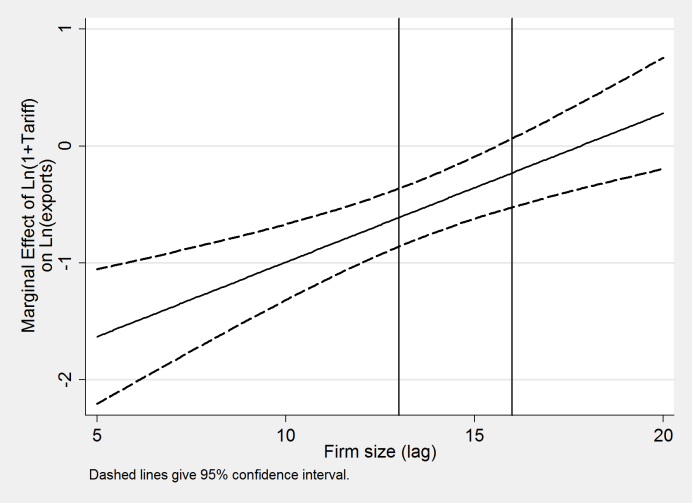
Source: Authors' calculations based on Peruvian custom data.

Figure 2: Technical regulations incidence at the firm level

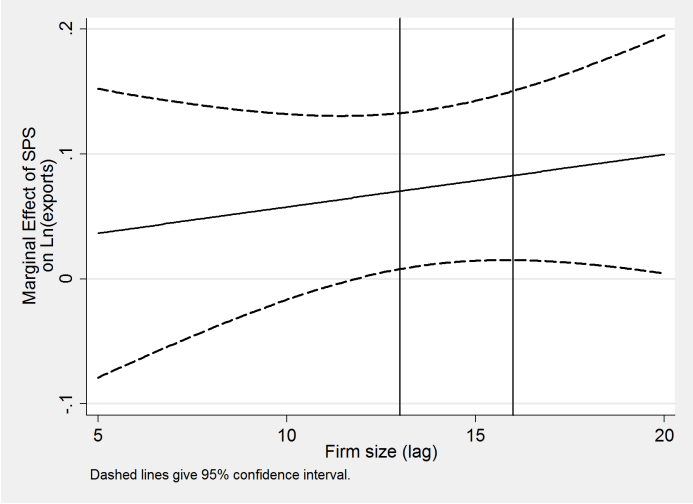


Source: Authors' calculations based on LAIA Secretariat and Peruvian customs data.
Note: Zero refers to the share of firms facing no NTM on any of their trade relationships. Partial refers to the share of firms facing at least one NTM on one of their trade relationships. Full refers to the share of firms facing at least one NTM on all their trade relationships.

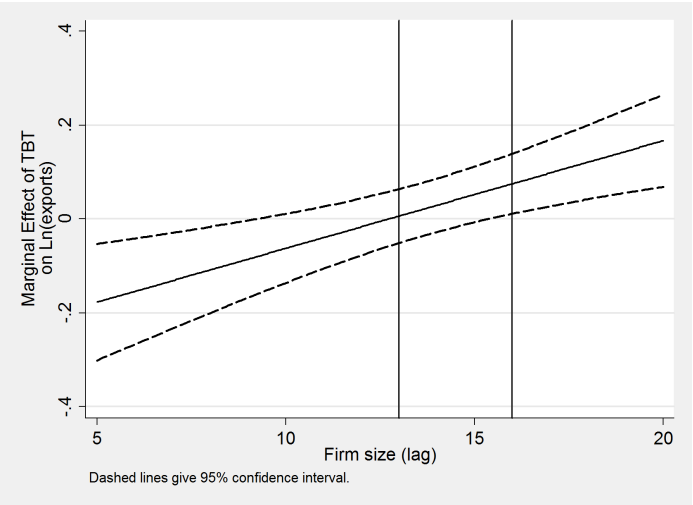
Figure 3: Impact of market-access barriers on exporters' intensive margin by firm size



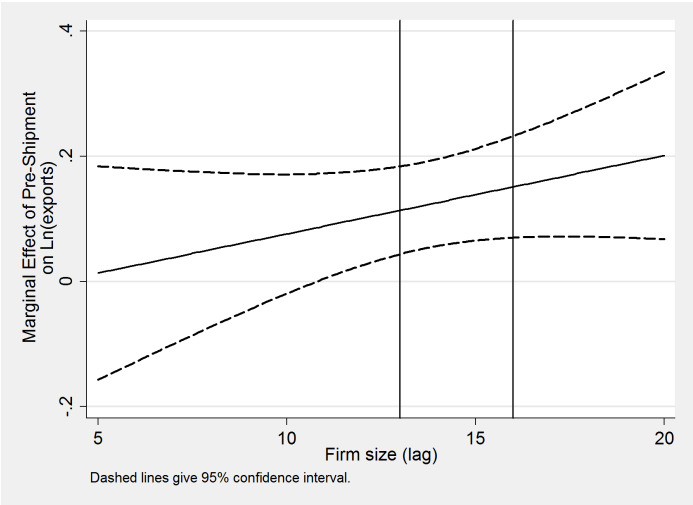
(a) Foreign Tariffs



(b) Foreign SPS measures



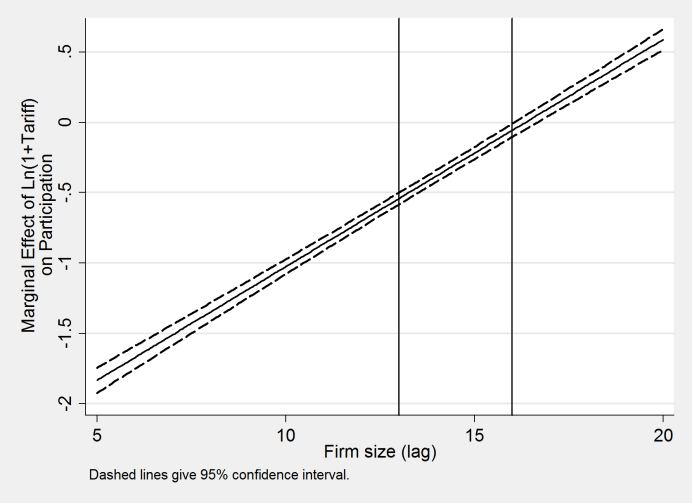
(c) Foreign TBT measures



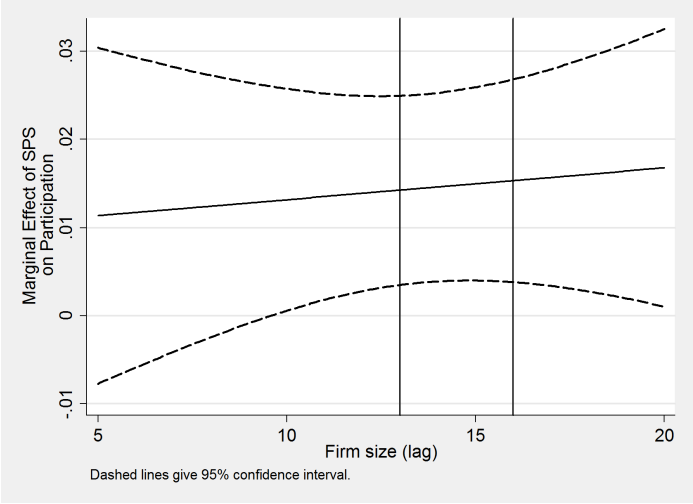
(d) Foreign PSI measures

Source: Authors' calculations.

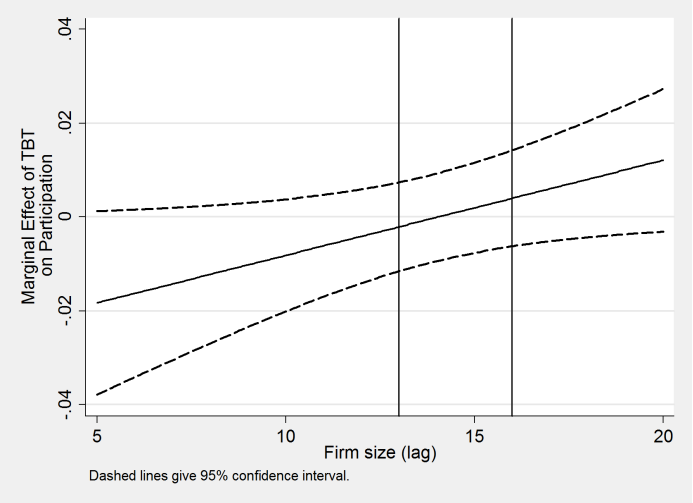
Figure 4: Impact of market-access barriers on exporters' extensive margin by firm size



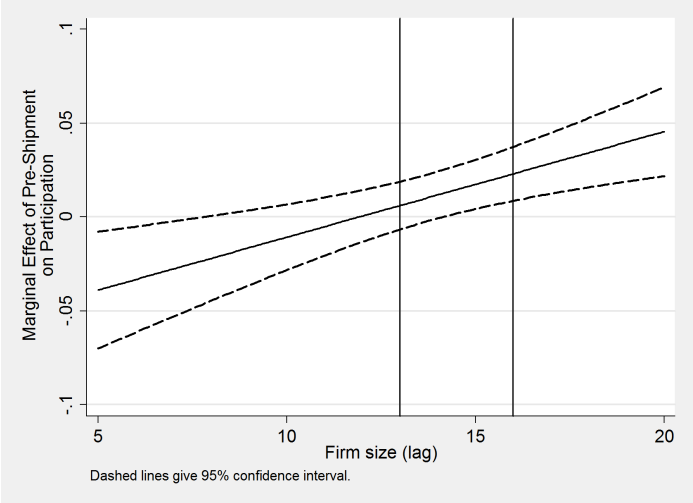
(a) Foreign Tariffs



(b) Foreign SPS measures



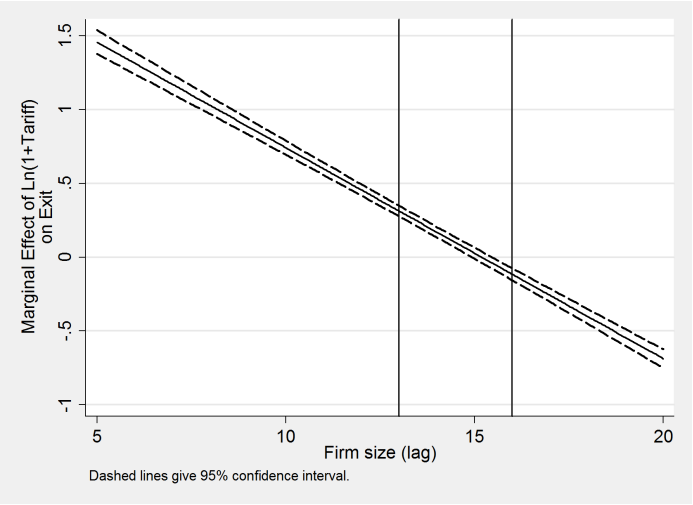
(c) Foreign TBT measures



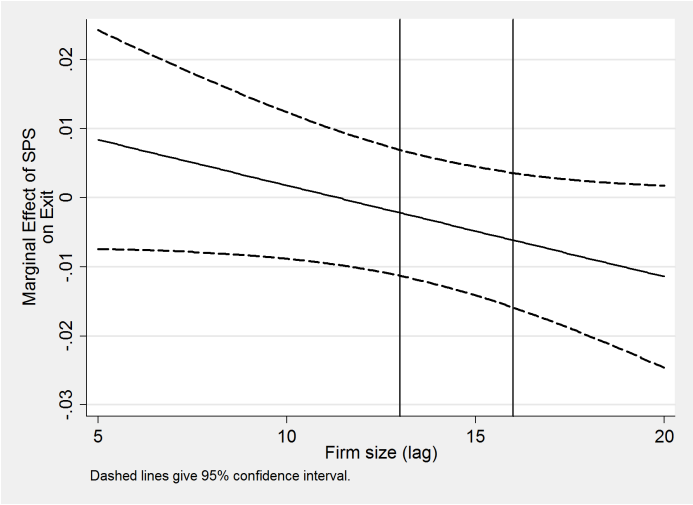
(d) Foreign PSI measures

Source: Authors' calculations.

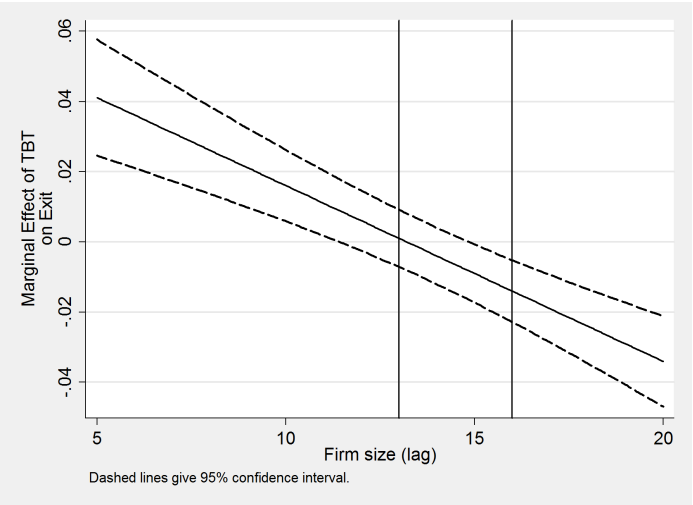
Figure 5: Impact of market-access barriers on exporters' exit probability by firm size



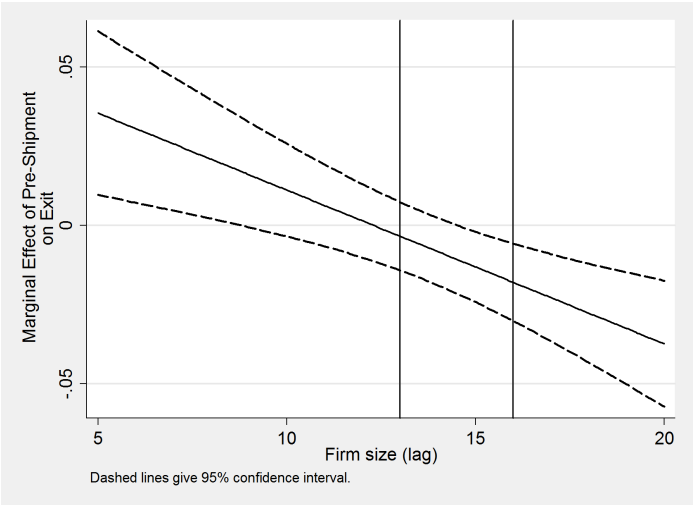
(a) Foreign Tariffs



(b) Foreign SPS measures



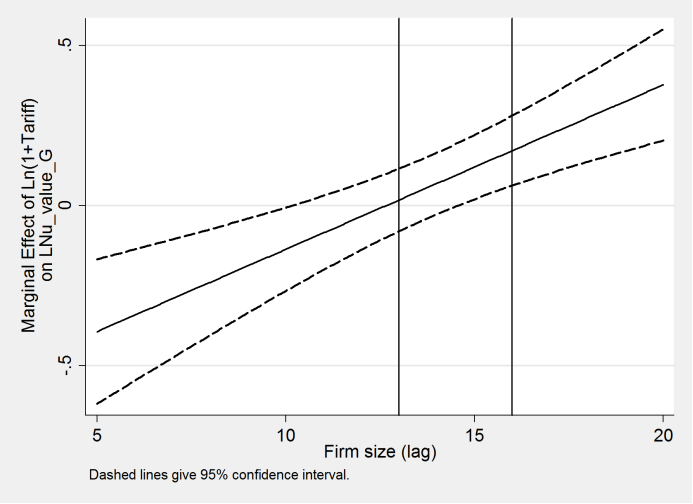
(c) Foreign TBT measures



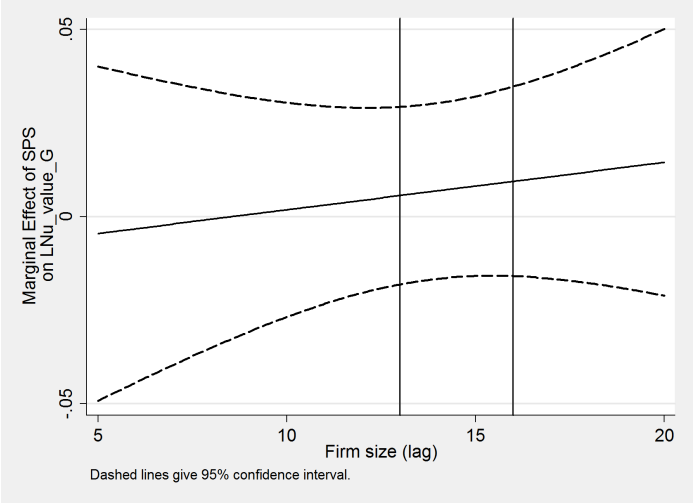
(d) Foreign PSI measures

Source: Authors' calculations.

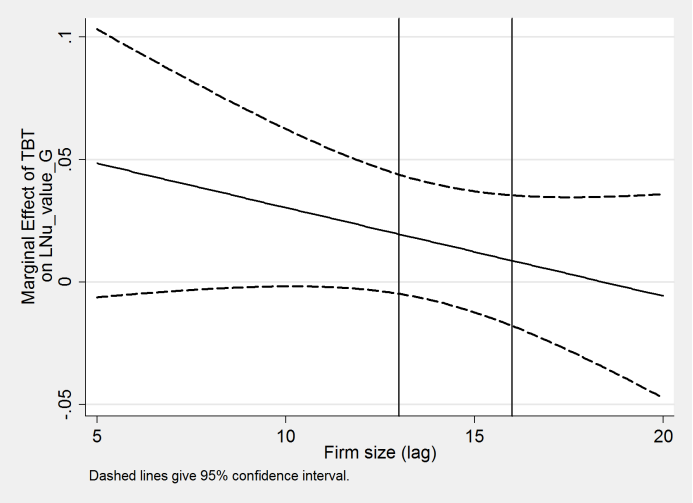
Figure 6: Impact of market-access barriers on exporters' unit prices by firm size



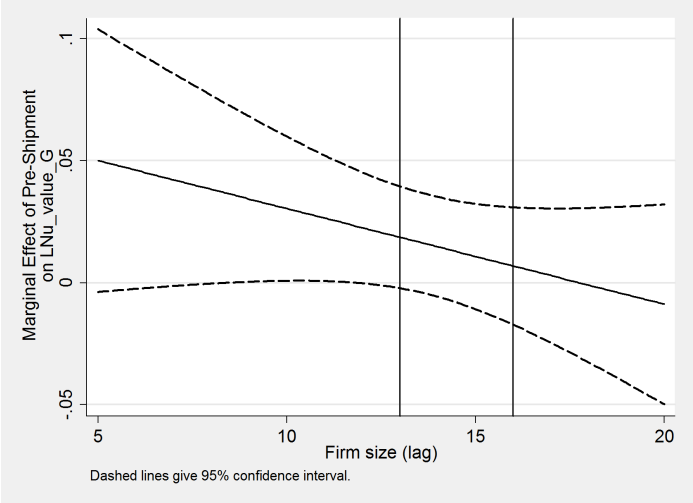
(a) Foreign Tariffs



(b) Foreign SPS measures



(c) Foreign TBT measures



(d) Foreign PSI measures

Source: Authors' calculations.