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research paper series

Globalisation, Productivity and Technology Programme

Research Paper 2020/08

Export performance under domestic anti-dumping protection

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GEP

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August, 2020

Abstract

This paper investigates the effects of import protection on export performance at the firm-product level. We exploit product-specific information on anti-dumping (AD) measures imposed by Peru along with several indicators on the performance of Peruvian exporting firms across and within destination markets. Findings indicate that the impact of protection on export performance depends on which economies are targeted by domestic AD protection. Duties towards China are associated with significantly higher prices, especially among small exporting firms. These firms also reduce their shipments, as suggested by frameworks stressing the role of adjustment costs. In contrast, when AD measures are imposed on competitors from middle- and high-income countries, exporters decrease prices and increase quantities, consistent with the presence of learning curves and economies of scale.

JEL codes: *F13, F14, D22, L25, L41.*
Keywords: *Anti-dumping, Export Prices, Emerging Economies*

*We thank Daniel Bernhofen, Julia Cajal Grossi, Davin Chor, Beata Javorcik, Kalina Manova, Andreas Moxnes, Alberto Osnago, Martha Denisse Pierola, Tom Prusa, Jens Suedekum, Lorenzo Trimarchi, and participants to the ETSG Conference, EARIE Conference, ISGEP Workshop, and to the Workshop "Firms in a Global Economy", for helpful comments and suggestions. The usual disclaimers apply.
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1 Introduction

There has been a remarkable increase in the occurrence of trade protection in the form of anti-dumping (AD) duties with nearly 4,500 cases filed by almost 50 countries in the last two decades (Vandenbussche and Zanardi, 2008; Bown and Crowley, 2014). AD protection is allowed under the WTO agreement with the goal to protect domestic industries from unfair pricing by foreign firms, and has been the most used temporary trade barrier in a period characterized by pervasive trade liberalizations.[1]

While the traditional users of AD duties are industrialized economies like the European Union and the United States, the majority of recent AD cases were filed by developing economies to protect their industries against imports from emerging economies such as China and India (Blonigen and Prusa, 2016).[2] From the perspective of the country imposing AD measures, policy makers often hope that temporary protection in the home market may enhance the competitiveness of domestic industries in global markets (Blonigen, 2016). This is particularly relevant for emerging economies which may strongly rely on trade policy to accomplish their targets of economic development (Costinot et al., 2015).

In this paper, we analyse the following research questions: (1) Is AD a suitable measure to improve the export performance of protected firms in an emerging economy? (2) Does it matter on which exporting countries AD measures are imposed?

From a theoretical point of view, the relationship between domestic AD protection and export performance is ambiguous. When domestic firms face less competition from abroad, they are likely to increase domestic production. On the one hand, protected firms may benefit from economies of scale when increasing production, implying lower marginal costs which allow them to decrease prices and compete more successfully in global markets (Krugman, 1984). One the other hand, if domestic firms face capacity or financial constraints, they might substitute exports for domestic sales (Ahn and McQuoid, 2017; Almunia et al.,

[1] AD constitutes the international-trade counterpart of the legislation on domestic competition enacted by the countries pioneering the first industrial revolution (Bown and McCulloch, 2012).

[2] Since the foundation of WTO in 1995, developing countries account for more than 70 percent of AD cases in most years.

2018; Medina, 2019). Hence, the net effect of AD on export performance is ultimately an empirical question.[3]

To answer our research questions, we investigate the effects of AD measures on export revenue, volumes, and market entry of Peruvian firms exporting the same product on which the AD duty has been imposed in their home economy.[4] We first assess the impact of domestic import protection at the firm-product level *across* destination markets, then we determine effects of AD protection on the extensive trade margin, finally we provide detailed evidence on firm-level adjustments taking place *within* destination markets. With the aim to infer adjustments to trade protection affecting the determinants of export performance, we focus on price adjustments[5] which—together with variation in export sales—provide indirect evidence on the features of firms' cost function and changes in product characteristics (Baldwin and Harrigan, 2011).

We rely on detailed customs data from Peruvian exporting firms, available from the Exporter Dynamics Database (EDD) for the period 1993-2009 (Fernandes et al., 2016). We match this data to product-level information on AD measures imposed by Peru from the Global Antidumping Database (GAD) (Bown, 2012).

In our empirical analysis, we combine a difference-in-differences estimator with a propensity score re-weighting approach to control for selection into AD. Since we observe product-destination specific exports at the firm-level, we are able to control for various confounding factors using firm-year fixed effects and exploit variation in AD initiation across product categories and time within firms.

The effects of import protection are likely to depend on which economies are targeted and the characteristics of protected firms. Exporters facing competitors based in developed economies tend to operate in markets characterized by high fixed costs of production and high R&D intensity (Hallak, 2006; Hallak and Sivadasan, 2014).[6] Such markets are likely

[3]Frameworks investigating the behaviour of heterogeneous firms following Melitz (2003) assume a constant firm productivity (marginal cost) draw which determines intra-industry adjustments to trade policy across firms. In this paper, we focus on adjustments to trade policy taking place *within* firms.

[4]Appendix C reports details on the Peruvian anti-dumping law.

[5]In this manuscript, the terms price and unit value are employed interchangeably.

[6]Similarly, the literature focusing on product quality and innovation shows that developed countries

to be characterized by scale economies which can be either static and internal to the firm or dynamic due to "learning curves" (Krugman, 1984). In the presence of economies of scale, export performance is likely to improve after domestic AD protection. We therefore differentiate between AD measures imposed towards economies at different stages of economic development such as high, middle, and low-income countries. Given the role of China as the world's leading exporter of manufactured goods and the surge of AD measures against Chinese firms by emerging economies, we separately analyse measures against Chinese imports (Bown and McCulloch, 2012; WTO, 2015).[7]

Capacity constraints as well as financial frictions are usually concentrated among small enterprises (Beck et al., 2005; Soderbery, 2014). Small firms are therefore more likely to face higher adjustment costs implying increasing marginal cost curves and a negative relationship between import protection export performance.[8] We therefore investigate heterogeneous effects among small and large exporters.

To preview our results, we find that, on average, Peruvian firms report higher export revenues after being protected in the home economy. However, this finding disguises sizeable differences in firm-level responses depending on the economies targeted by AD measures. Specifically, we observe that Peruvian firms decrease export prices and increase the size of their shipments, within and across destinations, when AD measures are imposed on imports from other middle-income countries.

Firms protected from competitors based in high-income countries report a significant increase in export revenue which is associated with an increase in the number of destinations reached. In contrast, Peruvian exporters increase export prices and report reductions in export quantity when AD measures are imposed against Chinese competitors. The reduction in export performance after these AD measures is mostly driven by relatively small exporting

produce goods of higher quality, which require costly inputs (Schott, 2004; Verhoogen, 2008), and higher expenditures on innovation (Hummels and Klenow, 2005; Hallak and Schott, 2011).

[7] Up to now, the anti-dumping literature has investigated the effects of anti-dumping protection on firm-level outcomes mostly focusing on AD measures imposed by developed economies against China (Konings and Vandenbussche, 2013; Jabbour et al., 2019; Sandkamp, 2020) and has not distinguished target economies with respect to their income group.

[8] Models that formally derive increasing marginal cost curves due to fixed capital include Medina (2019) and Blum et al. (2013).

firms.

Our estimated effects are economically and statistically significant. Anti-dumping measures towards China are associated with 19 percent higher prices by small exporting firms. In contrast, Peruvian exporters, on average, reduce prices by 8 percent and increase export quantities by more than 40% when anti-dumping measures are imposed on imports from middle-income countries. Interestingly, we observe that half the magnitude of this adjustment is due to within-destination changes in prices, while we do not observe any significant effect of import protection on product quality, estimated following Khandelwal et al. (2013). These adjustments are not determined by AD measures imposed by leading importing markets (US and EU), and by AD duties imposed in each destination market against possible competitors of Peruvian exporters.

This study is related to several strands of the theoretical and empirical literature. The empirical literature investigating the effects of import protection on firm-level outcomes concludes that anti-dumping duties have, on average, a positive effect on domestic firms' revenue productivity (Konings and Vandenbussche, 2008). However, this effect seems to be mainly driven by inefficient producers, while the revenue of more efficient firms and exporters decreases (Konings and Vandenbussche, 2013; Jabbour et al., 2019). Pierce (2011) finds that increases in revenue-based productivity among import-competing firms are mainly driven by increases in prices and mark-ups, while physical productivity actually falls after AD initiation. Similarly, Konings and Vandenbussche (2005) provide evidence that AD protection is associated with higher domestic mark-ups.[9] Purely domestic firms without any international activity benefit from import protection and see their domestic sales rise, while exporters, especially if they are part of a global network, suffer from a reduction in sales relative to unprotected firms. We contribute to this literature by investigating the effects of domestic import protection on firms' competitiveness in global markets rather than measures of productivity and mark-ups that mainly refer to the domestic market. We find evidence of differing price adjustments among exporters benefiting from domestic AD

[9]See also the review of related literature in Blonigen and Prusa (2016).

protection.

This paper is also related to the empirical literature studying the effects of tariffs and trade liberalization on productivity and other firm-level outcomes (Pavcnik, 2002; Goldberg et al., 2009; Halpern et al., 2015; De Loecker et al., 2016). Closely related to our study is Amiti and Khandelwal (2013) who employ cross-country and cross-industry variation in tariffs to study their effects on export quality. They find that lower tariffs are associated with higher quality of products exported to the US from countries close to the world technological frontier but lower quality from countries far away from the frontier. Medina (2019) studies the response of Peruvian exporters of textile products to Chinese competition following China's accession to the WTO. Peruvian textile manufacturers react to Chinese competition upgrading the quality of their products and exporting to new markets. In contrast to this literature, we study within firm adjustments to AD measures and exploit cross-product and time variation in trade protection. This leads us to find that AD protection affects exporters' short run strategies concerning prices rather than determining their choices concerning product characteristics.

The rest of the paper unfolds as follows. Section 2 describes the database used in the empirical analysis and presents descriptive statistics. The empirical strategy and our results are detailed in section 3. Section 4 concludes.

2 The Data

The aim of the empirical analysis carried out in the following sections is to investigate the impact of import protection on firm-level export performance. We obtain detailed customs data on exporting firms and merge it with product-country data on anti-dumping duties in the home economy, Peru. Given the purpose of this study, we focus on firms exporting differentiated products according to the Rauch (1999) classification. Indeed, producers of differentiated goods are more able to adjust prices to changing market conditions than producers of homogeneous or reference-priced goods whose prices tend to be determined in

organized markets. The specific attributes which make differentiated goods distinct, such as their physical characteristics, design, or brand image often allow them to sell for higher prices (Hallak, 2006).[10]

Data on Peruvian exporting firms. We rely on the Exporter Dynamics Database (EDD) compiled by the World Bank which contains comparable information on trade flows by exporting firm, product, and destination country (Fernandes et al., 2016). We employ data on Peruvian exporters during the period 1993-2009. This database was assembled from customs-level data and reports yearly observations on the identification code of exporting firms, HS 6-digit products, destination country, total value, and quantity of trade flows.[11] The monetary value of export flows is measured in Free on Board (FOB) US Dollars (USD), therefore it does not include any cost associated with shipping and freight. Export quantities are measured in kilograms. To take into account changes in product codes between HS-1992 through HS-2007, a consolidation procedure has been adopted by the compilers of the EDD.

Data on import protection. To obtain information on anti-dumping duties imposed by the Peruvian government on foreign firms during the period 1993-2009, we rely on data from the Global Anti-dumping Database (GAD), available from the World Bank Temporary Trade Barrier Database (TTBD) (Bown, 2012). This data-set provides information on trade barriers at the product level across countries and over time. The GAD reports information on whether Peruvian authorities filed an investigation on foreign firms alleged to sell their products in Peru at a price lower than the normal value.[12] In the same database, we also find information on those investigations that actually lead to the imposition of an anti-dumping duty on imports. For these cases, we observe the product, the time period in which the

[10] We also report findings for homogeneous goods and find smaller, non-significant, effects. In our database, export flows of homogeneous products are much less frequent than exports of differentiated products.

[11] This identification code is assigned by the compilers of the EDD database and cannot be linked to other data-sets reporting information on Peruvian firms.

[12] Article VI of GATT 1994 explicitly authorizes the imposition of a specific AD duty on imports from a particular source, in excess of bound rates, in cases where dumping causes or threatens injury to a domestic industry, or materially retards the establishment of a domestic industry. According to the Peruvian Antidumping law, petitions can be filed to the National Institute for the Defense of Competition and the Protection of Intellectual Property (INDECOPI) if domestic producers supporting the petition account for at least 25 percent of total domestic production of the like product. Fore more details on the Peruvian AD law refer to Appendix C.

duty was in place, and the origin-country of the product on which the measure was imposed. To assess whether the imposition of anti-dumping duties in the home economy affects the performance of Peruvian exporters, we merge the two databases at the product level.[13] We consider only those cases in which an anti-dumping duty was imposed on imported products, therefore we discard cases in which the investigation following a petition did not lead to an increase in Peruvian import tariffs. To measure average import protection in the home economy, we rely on data on Peruvian import tariffs for each HS 6-digit product, available from the World Integrated Trade Solution (WITS) database. From the same source, we obtain data on effectively applied tariffs at the product-level on Peruvian exports in each destination market.

Different target economies. To identify differential effects of targeted import protection measures, as AD duties are, we differentiate countries targeted by Peruvian AD duties with respect to their income per-capita relying on the World Bank income classification.[14] We are then able to assess how the imposition of anti-dumping duties on imports from high, middle, and low-income countries differently affects the export performance of Peruvian exporters across *and* within destinations. Moreover, a large strand of the literature underlines the role of Chinese exports as a major factor affecting competition in international markets (Song et al., 2011; Autor et al., 2014, 2016), therefore we distinguish this country from other target economies belonging to the same income group.[15]

Figure 1 reports the number of HS 6-digit products covered by Peruvian AD measures each year during the period under investigation. The increase in the number of products subject to AD duties from 1999 onwards is remarkable. This evidence is in line with findings from the recent literature reporting a noticeable increase in AD duties by emerging and

[13] GAD identifies products with 8-digit or 10-digit HS product codes. A conversion procedure is applied before merging GAD data with data on Peruvian exporting firms available from the EDD.

[14] This classification of world's economies is based on estimates of gross national income (GNI) per capita. We rely on income thresholds for year 1993. Countries reporting a GNI per capita below 675 are classified as low income, countries reporting a GNI per capita between 676 and 8,625 are classified as middle-income, while countries reporting a GNI per capita above 8,625 are considered as high-income.

[15] Table A.1 reports the list of Anti-dumping cases considered in this empirical analysis. A sizeable number of AD measures are imposed on different target economies in a given year and affect several HS 6-digit products.

developing countries in a period characterized by large tariff reductions (Vandenbussche and Zanardi, 2008; Blonigen and Prusa, 2016). It appears that Peruvian policy markers followed this strategy in the early 2000s.[16]

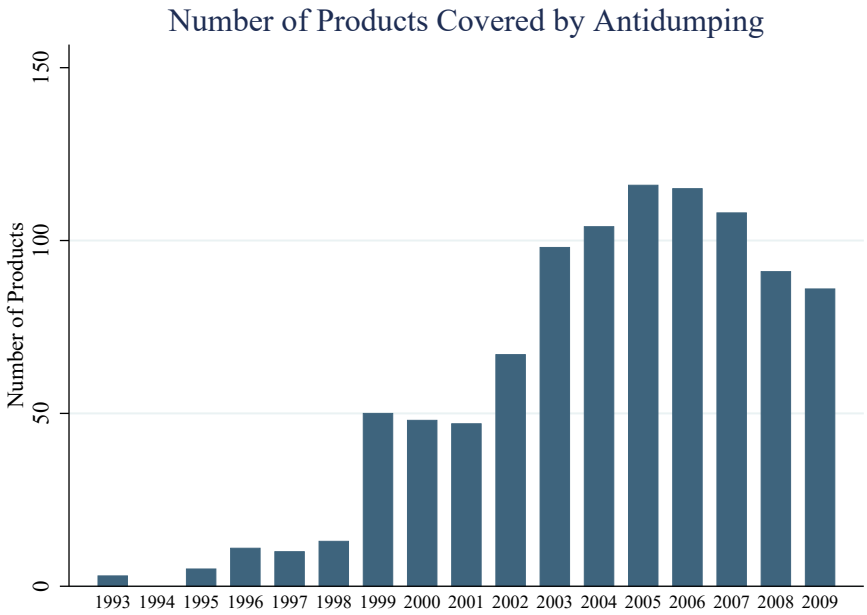

Figure 1: HS 6-digit products covered by Anti-dumping (AD) duties, Peru.

Descriptive statistics. Table 1 reports statistics for some key variables in the period 1993-2009. During this period, on average, more than 5,000 Peruvian firms export per year.[17] Among these firms, an average of 632 benefit from an AD measure imposed in the home economy on any of the HS 6-digit products they supply to the foreign market. On the contrary, more than 90 percent of exporting firms in our sample does not benefit from domestic AD protection.

[Table 1 here]

The number of destinations reached by Peruvian exporters is quite limited. Indeed, a large share of exporters ships one HS 6-digit product to only one foreign destination, while

[16] This is confirmed by Bown and Crowley (2014) which include Peru in the group of emerging economies strongly relying on temporary trade barriers (TTB) to counteract macroeconomic shocks.

[17] The smallest number of exporters per year is 2,698 in 1994.

the top 5 percent of firms exports to more than 4 destinations.[18] On average, a firm exports more than 31 different HS 6-digit products, yet, the median number of exported products is equal to 16 since the majority of firms supplies much fewer products. Data on export revenue and quantity underlines that the export performance of Peruvian firms is heterogeneous and highly polarized. The average firm-level export revenue on a single HS 6-digit product is above 400,000 US dollars. However, the median revenue on yearly shipments at the firm-product level is far smaller than the average, suggesting that export revenue tends to be highly polarized not only across firms but also within firms across products. The logarithm of the average firm-product unit value reports a considerable variation thus suggesting a large heterogeneity in prices charged on similar products across different destination markets.[19]

Figure 2 reports on the number of products subject to Peruvian AD protection during the period 1993-2009. We distinguish products according to the country-group on which duties were imposed. Consistently with previous evidence, the majority of duties is enforced on imports from China (Prusa, 2005; Vandenbussche and Zanardi, 2008; Jabbour et al., 2019).[20] The number of HS 6-digit products exported from China on which Peru introduced AD duties increased from 20 in year 2000 to more than 70 in 2006. Products exported by middle-income countries represent the second largest group subject to anti-dumping duties, while the number of HS 6-digit products exported by high-income and low-income countries subject each year to AD duties remains around 20 during the whole period under investigation.

[18] The high granularity of firm-level customs data is consistent with evidence (Bernard et al., 2007).

[19] The average unit value at the firm-product level is obtained taking the ratio between product-level export revenue and product-level export quantity. This measure can be considered as a proxy for the average price at which a firm exports a product across destinations.

[20] In the years between 1995 and 2014, China was the target of 759 AD cases out of 3058 recorded worldwide.

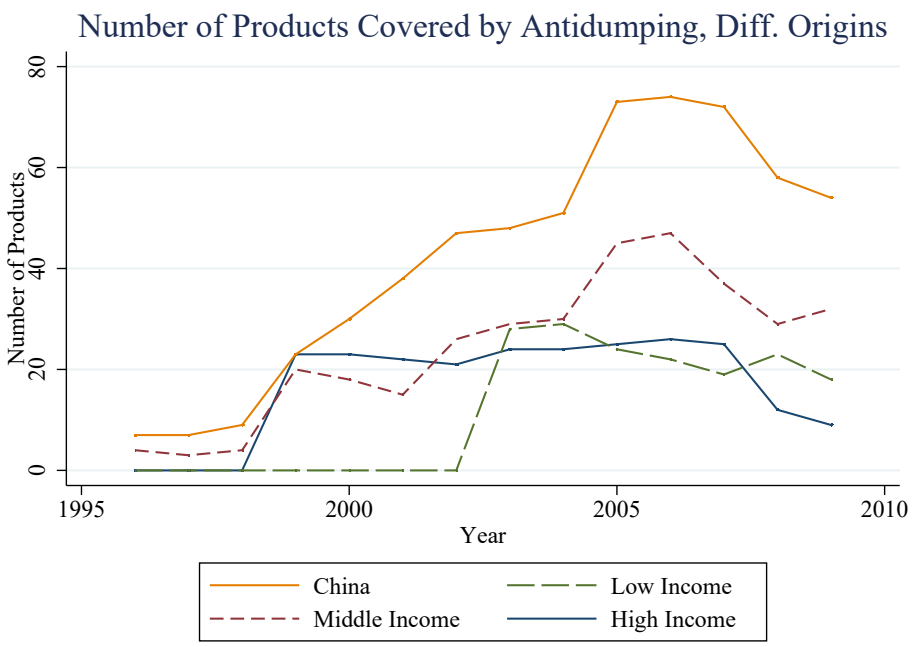

Figure 2: HS 6-digit products covered by Anti-dumping (AD) duties, target economies.

Table 2 describes how effective these temporary import-protection measures are at reducing Peruvian imports from the different target economies. We observe significant reductions in HS 6-digit product-level imports when AD duties are imposed on middle-income countries and China. On average, duties on Chinese imports are associated with 38 percent lower import value from China in the following year, while duties on middlle-income economies are associated with contractions in imports from this group of countries larger than 70 percent. These sizeable effects are confirmed by significant reductions in import quantities, reported in Panel B of this table.[21]

[Table 2 here]

Data displayed in Table 3 describes the sizeable increase in the number of Peruvian exporters between 1993 and 2009. The number of firms serving foreign markets increases

[21]The share of Peruvian imports covered by AD duties varies widely across the different HS 2-digit industries. During the period under investigation, the 2-digit chapters in which AD protection affects more than 10 percent of Peruvian imports in that chapter "are toys and sport requisites" (chapter 95), and "footwear" (chapter 64).

constantly in this period, and a non-negligible share of them benefits from protection in the home economy. Indeed, from 1999 onwards, more than 7 percent of firms ships abroad products which are subject to AD duties in the home economy. The share of AD-protected exporters rises considerably as more AD measures are imposed at the beginning of the 2000s, reaching a remarkable 15 percent of Peruvian exporters in 2007. The majority of firms protected by AD in the home economy exports products on which AD duties are imposed on China, followed by products exported from high-income countries (e.g. South Korea, Taiwan), and products supplied by countries at a similar stage of development as Peru (middle-income countries).

[Table 3 here]

Overall, this preliminary evidence confirms that Peruvian policy makers increasingly relied on AD duties in a period characterized by trade liberalization: the majority of AD duties was imposed on imports from China. The imposition of AD duties was associated with significant reductions in imports from targeted economies. Bringing together the evidence described in this table and the previous graph, we observe that duties on middle-income countries affect a large number of HS 6-digit products, while a small share of Peruvian exporters is concerned by these measures. On the contrary, duties on imports from China affect a large number of products and a large number of Peruvian exporters. Anti-dumping duties on high-income countries involve few HS 6-digits categories but a relatively large group of Peruvian exporters.

To have a first look on the role of import protection for the performance of exporting firms, we now focus on those firms that at some point in time benefit from AD protection in the home economy. Figure 3 plots average export revenue at the firm-product level in the three years before and after the imposition of an anti-dumping duty on any of the products supplied by the firm. This plot shows that protected firms, on average, report a significant reduction in export revenue before AD measures are imposed. This is consistent with a general deterioration of firm performance which might justify the introduction of

domestic protection measures. Revenue rapidly increases in the first two years following the imposition of the duty. Noticeably, a major part of the increase in export revenue concomitant with import protection materializes in the first year following the introduction of the duty, the magnitude of this increase shrinks in the following two years.

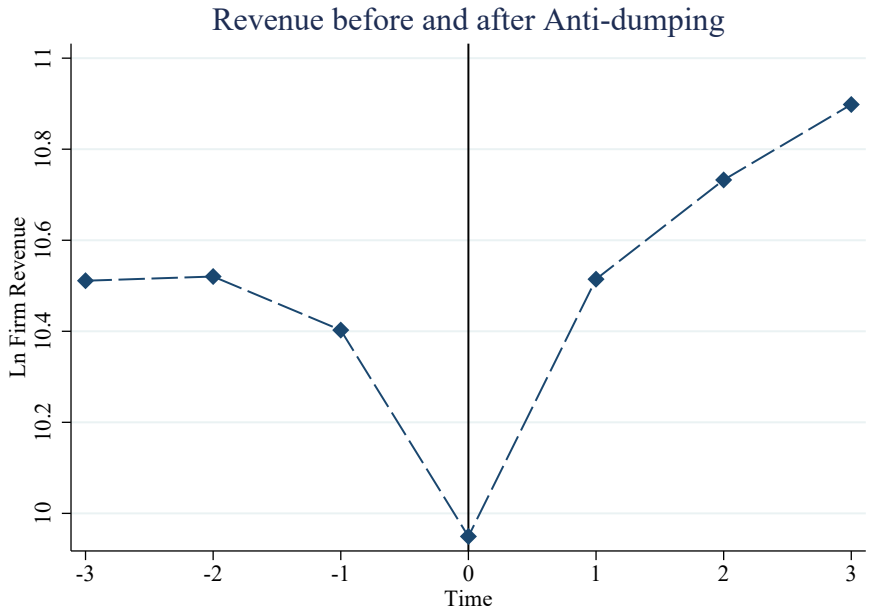

Figure 3: Export revenue before and after AD protection on competing products.

The variation in this proxy for firm-level performance once domestic AD measures are imposed is worth deeper investigation. The empirical analysis carried out in the following sections takes on from this preliminary evidence and investigates within-firm adjustments to import protection.[22] Our aim is to take into account firm-level and product-level characteristics which might determine variation in firm-level outcome variables due to domestic AD.

[22]Table A2, included in Appedix A, reports on sample means for export revenue, quantity, and average unit value between AD-protected and non-protected firms. Protected firms report higher export revenue, ship larger amounts, and report higher average unit values at the firm-product level, differences in means are statistically significant.

3 Empirical Analysis

3.1 Identification

Our empirical analysis aims to identify the causal effect of antidumping protection on export performance. In particular, we are interested in the average treatment effect on the treated (ATT) which involves a comparison between the actual outcomes of protected firms and the situation had AD not been imposed:

$$ATT = E[y^1_{t+s}|\boldsymbol{x}_{t-1}, AD_t = 1] - E[y^0_{t+s}|\boldsymbol{x}_{t-1}, AD_t = 1]$$

AD_t takes value one if AD protection has been initiated in year t. y^1_{t+s} is the observed outcome of protected firm-products (firms that exported the protected product in t-1) s periods after initiation of an AD measure. y^0_{t+s} is the unobserved counterfactual outcome, i.e. the performance of protected firms in the absence of AD protection. To approximate the counterfactual, we rely on firm-products without protection but with similar characteristics to protected firms.

For this purpose, we employ propensity score reweighting (Imbens, 2004) to construct the counterfactual and combine it with a difference-in-differences estimator in order to evaluate the impact of import protection.[23] We first estimate the propensity score, $\hat{Pr}(AD_t = 1|\boldsymbol{x}_{t-1})$, the predicted probability of AD protection, from a Probit model which allows us to control for observable characteristics affecting AD and our outcome variables of interest. The vector $\boldsymbol{x}_{t-1}$ contains only firm-product characteristics measured before AD-protection in order to avoid reverse causality problems (Caliendo and Kopeinig, 2008).

We estimate the propensity score at the firm-product level relying on the following set of lagged variables: number of products, export revenue, quantity, average tariffs—computed separately for imports from high, low, middle income and China—and domestic growth of

[23] Matching and reweighting methods are widely applied in the context of international economics (e.g., Guadalupe et al., 2012; Branstetter and Drev, 2014) and antidumping in particular (Konings and Vandenbussche, 2005; Pierce, 2011; Jabbour et al., 2019).

prices and production at the industry level.[24] Results for the propensity score estimation are depicted in Table A3.

As we exploit a panel data-set, we can relax the assumption of selection on observables. Instead of comparing differences in the levels of outcome variables between the two groups, we focus on within-firm (and within firm-product) changes of outcome variables (Arnold and Javorcik, 2009; Chen, 2011; Guadalupe et al., 2012). This procedure allows selection into the group of protected firms to be based on the expected impact on our outcome variables (Heckman et al., 1997). Furthermore, we can control for time-invariant unobservables through the DiD estimator, while time-varying observables are controlled through the propensity score. Specifically, our DiD estimates are obtained from weighted regressions where non-protected firm-products receive a weight of $\frac{\hat{Pr}(AD_t=1|\boldsymbol{x}_{t-1})}{1-\hat{Pr}(AD_t=1|\boldsymbol{x}_{t-1})}$. The balancing test based on the reweighted sample documented in Table A4 indicates that the reweighted comparison group indeed looks similar in terms of observable characteristics before AD initiation. We discuss the details of our DiD regressions in the next subsection.

3.2 Firm-Product Level Estimations

We first investigate the effect of AD duties in the home economy on export revenue, quantity, and average unit value at the firm level, relying on propensity-score re-weighting. We compute the sum of export revenue (quantity) across various destinations for each firm-product-year triplet and then obtain a proxy for average unit value dividing total revenue by total quantity at the firm-product level. We rely on the following empirical specification:

$$Y_{fp,t} = \phi_{f,t} + \theta_{fp} + \gamma_k Imp.Tariff_{p,t-1} + \beta_k AD_{p,t-1} + \epsilon_{fp,t} \quad (1)$$

The term $Y_{fp,t}$ represents either export revenue, quantity or average unit value, of a specific HS 6-digit product p sold by firm f in year t. The main explanatory variable, AD, is equal to 1 for those years in which a product is protected by an AD duty in Peru, and 0 otherwise.

[24] Data on domestic industry prices and production is available from the Peruvian National Statistical Office, INEI. Data on import tariffs at the product-level is obtained from the WITS database.

Estimates reported in columns (2), (4), and (6) of Table 4, are obtained employing dummy variables for AD measures imposed on the different target economies: China, high-income, middle-income, and low-income. In all specifications, we include firm-year fixed effects, $\phi_{f,t}$, to control for factors varying over time within the firm, such as firm productivity or total investment in R&D, which might correlate with the variable of interest and affect our dependent variables. Moreover, we employ firm-product fixed-effects θ_{fp}. This rich set of fixed effects allows us to consider unobservable factors at the firm and product level affecting the export performance of the firm. In particular, using firm-product fixed effects we take into account those factors making a firm relatively more productive than others in supplying a specific HS 6-digit product during the period under analysis.

Following Konings and Vandenbussche (2008), we lag our main variable of interest by one year to determine the impact of AD duties on firm-level export performance in the subsequent year. To consider the average level of protection on a given product, we control for the HS 6-digit Peruvian import tariff in the year before the trade flow occurs. Indeed, our aim is to identify the additional effect of AD protection on the performance of exporting firms on top of standard protection granted by Peruvian import tariffs.[25]

Evidence reported in Table 4 can be considered as a first assessment on adjustments due to import protection. As shown by the estimates reported in columns (1), (3) and (5) of Table 4, the imposition of an AD measure on any of the different target economies is associated with a significant increase in export revenue and average unit value. On average, product-level export revenue increases by more than 24 percent when AD measures are imposed; columns (3) and (5) decompose this into variations in prices and quantities. We observe a significant increase in average unit value associated to AD protection by 11 percent. However, as shown in columns (2), (4), and (6), the effect of duties on export firm-product level revenue, quantity, and average unit value depends on the target economies on

[25] In order to reduce the role of outliers in affecting our estimated coefficients, these specifications are estimated using observations from firms reporting firm-product revenue below the 95th percentile and above the 5th percentile.

which AD duties are imposed.[26]

[Table 4 here]

Duties imposed on high-income countries are associated with significant increases in export revenue and quantity, while duties on Chinese imports are associated with significant reductions in export quantities. Moreover, when focusing on adjustments in average export unit-value within firm-product pairs over time, we observe that anti-dumping duties on high-income and middle-income countries are associated with reductions in average export unit values, while duties on Chinese imports and low-income countries are associated with an increase in average unit value. Relying on coefficients obtained in specification (6) of Table 4, we observe that imposing an AD duty on a middle-income economy is associated with a 18.40 percent reduction in average product-level unit value across destinations, while duties on imports from China are associated with 29.70 percent higher average unit value in the following year.

Adjustments taking place in firms protected from competitors in high and middle income countries might be explained by the presence of scale economies within the firm. On the contrary, adjustments in firms protected from Chinese competitors are consistent with increasing marginal costs or due to lacking incentives to invest in cost-reducing innovations. Differential changes happening at the extensive margin and at the intensive margin within destination may also contribute to these findings. We investigate these mechanisms in the following sections.

3.2.1 Extensive margin: number of destinations and firm entry

Changes in export revenue and quantity at the firm-product level can be associated with adjustments at the extensive margin (i.e. number of destinations) or with adjustments at the intensive margin (i.e. changes in performance indicators within destination). To determine whether import protection has an impact on the extensive trade margin, we run

[26] Results reported in Table A5 show that firm-product revenue and quantity are notably less affected by AD protection when focusing on homogeneous and reference-priced goods.

specification (1) using the logarithm of the number of destinations reached each year by a firm-product pair as a new dependent variable. Estimates reported in Panel A of Table 5 show that AD protection is associated with a higher number of destinations reached by protected firms exporting differentiated products, this coefficient is significant at the 1 percent level. Firms exporting goods on which duties are imposed in the home economy, on average, ship to 14 percent more destinations. Yet, it is important to stress that mostly AD duties on high-income countries are positively and significantly correlated with the number of destinations reached, while duties on middle-income countries and China are not significantly associated with this outcome variable. Findings reported in column (4a) suggest that exporters supplying a product on which AD measures are imposed on competitors based in high-income countries reach 27 percent more destinations.

[Table 5 here]

Specifications reported in Panel (B) of Table 5 investigate whether protected exporters in the home economy enter a new product-destination pair. We rely on a linear probability model, where the dependent variable is a dummy indicating whether a firm in a given year starts exporting a new product to one of the possible destinations. Specifications reported in columns (2b) investigate heterogeneous effects on firm-entry due to protection on different target economies. Findings partially confirm results on the number of destinations reported in Panel A, exporters protected from competitors based in high-income countries tend to enter new destinations, while the extensive export margin of firms benefiting from AD protection on other target economies does not seem to be affected by AD duties in the home economy. In columns (3b) and (4b), we investigate adjustments taking place at the extensive margin from a different angle. In particular, we count the number of firms exporting a given HS 6-digit product each year, and then use this variable in a OLS specification which employs product and time fixed effects and the usual explanatory variables. Results confirm that the number of firms exporting a given product significantly increases when AD duties are imposed on high-income countries.[27] The opposite happens when duties are imposed

[27] These firms mainly export to developed economies.

on Chinese competitors and on firm/products from low-income economies. In this case, we observe a significant reduction in the number of Peruvian firms exporting a protected product.

Results discussed so far suggest that import protection has an impact on export revenues and average prices at the firm-product level. Effects on export prices support the presence of scale economies for firms benefiting from protection on middle-income and high-income countries. We find that duties on high-income countries are mostly associated with increases in export revenue accompanied by an increase in the number of destinations reached. These firms enter new destinations and/or start exporting protected products. This is not the case for firms protected from competitors based in middle economies whose entry into new markets is not significantly correlated with import protection in the home economy. Duties on Chinese and low-income competitors are associated with significant increases in average unit value, which take place in conjuction with a reduction in the number of firms exporting a given product. This is partial evidence of reduced entry in the export market when AD measures are imposed on Chinese and low-income competitors.

3.3 Adjustments within destination

Evidence reported in the previous section might hide important factors, such as within-market competition and determinants of import demand, that can be captured only employing data measuring the performance of firms in each destination. With this aim, specifications reported in this section rely on data at the firm-product-destination level. We first investigate effects on firm-level export revenue and quantity in each product-destination pair relying on the following specification:

$$Y_{fdp,t} = \psi_{f,t} + \theta_{fp} + \delta_{d,t} + \gamma_k Imp.Tariff_{p,t-1} + \beta_k AD_{p,t-1} + \omega_k Dest.Tariff_{dp,t-1} + \epsilon_{fpd,t}. \quad (2)$$

The term $Y_{fpd,t}$ represents the logarithm of export revenue, or alternatively, export quantity of a specific HS 6-digit product p sold by firm f, in year t to destination d. The main

explanatory variable, AD, is equal to 1 for those years in which a product is protected by an AD duty in Peru the year before the shipment to a given destination occurs. We include firm-year fixed effects $\psi_{f,t}$ to control for common time-varying factors within the firm, such as firm productivity. We rely on firm-product fixed effects, θ_{fp}, to consider time-invariant characteristics at the firm- product level affecting export performance. Time-varying unobservables affecting demand in each importing country are taken into account using destination-year fixed effects $\delta_{d,t}$. To take into account the level of protection in each destination market as well as possible retaliations against Peruvian exporters, we control for the effectively applied tariffs on Peruvian exports at the HS 6-digit product. Moreover, to consider the average level of protection on a given product in the domestic market, we control for the HS 6-digit Peruvian import tariff in the year before the trade flow occurs. Standard errors are two-way clustered at the firm and product level. To address the possible endogeneity of our explanatory variable, we rely on the propensity score weights employed for firm-product level estimations discussed in the previous section.

Estimates reported in columns (1) to (4) of Table 6 show that AD protection is associated with higher export revenue in each destination. However, this result is mainly due to firms protected from competitors based in middle-income and high-income countries.

[Table 6 here]

Firms protected from competitors in middle-income countries tend to be incumbents within product-destinations and, thanks to import protection in the home economy, are able to significantly increase the scale of their shipments to the usual destination markets. The increase in the size of shipments for this group of firms is highly significant and quite sizeable: export quantity increases by more than 60 percent.

Unit Value and Quality. The unit value of products traded between country pairs is determined by several characteristics of the trading partners, among which their level of development and economic innovation (Schott, 2004; Hallak and Schott, 2011). Coefficients reported in Table 4 and discussed above show that AD duties on middle-income countries

are negatively associated with the average unit value of products exported by firms in our sample. Considering the unit value as a proxy for product quality would then lead us to conclude that a stronger import protection due to AD measures on middle-income countries is associated with lower export quality.[28] However, reductions in export unit values might not necessarily reflect variations in product quality since unit values incorporate other firm-product level determinants of export prices, among which is the marginal cost. Following Khandelwal (2010) and Khandelwal et al. (2013), we relax the assumption that quality equals unit value and consider as products of higher quality those reporting a higher market share conditional on price (Berry, 1994).[29] Quality is then any attribute of the good, other than price, which affects consumer demand.

Columns (5) and (6) of Table 6 report estimates obtained using unit value as a dependent variable, while in columns (7) and (8) we assess the impact of AD protection on product quality.[30] Findings show that AD duties affect export unit values within destination without having any significant effect on the quality of exported products. Results confirm that duties imposed on imports from middle-income and low-income countries are negatively correlated with the unit value of goods exported from Peru to the various destination markets. Relying on estimates reported in column (6), we conclude that the imposition of an AD duty on imports from a middle-income economy is associated to a 8.9 percent lower unit value. This reduction in export prices is accompanied by an increase in export quantity and revenue which provides additional support to the role of scale economies for this group of protected exporters. Interestingly, the magnitude of this effect is almost half the magnitude of effect estimated at the firm-product level, thus suggesting that adjustments within destination markets account for half of the adjustment in average prices at the firm-product level. The remaining part of price adjustments at the firm-product level is most likely due to variations

[28] This would confirm previous research on product quality showing that a reduction in import tariffs leads exporting firms to increase the quality of exported products (Bass and Strauss-Kahn, 2015; Amiti and Khandelwal, 2013).

[29] Details on the procedure followed to obtain quality measures according to Khandelwal et al. (2013) are reported in Appendix B.

[30] Quality estimates above the 5th percentile and below the 95th percentile are employed in these estimations.

in the composition of destinations reached by firms and in the portfolio of products supplied by firms across destinations.

AD duties on Chinese competitors are not associated with significant increases in export prices within destination, while their effect on prices is positive and significant across destinations. Moreover, these exporting firms significantly reduce their international activities, supplying lower quantities across markets, as shown in Table 4, and reduce the number of products supplied across destinations, as suggested by the estimates reported in Panel B of Table 5. These firms, on average, serve few destination markets and the contemporaneous reduction in their international shipments most likely leads us to obtain a positive, non significant, effect on unit values within destination. These adjustments might also be determined by relevant firm-level characteristics, which we investigate in the following sections.

Specifications reported in this section control for tariffs applied on Peruvian exports in each destination market. Nevertheless, the imposition of AD measures against competitors of Peruvian exporters in the importing market may still determine our empirical findings. If an important destination market for Peruvian exports like Canada imposes an AD duty on Chinese exporters in the Canadian market, this may benefit Peruvian exporters in Canada which may experience an increase in revenue and consequently adjust their export prices. For this reason, in Table B1 we introduce a new variable which accounts for AD measures imposed in each destination on any HS 6-digit product. Estimates are largely consistent with those reported in Table 6, thus suggesting that the performance of Peruvian exporters in not significantly affected by AD measures adopted in the destination market.[31]

As highlighted when describing our customs-level data on Peruvian exporters, we observe a minority of firms supplying a product to a specific destination for more than one year. Peruvian exporters enter and exit different destination markets numerous times during the period under investigation. This limits the configuration of fixed effects that we can employ in our investigation. Nevertheless, we are aware that factors affecting demand for

[31] Results are robust to controlling for AD measures imposed in the destination market on specific economies, like China. Estimates are available upon request.

each product should also be considered in our analysis. Given this, we report in Table B2 specifications controlling for firm-year, firm-product, and destination-product fixed effects. Estimates show that controlling for determinants for export performance and prices varying at the destination-product level does not affect our findings.

Large and small firms. Findings reported in Table 7 bring additional evidence on heterogeneous effects of import protection across exporting firms. Relying on insights from frameworks stressing the role of capacity and financial constraint in small firms (Ahn and McQuoid, 2017), we split the sample of exporting firms into large and small exporters, depending on total export revenue recorded in the first year a firm enters the database. Firms reporting export revenue higher than the median, at the time they first appear in our sample, are classified as large firms, while those reporting revenue lower than the median are classified as small.

[Table 7 here]

In order to investigate adjustments taking place at the intensive trade-margin and the concomitant price variations, we focus on two variables of interest: export quantity and unit value. First, it is possible to notice that import protection largely affects the intensive margin of small firms. Indeed, we observe that small and large firms protected from competitors in high-income and middle income economies significantly increase the size of their shipments to the different markets, while the opposite happens to small firms protected from Chinese and low-income competitors. Consistently with findings in Blum et al. (2013), small firms protected from Chinese competitors report sizeable and significant reductions in the scale of their shipments to the foreign market.

Differential adjustments are also taking place on unit values. We find that small firms increase export prices when duties are imposed on imports from China: these firms increase prices by 19.5 percent; confirming that the majority of exporting firms affected by Chinese competition are small and most likely suffering from capacity constraints. On the contrary, significant reductions in unit values are found for small firms protected by duties on middle-

income countries, which increase the size of their shipments while reducing prices by 10.6 percent. Duties on high-income and low-income countries have an impact on the pricing strategy of large exporters, leading respectively to an increase and a reduction in export unit value. Large firms benefiting from AD duties on high-income economies mostly target developed destination markets, where prices tend to be higher. Since these firms also report significant increases in export quantity, we infer that this adjustment in unit values is not due to their cost-structure but rather to the characteristics of the markets targeted by these firms. The few duties targeting imports from low-income countries also have an effect on large exporting firms, which report a non-significant increase in export quantity and a statistically significant reduction in unit value, slightly larger than 5 percent.[32]

Initial export quality. Specifications reported in Table 6 do not show any significant correlation between AD protection and the quality of products supplied to the different destination markets. Nevertheless, this variable captures differences in product characteristics that might shape adjustments in export prices. We measure initial product quality relying on quality estimates obtained for the first year a firm supplies a given product to a specific destination market. Firms entering the destination market supplying a higher quality can be considered as more innovative and more productive (Khandelwal et al., 2013). Results displayed in Table 8 confirm the positive correlation between initial product quality and the price charged by small and large firms in each market. Firms reporting a higher initial product quality also report higher revenue.

We find that small exporters protected from competitors in middle-income and low-income economies report significant reductions in export unit values when the quality of their exported products is higher, thus suggesting that mostly small, innovative, exporters are able to further reduce export prices thanks to scale economies when benefitting from

[32]Table B3 provides further evidence on these findings by focusing on the income level of the countries reached by large exporting firms. We differentiate destination markets according to their average income and split our estimation sample according to whether large Peruvian exporters ship their goods to a developed or a developing market. Estimates confirm that price increases by large exporting firms protected from competitors in high-income countries mostly take place in developed markets. Conversely, reductions in prices due to large exporters protected from competitors in low-income countries take place in developing destination markets.

AD protection. On the contrary, initial product quality does not seem to determine any differential response by small firms reporting increases in unit values when protected from Chinese competitors. Similarly, large firms affected by AD duties on high-income countries, report significant increases in export quantity and revenue, associated with higher export prices which are not determined by the initial quality of their exports. Small firms supplying goods of higher quality report significant reductions in export revenue and quantity when duties are imposed on high-income countries, these adjustments are not accompanied by significant changes in prices thus suggesting that these firms mostly reduce their international activities when protected in the home economy without reporting any significant variation in export prices.

[Table 8 here]

Overall, our findings suggest that protected exporters report differential adjustments to import protection depending on the characteristics of their competitors and on their initial size. Estimates show that AD on Chinese imports are associated with increases in export unit values and reductions in the shipments' size by small exporters. This group of firms report adjustments consistent with what predicted by frameworks stressing the role of short-run adjustment costs which lead to increasing marginal costs and prices (Blum et al., 2013; Ahn and McQuoid, 2017). Exporters protected from competitors in middle income countries are able to significantly increase the scale of their shipments and, especially small, high-quality, firms, significantly reduce export unit values (Krugman, 1984).

3.3.1 Robustness checks

We discuss here additional estimations assessing the robustness of our results on the relationship between AD protection and export prices. All tables presented in this section display findings obtained distinguishing large and small exporting firms.[33]

[33] Estimation tables for findings discussed in this section are included in Appendix B, where we also report findings for the pooled effect of AD measures imposed on any of the possible target economies.

Duties in leading destination markets. The performance of Peruvian exporters in a single destination market might be affected by anti-dumping duties imposed in leading importing markets, such as the US or the EU. Suppose that the US government approves an AD duty on imports from China, in this case Peruvian firms exporting the same product to the US would benefit from reduced competition due to AD measures targeting China in the US. We address this issue in specifications reported in columns (1) and (2) of Table B4 where we introduce a dummy indicating whether the US imposed a duty on the same HS 6-digit product in a given year. Estimates reported in these columns confirm results discussed in the previous section. We observe that the imposition of duties in the US on the same product category does not affect the positive correlation between AD protection on imports from China and export unit value charged by small exporters. Moreover, small firms report lower unit values when AD protection is imposed on competitors from a middle-income economy. Duties on high-income and low-income countries, still affect prices charged by large exporters. Interestingly, we observe that anti-dumping duties in the US lead large Peruvian firms to charge higher prices abroad, thus showing a clear effect of US anti-dumping policy on the pricing strategy of large exporters from a third country like Peru.

Findings reported in columns (3) and (4) show that AD duties imposed by the other, more distant, leading importing market, the European Union, do not have an effect on unit values charged by Peruvian exporting firms, whether large or small. Reassuringly, adjustments associated with duties on the different target economies report signs and magnitudes similar to those discussed above.

Average global product-level unit value. Our specifications take into account the role of product-level factors not varying over time in determining the pricing strategy of exporting firms. Indeed, given the structure of the data on AD duties, we cannot control for unobservable factors varying over time at the product level affecting export unit values. One factor that might directly impact on the pricing strategy of exporting firms is the average global price of each HS 6-digit product they export. Indeed, Peruvian firms might respond to global trends in products' prices when setting the unit value of their shipments to the

different destination markets. Moreover, common supply shocks affecting producers of a given product at the global level may jointly determine the pricing strategy of the single firm and the decision on AD duties by Peruvian policy makers. If Peruvian exporters respond to these factors when setting export prices, then estimates discussed so far are biased. To partially address this issue, we compute the import-weighted average unit value for each product traded between different country pairs across the globe in the period 1995-2009.[34] Estimates reported in columns (5) and (6) of Table B4 show that taking into consideration the evolution of average product-level prices does not affect our findings.

To conclude, evidence discussed in this section shows that adjustments to AD protection are not affected by AD measures imposed by leading importing markets (US and EU) thus suggesting that third-country effects do not seem to play a role for price adjustments of Peruvian exporters. Results are confirmed when taking into consideration the average price at which HS 6-digit products are traded globally.

4 Conclusion

Emerging economies extensively relied on temporary trade barriers in a period characterized by pervasive trade liberalizations as the first decade of the current century. We investigate the effect of anti-dumping (AD) duties on several indicators for the performance of exporting firms benefiting from protection in the home economy. We take into account possible sources of endogeneity relying on a difference-in-difference methodology combined with a propensity score re-weighting approach to control for selection into AD. Increases in import duties caused by anti-dumping protection significantly affect export performance and provide differing incentives for adjustments in export prices.

Empirical findings indicate that Peruvian firms decrease export prices and increase export quantity when AD measures are imposed on imports from middle-income countries, confirming predictions from frameworks stressing the role of scale economies as Krugman

[34] We rely on product-level trade flows between country pairs available from the CEPII-BACI database which starts in 1995, this slightly reduces the size of our estimation sample. For more information on the CEPII-BACI database refer to Gaulier and Zignago (2010).

(1984). On the contrary, small exporters protected from Chinese competition report adjustments coherent with predictions of frameworks highlighting the role of adjustment costs within the firm (Blum et al., 2013; Ahn and McQuoid, 2017): prices increase while firms reduce shipments to the foreign market. Effects on unit values are not accompanied by significant variations in the quality of exported products.

Overall, this study brings new insights on the possible linkages between import protection and firm-level outcomes in the export market. Results suggest that heterogeneous effects of selective import protection provide contrasting incentives to exporting firms which should be taken into account when assessing the effects of domestic anti-dumping protection on domestic firms. Our findings suggest that governments in emerging economies might improve the export performance of exporting firms by protecting them from competitors in high-income and middle-income countries, therefore confirming predictions from "protection as export promotion" theories. However, anti-dumping duties imposed on low-income countries such as China might be detrimental to the export performance of domestic firms, especially in the presence of financial or capacity constraints.

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Tables

Table 1: **Descriptive Statistics, Firm Level Export Data, 1993-2009**

	Mean	Median	Min	Max	p5	p95
Number of exporting firms	5091.535	4983	2698	7129	3025	7129
Number of AD-Protected exporting firms	632.8105	671	3	846	272	846
Number of Non-Protected exporting firms	4588.58	4433	2698	6525	3016	6525
Number of destinations, firm-product	1.49	1	1	55	1	4
Number of exported products, firm	31.33	16	1	352	1	121
Revenue, firm-product	408472.3	770	1	2.11e+09	6.3	291177.3
Quantity, firm-product	594965.5	68.29	1	5.96e+09	.75	107544.5
Ln unit value, firm-product	2.13	2.13	-17.34	15.83	-.57	4.75

Notes: Statistics on Peruvian exporting firms based on the Exporter Dynamics Database (Fernandes et al., 2016). AD protected firms are identified using product-level data from the Global Antidumping Database (Bown, 2012): the firm is considered as "protected" when one of the HS 6-digit product exported by the firm is subject to an AD duty in the home economy. We report summary statistics for the period under investigation on the number of AD (non) protected firms, on the number of exporting firms, on the number of destinations reached by each firm-product pair, on the number of products exported by each firm, on export revenue, quantity, and average unit value for each firm-product pair.

Table 2: **Peruvian Imports and AD Duties**

	Panel A			
	(1a)	(2a)	(3a)	(4a)
	Imports, Value			
Target Economy:	High Income	Middle Income	Low Income	China
Anti-dumping (d), t-1	-0.336	-0.543**	-0.364	-0.327**
	(0.328)	(0.212)	(0.426)	(0.166)
Observations	329705	162894	7901	31238
R^2	0.731	0.732	0.728	0.727
	Panel B			
	(1b)	(2b)	(3b)	(4b)
	Imports, Quantity			
Target Economy:	High Income	Middle Income	Low Income	China
Anti-dumping (d), t-1	-0.294**	-0.593***	0.154	-0.436**
	(0.130)	(0.206)	(0.452)	(0.183)
Observations	329705	162894	7901	31238
R^2	0.803	0.830	0.835	0.752

Notes: Data on Peruvian imports at the HS 6-digit product level obtained from the CEPII-BACI database (Gaulier and Zignago, 2010). AD protected products are identified using product-level data from the Global Antidumping Database (Bown, 2012). Dependent variables are in logarithm. All specifiations include exporter-product and time fixed effects. Standard errors, reported in parentheses, are clustered at the exporter-product level.

Table 3: **Protected and Non-Protected Exporters, 1993-2009**

Year	Total N. Firms	Number of Non-Protected Firms	Number of AD-Protected Firms	Share AD High Income	Share AD Middle Income	Share AD Low Income	Share AD China
1993	3445	3442	3	0	100	0	0
1994	2698	2698	0	0	0	0	0
1995	3025	3016	9	0	0	0	100
1996	3455	3433	22	0	22.72	0	77.28
1997	3534	3498	36	0	16.67	0	83.33
1998	3471	3423	48	0	20.84	0	79.16
1999	3788	3516	272	49.48	2.90	0	47.62
2000	3919	3613	306	46.59	3.31	0	50.10
2001	4228	3921	307	45.85	2.11	0	52.04
2002	4578	4202	376	44.62	4.86	0	50.52
2003	4983	4433	550	39.82	13.78	1.42	44.98
2004	5333	4662	671	37.69	11.69	1.39	49.23
2005	5916	5145	771	39.57	9.87	0.62	49.94
2006	6362	5525	837	38.65	11.63	0.29	49.43
2007	6531	5685	846	38.66	12.81	0.43	48.10
2008	6967	6270	697	42.30	4.31	0.41	52.98
2009	7129	6525	604	22.28	7.85	0.38	69.49

Notes: This table reports on the evolution over time in the number of exporting firms, the number of non-protected exporters, and the number of AD-protected exporters. The number of exporting firms is the total number of firms exporting from Peru in a given year, without distinguishing among new or incumbent exporters. Similarly, the number of AD-protected exporters reports on the number of firms which in a given year benefits from AD protection in the home economy. Firms benefiting for AD measures in place for several years are considered as being protected for each year in which the measure is in place. The last four columns of this table display the share of Peruvian exporters benefiting from domestic AD measures imposed on the different target economies each year.

Table 4: **Revenue, Quantity, and Av. Unit Value, Firm-Product**
Matched sample, differentiated products

	(1)	(2)	(3)	(4)	(5)	(6)
	Revenue		Quantity		Av. Unit Value	
Anti-dumping (d), t-1	0.223*		0.119		0.104***	
	(0.133)		(0.139)		(0.028)	
Anti-dumping China (d), t-1		-0.275		-0.535***		0.260***
		(0.173)		(0.191)		(0.075)
Anti-dumping High Income (d), t-1		0.769***		0.921***		-0.152**
		(0.228)		(0.248)		(0.072)
Anti-dumping Middle Income (d), t-1		0.295		0.464*		-0.169**
		(0.228)		(0.260)		(0.082)
Anti-dumping Low Income (d), t-1		0.109		0.033		0.075***
		(0.318)		(0.316)		(0.022)
Observations	153102	153102	153102	153102	153102	153102
R^2	0.858	0.859	0.864	0.864	0.900	0.900

Notes: This table reports estimates obtained relying on firm-product level data. Column header indicates the dependent variable, (d) indicates a dummy variable, other variables are in logarithm. Revenue (quantity) is the total export revenue (quantity) by a firm on a HS 6-digit product in a given year across destinations. Av. unit value is the ratio between product-level export revenue and product-level export quantity. All specifications include firm-time and firm-product fixed effects. We control for Peruvian import tariff at the product-level. Standard errors, two-way clustered at the firm and product level, are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: **Number of Destinations and Firm Entry**
Differentiated products

	Panel A			
	(1a)	(2a)	(3a)	(4a)
	N. of Destinations			
	OLS		Matched Sample	
Anti-dumping (d), t-1	0.078***		0.139***	
	(0.013)		(0.039)	
Anti-dumping China (d), t-1		0.035		-0.024
		(0.028)		(0.045)
Anti-dumping High Income (d), t-1		0.055*		0.240***
		(0.030)		(0.051)
Anti-dumping Middle Income (d), t-1		0.020		0.088
		(0.025)		(0.061)
Anti-dumping Low Income (d), t-1		0.058		0.047
		(0.087)		(0.102)
Observations	183053	183053	153102	153102
R^2	0.761	0.761	0.795	0.795
	Panel B			
	(1b)	(2b)	(3b)	(4b)
	Firm Entry, (d)		N. of Firms, Product Level	
	OLS		OLS	
Anti-dumping (d), t-1	0.001		-0.064**	
	(0.006)		(0.031)	
Anti-dumping China (d), t-1		-0.007		-0.196***
		(0.006)		(0.065)
Anti-dumping High Income (d), t-1		0.019**		0.176***
		(0.009)		(0.065)
Anti-dumping Middle Income (d), t-1		-0.013*		0.029
		(0.007)		(0.040)
Anti-dumping Low Income (d), t-1		0.023		-0.491***
		(0.026)		(0.073)
Observations	3169694	3169694	333520	333520
R^2	0.403	0.403	0.940	0.940

Notes: In Panel A we employ firm-product data, while in Panel B we rely on firm-product-destination data, in (1b) and (2b), and product-level data, in (3b) and (4b). The number of destinations is the sum of different countries to which a firm exports an HS 6-digit product in a given year. Firm entry is a dummy variable indicating whether a firm enters a given product-destination pair in a given year. The number of firms exporting an HS 6-digit product in a given year is employed as a dependent variable in (3b) and (4b). Firm-time and firm-product fixed effects are employed in regressions reported in Panel A, where we also control for Peruvian import tariff on each product. In Panel B, in columns (1b) and (2b), we introduce destination-time fixed effects and control for the tariff effectively applied in each destination on products exported by Peruvian firms. Regressions reported in columns (3b) and (4b) rely on product and time fixed effects, we also control for Peruvian import tariff on each product. (d) indicates a dummy variable, other variables are in logarithm. Standard errors, two-way clustered at the firm and product level, are reported in parentheses in columns (1a) to (2b). Standard errors clustered at the product level are reported in (3b) and (4b). * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 6: **Revenue, Quantity, Unit Value, and Quality within destination**
Matched sample, differentiated products

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Revenue		Quantity		Unit Value		Quality	
Anti-dumping (d), t-1	0.419***		0.409***		0.009		0.196	
	(0.089)		(0.092)		(0.023)		(0.151)	
Anti-dumping China (d), t-1		0.086		0.051		0.035		0.238
		(0.186)		(0.190)		(0.030)		(0.222)
Anti-dumping High Income (d), t-1		0.389*		0.342		0.047		-0.120
		(0.234)		(0.228)		(0.053)		(0.323)
Anti-dumping Middle Income (d), t-1		0.393**		0.478***		-0.085***		0.085
		(0.175)		(0.164)		(0.030)		(0.253)
Anti-dumping Low Income (d), t-1		0.277		0.317		-0.040**		0.132
		(0.195)		(0.198)		(0.020)		(0.094)
Observations	223324	223324	223324	223324	223324	223324	223324	223324
R^2	0.778	0.778	0.807	0.807	0.855	0.855	0.562	0.562

Notes: Estimates reported in this table rely on firm-product-destination level data. Firm-time, firm-product, and destination-time fixed effects are employed in all regressions. We control for the applied tariff in each product-destination on Peruvian exports and for the Peruvian import tariff on each product. (d) indicates a dummy variable, all other variables are in logarithm. Standard errors, two-way clustered, at the firm and product level are reported in parentheses.*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table 7: **Quantity and Unit Value within destination**
Matched sample, differentiated products

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Quantity				Unit Value			
	Large	Small	Large	Small	Large	Small	Large	Small
Anti-dumping (d), t-1	0.480***	0.179			-0.003	0.034		
	(0.090)	(0.155)			(0.025)	(0.047)		
Anti-dumping China (d), t-1			0.129	-0.559***			-0.016	0.179**
			(0.204)	(0.199)			(0.041)	(0.071)
Anti-dumping High Income (d), t-1			0.476**	0.798***			0.148***	-0.120
			(0.227)	(0.286)			(0.054)	(0.086)
Anti-dumping Middle Income (d), t-1			0.404*	0.473***			-0.057	-0.101**
			(0.239)	(0.130)			(0.050)	(0.052)
Anti-dumping Low Income (d), t-1			0.295	-1.501***			-0.049**	0.137
			(0.189)	(0.271)			(0.020)	(0.106)
Observations	111486	111755	111486	111755	111486	111755	111486	111755
R^2	0.805	0.783	0.805	0.784	0.865	0.855	0.865	0.855

Notes: Estimates reported in this table rely on firm-product-destination level data. Small (large) firms report revenue below (above) the median revenue in the first year they start exporting. Firm-time, firm-product, and destination-time fixed effects are employed in all regressions. We control for the applied tariff in each product-destination on Peruvian exports and for Peruvian import tariff on each product. (d) indicates a dummy variable, all other variables are in logarithm. Standard errors two-way clustered at the firm and product level are reported in parentheses.*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table 8: **Revenue, Quantity, and Unit Value within destination: Initial Product Quality**
Matched sample, differentiated products

	(1)	(2)	(3)	(4)	(5)	(6)
	Revenue		Quantity		Unit Value	
	Large	Small	Large	Small	Large	Small
Initial Quality	0.116***	0.058***	0.093***	0.035***	0.023***	0.023***
	(0.015)	(0.012)	(0.014)	(0.010)	(0.003)	(0.003)
Anti-dumping China (d), t-1	0.166	-0.252	0.206	-0.445**	-0.040	0.192***
	(0.219)	(0.187)	(0.210)	(0.213)	(0.028)	(0.068)
Anti-dumping China (d), t-1 × Initial Quality	0.010	0.004	0.004	0.019	0.006	-0.015
	(0.048)	(0.038)	(0.047)	(0.032)	(0.012)	(0.019)
Anti-dumping High Income (d), t-1	0.627**	0.216	0.458*	0.354	0.169***	-0.138
	(0.270)	(0.247)	(0.250)	(0.274)	(0.056)	(0.099)
Anti-dumping High Income (d), t-1 × Initial Quality	-0.037	-0.206***	-0.027	-0.198**	-0.010	-0.008
	(0.080)	(0.074)	(0.063)	(0.086)	(0.031)	(0.026)
Anti-dumping Middle Income (d), t-1	0.314	0.393**	0.362	0.617***	-0.049*	-0.224***
	(0.251)	(0.155)	(0.249)	(0.197)	(0.028)	(0.063)
Anti-dumping Middle Income (d), t-1 × Initial Quality	-0.030	0.037	0.002	0.101**	-0.032	-0.064***
	(0.071)	(0.039)	(0.061)	(0.047)	(0.020)	(0.013)
Anti-dumping Low Income (d), t-1	0.134	-1.507***	0.180	-1.632***	-0.046**	0.125
	(0.222)	(0.299)	(0.221)	(0.291)	(0.020)	(0.104)
Anti-dumping Low Income (d), t-1 × Initial Quality	-0.132**	-0.029	-0.134**	0.035	0.002	-0.064***
	(0.056)	(0.050)	(0.062)	(0.056)	(0.009)	(0.019)
Observations	107862	109477	107862	109477	107862	109477
R^2	0.758	0.790	0.812	0.788	0.872	0.855

Notes: Estimates reported in this table rely on firm-product-destination level data. Small (large) firms report revenue below (above) the median revenue in the first year they start exporting. Firm-time, firm-product, and destination-time fixed effects are employed in all regressions. We control for the applied tariff in each product-destination on Peruvian exports and for Peruvian import tariff on each product. (d) indicates a dummy variable, all other variables are in logarithm. Standard errors two-way clustered at the firm and product level are reported in parentheses.*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Appendix

A Additional material

This appendix includes tables showing additional information on Peruvain anti-dumping duties in the period under investigation. We also report descriptive evidence on differences between protected and non-protected exporters. Moreover, we include estimates supporting our propensity-score re-weighting procedure.

Table A1: **Anti-dumping (AD) measures, Peru, 1993-2009**

Product Group	**Targeted Countries**	**First Year AD measure**	**Last Year AD measure**	**N. of HS-6 involved**
Aluminium	Middle Income	1993	2007	12
Bodyboards	High Income, Low Income, China	2000	2012	2
Calcium Carbide	Middle Income	1997	1998	2
Ceramic Dishware and Loose Articles and Accessories	China	2004	2009	3
Corn Starch	Middle Income	1996	2005	1
Denim	Middle Income, China	2004	2011	3
Drywall	Middle Income	2003	2009	1
Footwear	Low Income, China	2006	2011	4
Galvanized Steel Coil and Plate	Middle Income	2002	2011	1
Glucose Syrup	Middle Income	1996	2005	1
Hot and Cold Rolled Steel Coils and Plate	Middle Income	1999	2011	22
Hot Rolled Steel Coils and Plate	Middle Income	2003	2011	12
Iron Hinges	China	2004	2009	1
Kickboards	China	2000	2012	1
Magnesium - Chromium Bricks	Middle Income	1994	Ongoing	1
Paper Cups	Middle Income	2001	2012	1
Polyester - Cotton Poplin Fabrics	China	2004	Ongoing	4
Poplin Fabrics	Low Income	2004	Ongoing	44
Powdered Drinks	Middle Income	2003	2008	1
Shoes	High Income, Middle income, China	1999	Ongoing	10
Shoes with Leather Soles	China	1996	2005	1
Single-Phase Electrical Meters	China	1999	2011	1
Sneakers	China	1997	2005	1
Sneakers with Rubber Soles	China	1997	2005	1
Stainless Steel Articles (Pots-Frying Pans and Saucepans)	Low Income	2004	2009	1
Stainless Steel Articles (Pots-Frying Pans, Teapots and Saucepans)	China	2004	2009	1
Stainless Steel Articles (Pots-Frying Pans and Saucepans)	High Income	2004	2009	1
Stainless Steel Plate	China	2002	Ongoing	4
Steel Bearings	Middle Income	2001	2006	1
Steel Coils and Plate (Cold Rolled)	Middle Income	2003	2011	7
Steel Coils and Plate (Hot Rolled)	Middle Income	2003	2011	5
Textiles	China	1995	2013	5
Tires	China	2002	2012	4
Vegetable Oil	Middle Income	2002	2012	3
Water Meters (0.5, 0.75, 1 Inch)	China	1995	2004	1
White Cement	Middle Income	2007	2008	1
Woven Fabrics of Cotton and Polyester - Cotton Mixes (Drill)	Middle Income, China	2005	2010	19
Woven Labels	Middle Income	1997	2002	1
Zippers	China	2002	Ongoing	3

Notes: The first column of this Table reports product categories on which Peru imposed Anti-dumping duties in the period under investigation. Several HS 6-digit products can belong to product categories listed in this Table. In the second column, we report countries whose exports were targeted by AD measures in Peru. In the third column we report the first year in which AD duties are in place against products of any targeted exporter, while in the fourth column we indicate the year in which the AD duty was revoked on the last targeted exporters. "Ongoing" indicates that AD duties were still in force according to the version of the Global Antidumping Database at our disposal (2016).

Table A2: **Firm Level Outcomes**
Non-Protected (No AD) and Protected (AD), 1993-2009

Variable	Mean No AD	Std. Dev. No AD	Mean AD	Std. Dev. AD	TTest
Ln Revenue	6.84	3.26	7.76	3.12	-0.92***
Ln Revenue Differentiated	6.47	2.92	7.58	3.13	-1.11***
Ln Revenue Homogeneous	8.56	4.07	11.01	2.44	-2.45***
Ln Quantity	4.71	3.59	5.35	3.38	-0.64***
Ln Quantity Differentiated	4.11	3.05	5.15	3.35	-1.04***
Ln Quantity Homogeneous	7.82	4.43	9.45	2.77	-1.63***
Ln Unit Value	2.13	1.70	2.40	1.30	-0.27***
Ln Unit Value Differentiated	2.36	1.56	2.43	1.27	-0.07*
Ln Unit Value Homogeneous	0.74	1.54	1.56	1.28	-0.82***

Notes: Variables are computed at the firm-product level. The Rauch (1999) conservative classification is employed to distinguish between differentiated goods and homogeneous/reference priced goods. *, ** and *** indicate significance at the 10%, 5% and 1% level respectively.

Table A3: **Probability of Anti-Dumping (AD) Treatment: Propensity Score Estimation**

	(1)
	New AD Protection
Number of exported products, firm, t-1	0.030***
	(0.011)
Total export revenue, firm-product, t-1	-0.024***
	(0.009)
Total export quantity, firm-product, t-1	-0.018**
	(0.008)
Import tariff on High Income, product, t-1	-0.038***
	(0.005)
Import tariff on Middle Income, product, t-1	0.001
	(0.005)
Import tariff on Low Income, product, t-1	0.005
	(0.003)
Import tariff on China, product, t-1	-0.005
	(0.005)
Domestic price growth, industry, t-1	-0.019***
	(0.002)
Domestic production growth, industry, t-1	0.185
	(0.137)
Observations	156435

Notes: This table reports estimates obtained relying on Probit estimation. Standard errors are reported in parentheses, * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table A4: **Balancing Property, Propensity Score**

	Mean			t-test	
	Treated	Control	%diff	t	$p>\|t\|$
Number of exported products, firm, t-1	3.060	3.056	0.3	0.07	0.944
Total export revenue, firm-product, t-1	6.629	6.673	-1.4	-0.28	0.776
Total export quantity, firm-product, t-1	4.478	4.528	-1.4	-0.30	0.766
Import tariff on High Income, product, t-1	4.068	4.191	-1.9	-0.42	0.672
Import tariff on Middle Income, product, t-1	3.965	4.122	-2.5	-0.55	0.582
Import tariff on Low Income, product, t-1	2.238	2.28	-0.7	-0.18	0.857
Import tariff on China, product, t-1	3.669	3.805	-2.1	-0.48	0.634
Domestic price growth, industry, t-1	1.774	1.648	2.6	0.49	0.623
Domestic production growth, industry, t-1	0.044	0.045	-0.9	-0.17	0.862

Notes: This table shows mean values of the matching variables for the treated and control group. Results for the t-test reported in the last columns of the table confirm the balancing of the variables across the two groups.

Table A5: **Revenue, Quantity, and Av. Unit Value, Firm-Product**
Matched sample, homogeneous and reference-priced products

	(1)	(2)	(3)	(4)	(5)	(6)
	Revenue		Quantity		Av. Unit Value	
Anti-dumping (d), t-1	-0.022		-0.089		0.067**	
	(0.263)		(0.253)		(0.028)	
Anti-dumping China (d), t-1		0.412		0.319		0.093*
		(0.744)		(0.790)		(0.050)
Anti-dumping High Income (d), t-1		-0.384		-0.320		-0.064
		(0.811)		(0.886)		(0.216)
Anti-dumping Middle Income (d), t-1		0.188		0.192		-0.005
		(0.572)		(0.609)		(0.060)
Anti-dumping Low Income (d), t-1		-0.632		-0.762		0.130
		(0.567)		(0.480)		(0.115)
Observations	36228	36228	36228	36228	36228	36228
R^2	0.879	0.879	0.901	0.901	0.942	0.942

Notes: This table reports estimates obtained relying on firm-product level data. Column header indicates the dependent variable, (d) indicates a dummy variable, other variables are in logarithm. Revenue (quantity) is the total export revenue (quantity) on a given HS 6-digit product obtained by a firm in a given year across destinations. Av. unit value is the ratio between product-level export revenue and product-level export quantity. All specifications include firm-time and firm-product fixed effects. We control for Peruvian import tariff at the product-level. Standard errors two-way clustered at the firm and product Level are reported in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

B Adjustments within destination

In this appendix, we describe the procedure employed to measure the quality of HS 6-digit products supplied by Peruvian exporters to the different destination markets. We also include tables reporting estimates assessing the effect of AD measures on unit value, without distinguishing duties on the different target economies.

B.1 Quality Measure

Following Khandelwal (2010) and Khandelwal et al. (2013), we relax the assumption that quality equals unit value and consider as products of higher quality those reporting a higher market share conditional on price (Berry, 1994). Quality is then any attribute of the good, other than price, which affects consumer demand. Using the methodology developed by Khandelwal et al. (2013), we disentangle the quality component from unit value estimating the following specification:

$$ln(q)_{fpd,t} + \sigma \ln(p)_{fpd,t} = \alpha_p + \delta_{d,t} + \mu_{fpd,t}.$$

Where $q_{fpd,t}$ and $p_{fpd,t}$ are, respectively, the quantity and the price of a 6-digit HS product p sold by firm f in destination market d, in year t. The 3-digit industry-level elasticity of substitution, σ, is computed as the average of country-specific elasticities estimated by Broda et al. (2017). Product fixed-effects, α_p, control for factors affecting product-level demand not varying over time, while country-specific demand characteristics are controlled for using destination-time fixed effects $\delta_{d,t}$. The natural logarithm of quality for each product p sold by firm f in destination d is then equal to:

$$ln(\lambda)_{fpd,t} = \mu_{fpd,t}/(\sigma - 1)$$

As shown in Figure B1, this measure of product quality is positively correlated with unit values in the years under observation. Unit value explain more than 49 percent of variation in product quality, while a 1 percent higher unit value is associated with a 1.14 percent higher product quality.[35]

[35] To obtain this graph we demean export unit values and product quality at the year and product level using data on export flows of differentiated products.

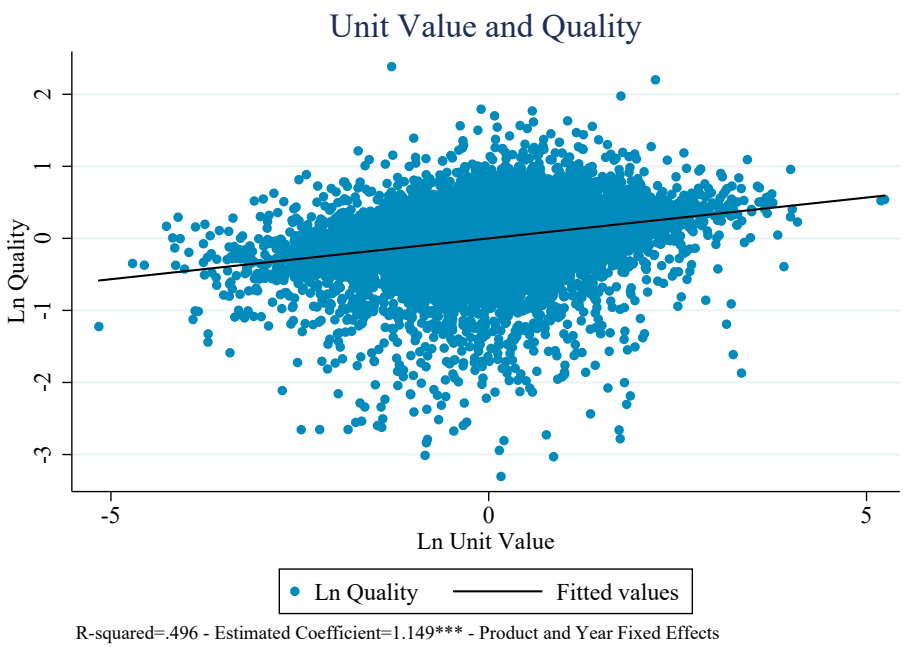

Figure B1: Correlation between export unit value and export quality, 1993-2009.

Using this proxy for product quality as an additional depedent variable in specifications reported in section 3, we assess whether anti-dumping protection in the home economy differently affects unit values with respect to product quality in the different destinations reached by Peruvian exporters.

Table B1: **Revenue, Quantity, Unit Value, and Quality within destination Controlling for AD in each destination**

Matched sample, differentiated products

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Revenue		Quantity		Unit Value		Quality	
Anti-dumping (d), t-1	0.419***		0.410***		0.010		0.187	
	(0.090)		(0.093)		(0.023)		(0.146)	
Anti-dumping China (d), t-1		0.083		0.049		0.034		0.285
		(0.191)		(0.193)		(0.031)		(0.215)
Anti-dumping High Income (d), t-1		0.390*		0.342		0.048		-0.131
		(0.235)		(0.229)		(0.053)		(0.321)
Anti-dumping Middle Income (d), t-1		0.398**		0.481***		-0.083***		0.028
		(0.184)		(0.170)		(0.031)		(0.219)
Anti-dumping Low Income (d), t-1		0.278		0.317		-0.040**		0.121
		(0.196)		(0.199)		(0.020)		(0.096)
Anti-Dumping by Destination (d), t-1	Y	Y	Y	Y	Y	Y	Y	Y
Observations	223324	223324	223324	223324	223324	223324	223324	223324
R^2	0.778	0.778	0.807	0.807	0.855	0.855	0.564	0.564

Notes: Estimates reported in this table rely on firm-product-destination level data. Firm-time, firm-product, and destination-time fixed effects are employed in all regressions. We control for the applied tariff in each product-destination on Peruvian exports and for the Peruvian import tariff on each product. (d) indicates a dummy variable, all other variables are in logarithm. Standard errors, two-way clustered, at the firm and product level are reported in parentheses.*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table B2: **Revenue, Quantity, Unit Value within destination Product-destination fixed effects**

Matched sample, differentiated products

	(1)	(2)	(3)	(4)	(5)	(6)
	Revenue		Quantity		Unit Value	
Anti-dumping (d), t-1	0.259***		0.272***		-0.013	
	(0.093)		(0.094)		(0.018)	
Anti-dumping China (d), t-1		-0.158		-0.176		0.018
		(0.144)		(0.147)		(0.029)
Anti-dumping High Income (d), t-1		0.548***		0.550***		-0.002
		(0.201)		(0.209)		(0.046)
Anti-dumping Middle Income (d), t-1		0.382*		0.449**		-0.066*
		(0.206)		(0.188)		(0.038)
Anti-dumping Low Income (d), t-1		0.080		0.118		-0.038**
		(0.168)		(0.167)		(0.015)
Observations	218537	218537	218537	218537	218537	218537
R^2	0.825	0.825	0.848	0.849	0.876	0.876

Notes: Estimates reported in this table rely on firm-product-destination level data. Firm-time, firm-product, and product-destination fixed effects are employed in all regressions. We control for the applied tariff in each product-destination on Peruvian exports and for the Peruvian import tariff on each product. (d) indicates a dummy variable, all other variables are in logarithm. Standard errors, two-way clustered, at the firm and product level are reported in parentheses.*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table B3: **Revenue, Quantity, and Unit Value**
Large Firms in Developed and Developing destinations
Matched sample, differentiated products

	(1)	(2)	(3)	(4)	(5)	(6)
	Revenue		Quantity		Unit Value	
	Developed	Developing	Developed	Developing	Developed	Developing
Anti-dumping China (d), t-1	-0.116	0.507	-0.058	0.496	-0.058	0.011
	(0.148)	(0.402)	(0.135)	(0.400)	(0.047)	(0.068)
Anti-dumping High Income (d), t-1	0.775***	0.520	0.566**	0.593	0.210***	-0.073
	(0.272)	(0.375)	(0.269)	(0.375)	(0.040)	(0.070)
Anti-dumping Middle Income (d), t-1	0.630**	-0.217	0.658***	-0.185	-0.028	-0.031
	(0.248)	(0.506)	(0.193)	(0.517)	(0.100)	(0.063)
Anti-dumping Low Income (d), t-1	0.644***	0.097	0.696***	0.140	-0.052	-0.043*
	(0.113)	(0.187)	(0.109)	(0.181)	(0.040)	(0.024)
Observations	63799	43460	63799	43460	63799	43460
R^2	0.732	0.752	0.763	0.819	0.826	0.910

Notes: Estimates reported in this table rely on firm-product-destination level data. Large firms report revenue above the median revenue in the first year they start exporting. Developed destinations are destination countries classified as high-income economies according to the World Bank classification in the year in which the trade flow occurs. Developing destinations are countries classified as middle-income and low-income economies according to the World Bank classification in the year in which the trade flow occurs. Firm-time, firm-product, and destination-time fixed effects are employed in all regressions. We control for the applied tariff in each product-destination on Peruvian exports and for Peruvian import tariff on each product. (d) indicates a dummy variable, all other variables are in logarithm. Standard errors two-way clustered at the firm and product level are reported in parentheses.*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table B4: **Robustness checks**
Matched sample, differentiated products

	AD by US		*AD by EU*		*Av. Price, P. Level, '95-'09*	
	(1) Large	(2) Small	(3) Large	(4) Small	(5) Large	(6) Small
	Unit Value	Unit Value	Unit Value	Unit Value	Unit Value	Unit Value
Anti-dumping by US (d), t-1	0.137**	-0.025				
	(0.066)	(0.047)				
Anti-dumping by EU (d), t-1			-0.025	-0.013		
			(0.045)	(0.054)		
Average Global Product Price, t					-0.005	0 .007
					(0.018)	(0.023)
Anti-dumping China (d), t-1	-0.015	0.178**	-0.016	0.179**	-0.020	0.173**
	(0.040)	(0.071)	(0.041)	(0.071)	(0.040)	(0.072)
Anti-dumping High Income (d), t-1	0.148***	-0.120	0.148***	-0.120	0.154***	-0.114
	(0.053)	(0.086)	(0.054)	(0.086)	(0.054)	(0.089)
Anti-dumping Middle Income (d), t-1	-0.057	-0.099**	-0.057	-0.101**	-0.053	-0.102**
	(0.050)	(0.050)	(0.050)	(0.052)	(0.049)	(0.051)
Anti-dumping Low Income (d), t-1	-0.048**	0.137	-0.049**	0.137	-0.047**	0.136
	(0.020)	(0.106)	(0.020)	(0.106)	(0.020)	(0.106)
Observations	111486	111755	111486	111755	108193	109397
R^2	0.865	0.855	0.865	0.855	0.865	0.859

Notes: Estimates reported in this table rely on firm-product-destination level data. Small (large) firms report revenue below (above) the median revenue in the first year they start exporting. Firm-time, firm-product, and destination-time fixed effects are employed in all regressions. We control for the applied tariff in each product-destination on Peruvian exports and for Peruvian import tariff on each product. (d) indicates a dummy variable, all other variables are in logarithm. Standard errors two-way clustered at the firm and product level are reported in parentheses.*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

Table B5: **Robustness checks, AD-pooled**
Matched sample, differentiated products

	AD by US		*AD by EU*		*Av. Price, P. Level, '95-'09*	
	(1) Large	(2) Small	(3) Large	(4) Small	(5) Large	(6) Small
	Unit Value	Unit Value	Unit Value	Unit Value	Unit Value	Unit Value
Anti-dumping by US (d), t-1	0.138**	-0.036				
	(0.067)	(0.048)				
Anti-dumping (d), t-1	-0.002	0.035	-0.003	0.034	-0.002	0.033
	(0.025)	(0.047)	(0.025)	(0.047)	(0.025)	(0.047)
Anti-dumping by EU (d), t-1			-0.024	-0.008		
			(0.046)	(0.055)		
Average Global-Product Price, t					-0.009	0.008
					(0.019)	(0.022)
Observations	111486	111755	111486	111755	108193	109397
R^2	0.865	0.855	0.865	0.855	0.865	0.858

Notes: Estimates reported in this table rely on firm-product-destination level data. Small (large) firms report revenue below (above) the median revenue in the first year they start exporting. Firm-time, firm-product, and destination-time fixed effects are employed in all regressions. We control for the applied tariff in each product-destination on Peruvian exports and for Peruvian import tariff on each product. (d) indicates a dummy variable, all other variables are in logarithm. Standard errors two-way clustered at the firm and product level are reported in parentheses.*$p < 0.10$, **$p < 0.05$, ***$p < 0.01$.

C Peru: Anti-dumping procedure, summary

- Petitions are initiated if domestic producers supporting the petition account for at least 25 percent of domestic production of the like product

- The commission (INDECOPI) investigates whether foreign products are imported at a price lower than the normal value, and whether those imports are causing material injury to the domestic industry

- The normal value is determined using one of the following four methods:
  - using the sales price in the exporting country's home market
  - using the exporting country's cost of production plus a reasonable amount for general costs and profits
  - using prices of sales from the exporting country to a selected third country
  - for non-market economy countries, the Commission determines the normal value using sales prices in a selected market economy country, or using any other reasonable basis

- Anti-dumping duties are usually lifted after five years

- Review can be requested by both parties after one year