



POLICY ISSUES IN INTERNATIONAL TRADE AND COMMODITIES  
STUDY SERIES No. 58

---

**MARKET ACCESS, EXPORT PERFORMANCE AND SURVIVAL:  
EVIDENCE FROM PERUVIAN FIRMS**

by

**Marco Fugazza**  
UNCTAD, Geneva

and

**Alain McLaren**  
University of Geneva



**UNITED NATIONS**  
New York and Geneva, 2013

## Note

The purpose of this series of studies is to analyse policy issues and to stimulate discussions in the area of international trade and development. The series includes studies by UNCTAD staff and by distinguished researchers from other organizations and academia. This paper represents the personal views of the authors only, and not the views of the UNCTAD secretariat or its member States.

This publication has not been formally edited.

The designations employed and the presentation of the material do not imply the expression of any opinion on the part of the United Nations concerning the legal status of any country, territory, city or area, or of authorities or concerning the delimitation of its frontiers or boundaries.

Material in this publication may be freely quoted or reprinted, but acknowledgement is requested, together with a copy of the publication containing the quotation or reprint to be sent to the UNCTAD secretariat at the following address:

Marco Fugazza  
Trade Analysis Branch  
Division on International Trade in Goods and Services, and Commodities  
United Nations Conference on Trade and Development  
Palais des Nations, CH-1211 Geneva 10, Switzerland  
Tel: +41 22 917 5772; Fax: +41 22 917 0044  
E-mail: marco.fugazza@unctad.org

Series Editor:  
Victor Ognitsev  
Officer-in-Charge  
Trade Analysis Branch  
DITC/UNCTAD

UNCTAD/ITCD/TAB/59

**UNITED NATIONS PUBLICATION**

ISSN 1607-8291

© Copyright United Nations 2013  
All rights reserved

## Abstract

This paper explores the effect of market access on firms' export performance and their survival on foreign markets. The data used cover all Peruvian exporting firms between 2002 and 2008, a period during which Peru was active in joining the global economy. This is done using two indices: one that summarizes the tariffs faced by exports; the other that measures the preferential margin at the bilateral level. Results show that more than market access conditions per se, it is market access conditions relative to those faced by competitors that significantly influence export performance and survival. About a fifth of the increase of exports directed to MERCOSUR countries is due to improvement in preference margins.

**Keywords:** export performance, survival analysis, Peru, firm-level data, market access

**JEL Classification:** F10, F14

## **Acknowledgements**

The authors wish to thank Marcelo Olarreaga for helpful comments and discussion. They also would like to thank seminar participants at UNCTAD, the University of Geneva and the WTO seminars for their comments.

The authors accept sole responsibility for any errors remaining.

# Contents

<b>EXECUTIVE SUMMARY .....</b>	<b>vii</b>
<b>1 INTRODUCTION.....</b>	<b>1</b>
<b>2 RELATED LITERATURE .....</b>	<b>3</b>
2.1 Survival .....	3
2.2 Export performance .....	4
<b>3 DATA .....</b>	<b>5</b>
3.1 Stylized facts for Peruvian exporting firms .....	5
3.2 Measuring market access.....	7
<b>4 EMPIRICAL STRATEGY AND RESULTS .....</b>	<b>10</b>
4.1 Trade relationships survival .....	10
4.2 Export value .....	16
4.3 Sensitivity analysis.....	19
4.3.1 Survival and export value.....	19
4.3.2 Export value .....	20
<b>5 CONCLUDING REMARKS.....</b>	<b>21</b>
<b>REFERENCES.....</b>	<b>22</b>
<b>APPENDIX .....</b>	<b>25</b>

### **List of figures**

Figure 1.	Market access conditions in MERCOSUR countries .....	2
Figure 2.	Market access conditions in non-MERCOSUR countries .....	2
Figure 3.	Positive versus negative preference margins .....	3
Figure 4.	Trade relationship status .....	7
Figure 5.	Entry versus continuing trade relationships .....	7

### **List of tables**

Table 1.	Survival of exports (weighted TTRI and RPM).....	13
Table 2.	Survival of exports (unweighted TTRI and RPM).....	14
Table 3.	Survival of exports (weighted and unweighted TTRI and RPM).....	15
Table 4.	Regression on the value of exports (weighted and unweighted TTRI and RPM).....	17
Table 5.	Regression on the value of exports with duration dummies (weighted and unweighted TTRI and RPM).....	18

### **Appendix**

Table A1.	Survival of exports with average marginal effects (weighted TTRI and RPM).....	25
Table A2.	Survival of exports with average marginal effects (unweighted TTRI and RPM).....	25
Table A3.	Survival of exports with average marginal effects (weighted and unweighted TTRI and RPM).....	26

## EXECUTIVE SUMMARY

The paper provides an empirical assessment of the impact of changes in tariff-wise market access conditions for Peru using firm-level customs data over the period 2002–2008. We use two indicators of tariff-wise market access. One is the average tariff level corrected for the responsiveness of foreign demand that Peruvian firms have to face in their destination market in their sector of activity. This indicator reflects absolute conditions of market access. The other reflects relative market access conditions. It is the average, again corrected for the responsiveness of foreign demand, between the average tariff of foreign competitors and the tariff faced by Peruvian firms in a given destination country and sector. The latter indicator closely measures the effective preference margin, which could be either positive or negative, enjoyed by Peruvian firms.

Empirical results suggest that better market access conditions increase the probability of survival of a trade relationship. However, the impact of our measure of preference margin appears to dominate that of our measure of absolute market access conditions. Other interesting features have emerged. For instance, diversification both in terms of destination country and products exported positively affects survival rates. Our results also show that firms that are part of some international production network, namely those which are both importing and exporting, enjoy lower hazard rates. Similar results are found when we assess the determinants of export performance. The predominance in influencing export performance of relative market access conditions is also observed. About 20 per cent of increase in exports to MERCOSUR markets observed during the 2002–2008 period was due to improvements in the effective preference margin seen by Peruvian firms. Diversification and integration into international production chains also improve export performance.

Complexity in exporting to some preferential trade partner market is often presented as the result of overlapping complicated rules of origin and administrative procedures to fulfil the latter. But complexity is also synonymous to opacity in effective tariff treatment. Taking the case of Peruvian firms facing a phase of trade integration into MERCOSUR markets, our results suggest that a fundamental component of trade creation in a trade agreement is the effective preference margin that firms in the various signatory countries would eventually have. From the point of view of policymakers, this could be easily computed and should be at the core of their approach to negotiations. Other benefits could obviously be retrieved from a trade agreement, especially if it goes, strictly speaking, beyond market access matters. However, if trade agreements are used as a trade promotion instrument, this can only be effective if the advantage provided by preferential market access is truly effective. This is to say that with the ongoing multiplication of trade agreements of all kinds and the inherent risk of preferences erosion, the trade promotion aspect of trade agreements could never stay the core element.





# 1. INTRODUCTION

Exemptions or partial exemptions from Most-Favoured-Nation tariff rates, namely tariff preferences, are still crucial in the eyes of policymakers especially in developing countries. In providing a competitive edge that could foster exports of domestic firms, tariff preferences remain the most cost-efficient trade promotion policy.

This could explain why countries have been engaging in an almost frenetic race to establish trade agreements. This is particularly true for the so-called South–South trade agreements that is, trade agreements whose members are developing countries. It certainly reflects the fact, although not exclusively,<sup>1</sup> that potential preference margins are higher for southern destinations relative to northern ones due to higher average levels of tariffs.

However, together with the generalized fall in applied MFN tariffs observed in the aftermath of the Uruguay Round due to multilateral trade negotiations and/or unilateral liberalization, the sequential proliferation of regional trade agreements has raised serious concerns especially in terms of preference erosion.<sup>2</sup> Preference erosion implies a de facto reduction in the competitive edge that tariff preferences provide and could nullify the impact on exports of the implementation of any trade agreement.

Eventually it has become increasingly complex for firms but also for policymakers to identify precisely the true advantage in terms of tariffs generated by any trade agreement. As a consequence, gains in effective market access and the impact of such gains on trade remain unclear.

Despite the relative importance of economic growth and development that one attributes to exports, there is very little evidence at the firm-level of the impact of market access conditions on exports. Most evidence is based at best on disaggregated trade data. Moreover, very little attention has been paid to the correct identification and a definition of market access indicators.

This paper contributes to filling in both gaps. First, it assesses empirically the impact of tariff-wise market access that Peruvian firms face when exporting. This is done using firm-level customs data over the period 2002–2008. Market access is qualified in both absolute and relative terms. The former refers to the average tariff prevailing in a given sector (corrected for the reactivity of demand in that sector). The latter refers to the difference between the average tariff faced by a Peruvian firm and the average tariff faced by competing firms from other countries (once again corrected for the reactivity of demand in that sector). We see this as an appropriate measure of the advantage firms have due to the preference they are given. Our approach to the measurement of preferential market access is comprehensive and allows us to fully identify its incidence. Second, the paper assesses the impact of market access conditions on two major components of export dynamics. We consider both the survival of export relationships and export performance as our dependent variables.

From an empirical point of view, Peru has seen several policy developments which could help identify the impact of market access conditions on exports. Since the 1990s, successive Governments have sought to restructure Peru's economy. The period under investigation in this paper corresponds to a phase in which Peru took an active approach to joining the global economy through regional integration and a commitment to pursuing bilateral Free Trade Agreements (FTAs). Peru has been a member of the Andean Community Customs Union since its establishment in 1969. In August 2003, MERCOSUR and Peru signed a FTA. Brazil and Peru reached an agreement on major investments in road infrastructure, multimodal transport, energy and communications. These agreements have been part of the basis for a South American trade bloc comprising the Andean Community and MERCOSUR

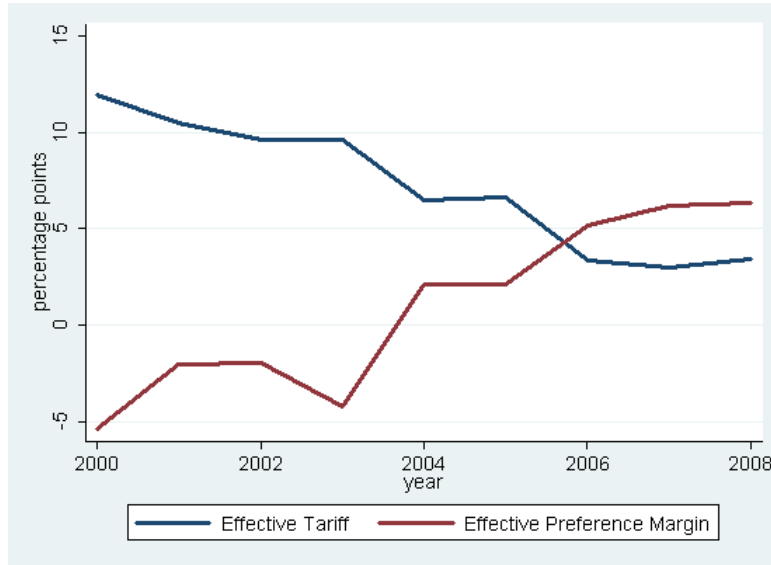
---

<sup>1</sup> See, for instance, Freund and Ornelas (2010) for a comprehensive review of elements motivating regional trade agreements.

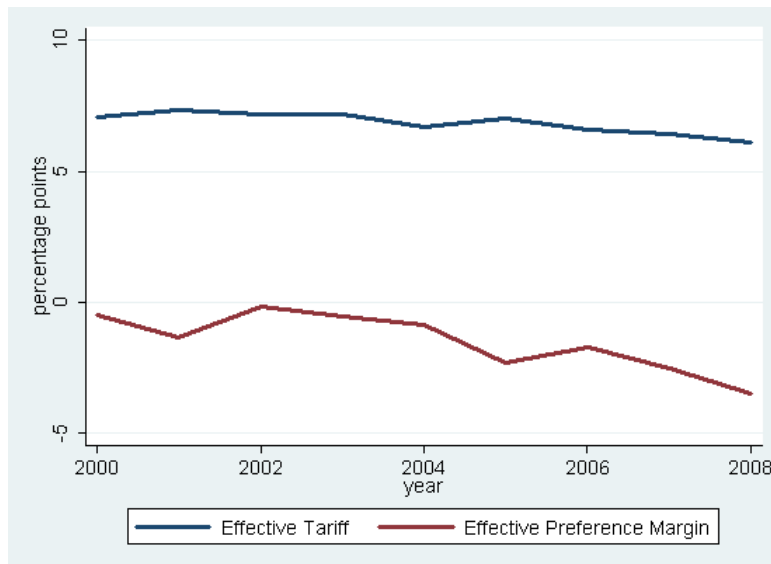
<sup>2</sup> Preference erosion can occur without any change in MFN rates. For instance, this would happen if export partners eliminated preferences or if they expanded the number of preference beneficiaries.

countries.<sup>3</sup> As a consequence, trade barriers have been cut, direct subsidies to exporters and domestic producers have been eliminated and equal treatment has been granted to foreign and domestic investors. On the other hand, Peruvian exporters have seen the tariffs imposed on their products falling steadily. Market access for Peruvian firms exporting towards MERCOSUR countries can be seen in figure 1 whereas the same access for non-MERCOSUR countries is presented in figure 2.

**Figure 1**  
**Market access conditions in MERCOSUR countries**



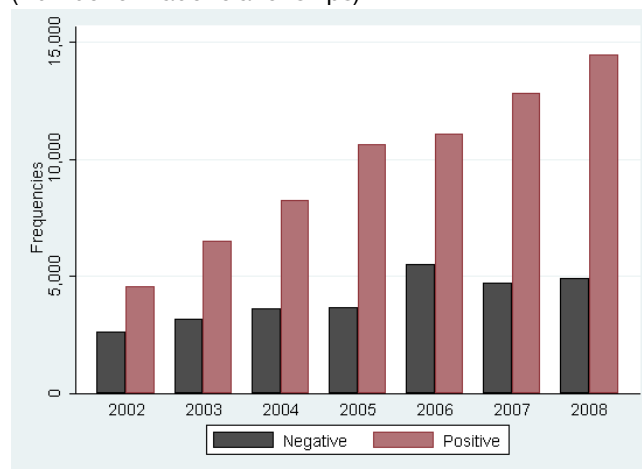
**Figure 2**  
**Market access conditions in non-MERCOSUR countries**



<sup>3</sup> Peru has further concluded negotiations on FTAs with Canada, Chile, Singapore and the United States of America. However, the impact of such negotiations on market access cannot be captured by our dataset. The 2006 United States-Peru Trade Promotion Agreement (PTPA) entered into force on 1 February 2009. FTAs with Canada and with Singapore were signed in May 2008. Along with Australia, Malaysia, the United States and Viet Nam, Peru is negotiating an expanded Trans-Pacific Strategic Economic Partnership (TPP) agreement (among Brunei Darussalam, Chile, New Zealand and Singapore).

In 2002, Peru's preferential margin with MERCOSUR was minus 5.35 percentage points. In 2008 it reached almost 6.5 percentage points. For non-MERCOSUR destinations, the preferential margin was almost nil in 2002 and went down to minus 3.5 percentage points in 2008. Exports to MERCOSUR partners increased almost fivefold during the 2002–2008 period while exports to non-MERCOSUR partners increased about fourfold. The number of firms exporting to MERCOSUR markets almost doubled, while at the same time the number of firms exporting to non-MERCOSUR markets increased by 54 per cent. This has implied that in 2002 firms exporting to non-MERCOSUR markets were 12 times more numerous than those exporting to MERCOSUR markets. The corresponding figure was 9 in 2008.<sup>4</sup> As a consequence, the number of trade relationships with a positive preference margin has almost tripled in seven years, as shown in figure 3.

**Figure 3**  
**Positive versus negative preference margins**  
 (Number of trade relationships)



Our results from both survival analysis and OLS estimation of export performance determinants suggest that both absolute and relative market access conditions play a significant role in framing export dynamics. However, results also indicate that relative market access conditions predominantly determine survival and performance. We also found that better diversified firms, both in terms of products and destinations, survive more easily on international markets. Being part of some form of an international production network also positively affects survival and slightly improves export performance.

The rest of the paper is organized into four chapters. The next chapter briefly discusses some results and insights from the related literature. Chapter 3 provides a description of the variables used and their sources, with a close look given to indices measuring market access conditions. It also provides some elementary descriptive statistics. Chapter 4 reports and comments some major results and the last chapter concludes and presents some possible directions for future research.

## 2. RELATED LITERATURE

This paper investigates two essential dimensions of export dynamics, namely survival and export performance. The literature dealing with these topics is vast. We review only a restricted list of papers, those we think are most closely related to our empirical work.

### 2.1. SURVIVAL

Several studies on survival are presented in this subsection, the first uses disaggregated trade data and the others use transactions data, of which one only focuses on the non-traditional agricultural sector.

<sup>4</sup> Figures on firms are not sensitive to whether we count firms exporting to both types of destinations or not.

Using disaggregated trade data (SITC 4-digit) for manufactures, Besedes and Blyde (2010) test a large set of correlates of trade duration to identify the main factors that explain differences in export survival rates observed across countries and regions. They first see that export relationships are often short-lived. Their main results concerning the variables that explain survival are that distance, ad valorem transport costs and the elasticity of import demand of the traded good increase the probability of exiting the export market. The variables that increase the chances of staying in the market are found to be the size of the partner, having a common language or a common border, having a trade agreement with the partner, a larger initial size of exports, depreciated exchange rates and the exporter being in a country with more developed financial systems and with institutions that support contract enforceability. The authors suggest that future research would be interesting with firm-level data, to thus uncover additional factors or policies affecting export survival that are more specific to a firm.

Cadot et al. (2011) use a unique dataset on transactions level exports for four African countries (Malawi, Mali, Senegal and the United Republic of Tanzania). They find that survival probability rises with the number of firms exporting the same product to the same destination from the same country, pointing towards the existence of cross-firm synergies. They also find that firms which are more diversified in terms of products, but even more so in terms of markets, are more likely to be successful and survive beyond the first year than those which are not. These countries experiment a lot when exporting, at a low scale and with low survival rates. They however also find that once a product has survived beyond the first year, it then grows significantly over time.

Using exporter-level international transactions data, Freund and Pierola (2010) focus on the non-traditional agricultural sector in Peru over the 1994–2007 period. They assess the role of idiosyncratic uncertainty and relatively low sunk entry costs in explaining why many firms enter the export sector and then exit almost immediately. The idea is that the exporter faces some uncertainty before entering the sector with regard to the cost the exporter will actually face, and only once the exporter has entered the market will this cost be revealed. Concerning sunk costs, the authors' observation of high entry and exit rates implies that sunk costs cannot be too large. This is also confirmed by the fact that a reasonable amount of firms tend to re-enter the market later on.

They also find that firms are more likely to exit in the first year and more so if they start small. They also examine entry and exit into new products. As new products are costly to introduce, it somewhat discourages entry such that the firms that do enter tend to be larger and more likely to succeed. Other firms will then enter once another firm has made it. Concerning entry into new markets with old products, firms face higher costs of entry but not excessively so, as suggested by the high entry and exit rates.

Martincus and Carballo (2009) examine exports from Peru from 2000 to 2006 and find that larger firms are more likely to survive in export markets, and that geographical and product diversification increase their duration in export markets. They justify this with two arguments, one being a portfolio explanation and the other an efficiency argument, with more productive firms being able to pay the sunk costs to enter export markets.

## **2.2. EXPORT PERFORMANCE**

There are a large number of contributions that look at the possible determinants of export performance. Most of these contributions estimate a gravity model using aggregated trade data. Very few however concentrate on the role played by changes in market access conditions in framing trade patterns besides the impact of specific events such as the entry into force of a trade agreement. Amongst those few, Redding and Venables (2004) consider that determinants of export performance can be split into external and internal components. External components include market access/entry conditions and a country's location vis à vis international markets, whereas internal components relate to supply-side conditions. They investigate the relative contribution towards export performance of external geography (particularly linkages to international demand) relative to capacity of internal supply (mainly internal geographical factors) using aggregated trade data. They emphasize on the fact that

countries geographically close to regions where there is strong aggregate import demand will tend to have better export growth. Based on standard gravity equation estimations, they find that most of the differential in export performance of various countries and regions since the 1970s is due to differences in the evolution of the external components mentioned above.

Papers providing evidence at the firm level do not really look at the impact of market access conditions per se but rather at the characteristics and specific features of market access. For instance, Eaton, Kortum and Kramarz (2004) show that most French firms sell to only one market, typically the most popular one while some others export widely and serve less popular markets. Eaton et al. (2007) find similar characteristics for Colombian exporters. In addition, they identify high entry and exit rates into exporting for Colombian firms. They find that there are more entrants per year than continuing firms and most entrants exit after one year.

Eaton et al. (2008) show that there is a large amount of heterogeneity in the number of transactions from one Colombian firm to another. They link this heterogeneity to geography, as they put forward that the negative relationship between aggregate exports and distance usually found in the literature is largely explained by their finding that firms exporting further away tend to make less frequent shipments.

Results on entry and exit rates for Chilean firms are also underlined by Alvarez and Lopez (2008). They find that heterogeneity of firms within an industry has an effect on entry and exit rates and that lower trade costs are associated with higher entry and exit rates, though to a lesser extent. They find that factor intensities play a minor role in explaining entry and exit rates whereas real exchange rates do not influence them at all, which would be consistent with the literature on hysteresis. Iacovone and Javorcik (2010) concentrate on the introduction of new varieties on export markets as well as product churning, or what they call export variety creation or destruction of Mexican firms during the liberalization period that followed NAFTA reforms. They find that Mexican firms tend to start small, in terms of volume and number of varieties, and then often change products with this churning being related to tariff rates.

### **3. DATA**

The data used are transaction data on Peruvian export flows. Monthly information is available for all exports from January 2001 to December 2009. In order to streamline our econometric analysis, the data are grouped by year. The dataset allows the identification of the exporter, the destination market for each trade flow, the description of the sector the flow belongs to (HS 2-digit), the Free On Board (FOB) value of each shipment and the number of products exported to any destination by each exporting firm. The dataset also enables one to identify which of the exporters also happen to be importers. The dataset further provides information on the number of products imported, their origin and the sector they belong to. As to the source of the explanatory variables, tariff data (MFN and preferential rates) originates from the UNCTAD TRAINS database, other trade data originates from the UN COMTRADE database, Gross National Income (GNI) per capita is from the \cite{WDI\_2010} whereas geography and location related data comes from the Centre d'Études Prospectives et d'Informations Internationales (CEPII) database for gravity analysis. In order to avoid estimation issues related to left censoring, only data from January 2002 on are used. In addition, in order to isolate as much as possible our econometric results from the impact of the financial crisis, data for 2009 are left aside. This leads to a set of 94314 observations.

#### **3.1. STYLIZED FACTS FOR PERUVIAN EXPORTING FIRMS**

This section presents some major stylized facts characterizing Peruvian exporting firms only for the 2002–2008 period. As mentioned above, the year 2001 is not considered to avoid left-censoring issues. In addition 2001 can also be seen to be in the immediate aftermath of the crisis in Argentina. As

stated above, the year 2009 has been voluntarily dropped from the analysis in order to minimize biases due to the impact of the last world economic crisis.

### ***Distribution***

Peru is no exception when considering the distribution of exporting firms: export value is essentially generated by a small group of multi-product, multi-destination firms. Besides these on average 500 firms, there has been an ever growing group of small and medium-sized firms fighting for survival in the export market.

Over the whole distribution, the top 1 per cent of exporters represents on average more than 80 per cent of the total yearly exports of Peru. At the sector level (HS 2 equivalent), the top 1 per cent of exporters represents on average 60 per cent of the sector total exports. At the other extreme, the smallest 75 per cent of exporters count for less than 9 per cent of exports in their respective sector.

Over the period under investigation there were around 21,200 different firms exporting. This represents a monthly average of almost 2,200 firms with a maximum of 3,000. The yearly figure increased significantly from 2002 to 2008. In 2002 there were 4,624 exporters, whereas in 2008 the corresponding figure reached 7,142 which corresponds to an increase of almost 55 per cent in the number of exporting firms.

On average, 60 per cent of the firms export only once or twice a year. Around 11 per cent export each month. The category shares are relatively constant over the whole period under investigation.

### ***Products and destinations***

The average firm exports two products. The maximum number of products exported by a single firm was around 30 over the sample period. The share of multi-product firms slightly increased from 52 per cent in 2002 to almost 55 per cent in 2008 and reached 56 per cent in 2006. The share of firms exporting at least 10 products was around 1.5 per cent. At the sectoral level, the presence of multi-product firms is verified essentially in the textile, food and metal-mechanical sectors. The average number of destinations per firm remained stable over the whole period of investigation and stands close to three. The maximum number of destinations served by a firm has been on average around 60, with a peak at almost 70 in 2006. The top three destinations identified in terms of number of exporters are the United States of America, Chile and Ecuador. The United States is also the top destination in terms of export value. However, along those terms, it is followed by China and Canada. We also observe that the number of firms exporting to a developing country has been increasing significantly since 2002. In 2002 there were more firms exporting to developed economies (53 per cent) than to developing ones (47 per cent). Since 2006 this feature has been reversed. In 2008, more than 53 per cent of firms exported to a developing country.

### ***Survival***

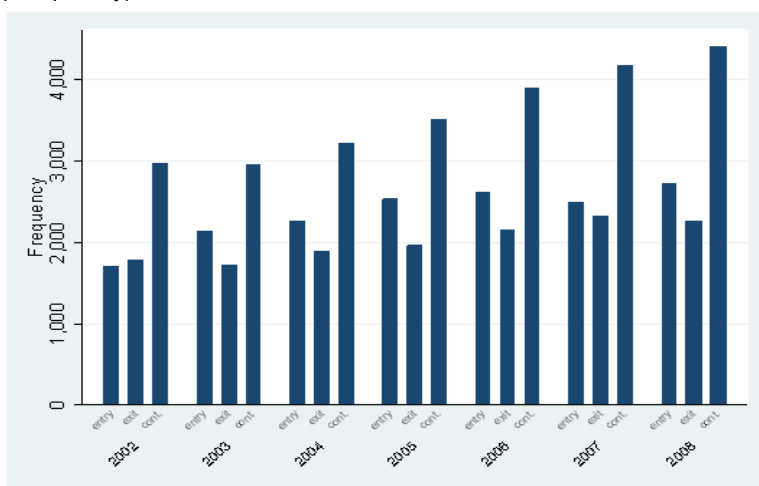
By aggregating to obtain yearly data, we find that half of the observed firms only exported during one year and just over 4 per cent exported permanently, including firms that may only have exported once a year, over the 2002–2008 period. Five years after entry, 12 per cent of entrants had survived.<sup>5</sup> We observe that survival in the export sector increases significantly after having been very low in the first year. The incidence of surviving firms also increased between 2002 and 2008, as illustrated by figure 4. We also observe that turnover, defined as the number of entering firms plus the number of exiting firms, increased. Nevertheless, continuing trade relationships accounted for almost 98 per cent of total current exports from 2003 to 2008, as shown in figure 5. Getting into the detail of

---

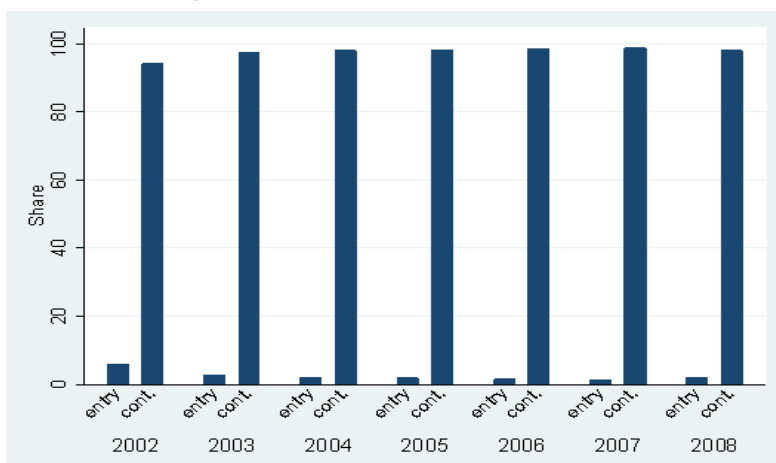
<sup>5</sup> This figure remains the same whether one considers 2001, 2002 or even 2003 as the starting year.

the latter figure, we find that, on one hand, the share of exports of firms exporting at least once a year over the whole period increased from 80 per cent in 2002, to almost 86 per cent at the end of the period. On the other hand, the share of the most “precarious” exporting firms (those that exported only once) declined significantly even though it has always remained negligible. It was around 0.35 per cent at the beginning of the period under investigation and dropped to less than 0.18 per cent at the end of it.

**Figure 4**  
**Trade relationship status**  
 (Frequency)



**Figure 5**  
**Entry versus continuing trade relationships**  
 (Share in current year exports)



### 3.2. MEASURING MARKET ACCESS

Over the last decade, market access conditions have increasingly been affected by bilateral trade agreements and Peru is no exception. Trade agreements generally provide trading partners with lower tariffs. As a result, countries apply different tariff rates to the same product depending on its origin.

The fact that countries apply different tariff rates to similar products depending on their origin is of great importance for exporters. From an exporter's perspective, market access depends not only on the disadvantages that the exporter faces compared to domestic producers, but also on the relative advantages or disadvantages that it has compared to competitors from other countries. In tariff terms, the former is measured by the tariff applied to the specific good, while the latter is a measure of the preferential margin that takes into consideration the fact that some preferential access may be granted to exporters from other countries. In practice, this measure of preferential margin provides a measure of the strength of preferential access. The larger the preferential margin, the greater the advantage is of a given country's exporters with respect to foreign competitors.

To measure market access conditions, two trade policy variables based on Fugazza and Nicita (2012) are provided in this paper. The first measure captures direct market access conditions (the overall tariff faced by exports), while the second measure captures relative market access conditions (the overall tariff faced by exports relative to that faced by foreign competitors). Both measures are calculated bilaterally and at the sectoral level. This latter aggregation is unfortunate but necessary as the full product description by firms was not provided in our database. However, the aggregation could also be rationalized on economic grounds. From a firm-level point of view, average tariffs computed at the sectoral level are an indicator of market access conditions that go beyond the simple tariff firms have to pay to send their product. It is an indicator of the incidence of protectionism in the sector and possibly of the ease of penetrating such a sector. Moreover, the aggregation procedure presented below is not expected to introduce a severe bias as long as the distribution of tariffs within a sector is concentrated around some median value.

Of the two measures mentioned above, the first is the Mercantilist Trade Restrictiveness Index (MTRI) derived from Anderson and Neary (1994) and Anderson and Neary (2003), and is directly related to the partial equilibrium simplification developed by Feenstra (1995). The Index provides the uniform tariff rate that yields the same level of imports at the level of aggregation of interest (here at the HS 2-level) as the differentiated structure of restrictions. In this paper, the measure capturing direct market access conditions is labelled Tariff Trade Restrictiveness Index (TTRI). In its construction, the aggregation across products takes into account the fact that the imports of some goods may be more responsive than others to a change in tariffs. Intuitively, products where imports are less sensitive to prices (inelastic) should be given less weight because preferential access (a lower tariff) would have a lesser effect on overall volumes of trade. In formal terms, the TTRI faced by Peruvian exporters in sector  $j$  in exporting to country  $d$  is given by equation (1), where  $x$  indicates exports from Peruvian firms in sector  $j$  to country  $d$  at the product level,  $\epsilon$  is the bilateral import demand elasticity,  $T$  is the applied tariff, and  $hs$  are HS 6-digit categories. That is,

$$TTRI_{jk} = \frac{\sum_{hs \subset j} x_{k,hs} \epsilon_{k,hs} T_{k,hs}}{\sum_{hs \subset j} x_{k,hs} \epsilon_{k,hs}} \quad (1)$$

This index provides the equivalent uniform tariff that will maintain Peruvian exports in sector  $j$  to country  $d$  constant. As a robustness check, we also consider a simpler version of our measure by removing trade weights but still correcting for demand responsiveness. That is,

$$TTRI_{jd} = \frac{\sum_{hs \subset j} \epsilon_{d,hs} T_{d,hs}}{\# \text{ of } hs \subset j} \quad (1')$$

The variable measuring the effect of the system of preferences relative to foreign competitors is provided by the second index, which we label the relative preferential margin (RPM). The RPM builds on the arguments of Low, Piermartini and Richter (2009), Carrère, de Melo and Tumurchudur (2010) and Hoekman and Nicita (2011). These studies recognize that the commonly used measure of



preference margins (the difference between the preferential tariff and the MFN rate) generally overestimates the actual benefits of preferences. Given the increase in the number of PTAs, a better measure of the preferential margin is one where the multilateral counterpart is not the MFN tariff, but the average tariff including preferential rates imposed on other foreign competitors. This is a measure of effective preferential margin in the sense that it allows for the fact that preferential rates granted to a particular country, although lower than MFN, could still penalize it relative to other countries that benefit from even lower tariffs. The RPM is then calculated as the difference, in tariff percentage points, that a determined basket of goods faces when imported from a given country relative to being imported from any other country.<sup>6</sup>

There are two sets of weights when calculating the RPM. First, the counterfactual (the tariff faced by foreign competitors) is a weighted average of the tariffs imposed on all other trading partners. Second, the overall tariff imposed on each exporter is a weighted average comprising the tariffs of many products. In the calculation of the counterfactual, we first compute the trade-weighted average tariff at the tariff-line level that one country (e. g. Brazil) imposes on all other countries except Peru. This is done by using bilateral imports (of Brazil) as weights, so as to take into account the supply capacity of trading partners (of Brazil). Aggregation across products is done by using Peruvian exports (to Brazil) so as to account for the different product compositions across partners. As in the case of the TTRI, a further complication relates to demand responses to changes in tariffs. When aggregating across product lines, the overall relative preferential margin should be higher if Peru has a higher preferential margin in products for which demand is more sensitive to small changes in prices. This is corrected, presumably, by using import demand elasticities in aggregating across products.

In more formal terms, the RPM measuring the advantage that Peru has in exporting its goods in sector  $j$  to country  $d$  can be calculated as:

$$RPM_{jd} = \frac{\sum_{hs \subset j} x_{d,hs} \epsilon_{d,hs} (T_{d,hs}^w - T_{d,hs})}{\sum_{hs \subset j} x_{d,hs} \epsilon_{d,hs}} \quad (2)$$

where  $T_{d,hs}^w = \frac{\sum_v x_{d,hs}^v T_{d,hs}^v}{\sum_v x_{d,hs}^v}$ ,  $v \neq Peru$

where notation is as above and  $v$  denotes countries competing with Peru in sector  $j$  in exporting to country  $d$ , so that the term  $T_{d,hs}^w$ , is the trade-weighted average of the tariffs applied by country  $d$  to imports for each  $hs$  product (HS 6-digit products) originating from each country  $v$ .

Again as a robustness check we also consider a non-trade weighted version of the RPM, namely,

$$RPM_{jd} = \frac{\sum_{hs \subset j} \epsilon_{d,hs} (T_{d,hs}^w - T_{d,hs})}{\# \text{ of } hs \subset j} \quad (2')$$

where  $T_{d,hs}^w$  is defined as in (2).

Note that any measure of a preference margin could be positive or negative, depending on the advantage or disadvantage of the country with respect to other competing exporters. The RPM varies

<sup>6</sup> To clarify with an example, in the RPM of Peru vis-à-vis Brazil, the counterfactual is the average tariff for the export bundle of Peru to Brazil if this bundle were to originate from other countries. The relative preferential margin is the difference between the counterfactual and the bilateral trade-weighted preferential tariff imposed by Brazil on Peru.

between the negative of the TTRI (maximum negative bias, i.e. being the only trading partner facing tariffs when all other exporters enjoy duty free access) and the MFN tariff rate (maximum positive bias, i.e. being the only trading partner enjoying duty free access while all other exporters face MFN tariffs). The RPM is exactly zero when there is no discrimination (i.e. the importing country applies identical tariffs across all existing trading partners).<sup>7</sup> In summary, the RPM provides a measure of the tariff advantage (or disadvantage) provided to the actual exports from Peru to country  $d$  in sector  $j$ , given the structure of the tariff preferences of country  $d$ . As the RPM provides the relative advantage not with respect to the average, but to each trading partner, it also captures the discriminatory effects of the overall system of preferences.

Although the TTRI and the RPM represent an improvement over other aggregate indicators of trade policy, these two indices are still imperfect measures of market access. Both the TTRI and the RPM depend not only on trade policy, but also on trade values as with any trade-weighted index. As a consequence, we expect our indicators to improve when exports shift towards products that are less protected. For instance, the TTRI declines when the export mix of a country shifts towards products that face a lower tariff. Similarly, the RPM index increases when the export mix shifts towards products where the preferential margin is higher. Although the use of import demand elasticities softens the endogeneity problem of trade to tariff, a related problem is that both indices reflect only non-zero imports, and thus they do not reflect prohibitive tariffs. These problems result in a systematic underestimation of the effect of tariffs which could be corrected by setting the weights in the indices at trade levels that would arise in a tariff-free world. As this is not possible because these levels remain unknown, the issue can be eased by fixing trade weights in order to correct for some of the endogeneity. This is the approach we follow in the econometric estimation. More precisely, weights are based on average trade flows observed at the product level over the 1995–1997 period.

Limitations are also related to the scope of the indices. In particular, these indices only take into account the direct own-price effects of tariffs and ignore the general equilibrium of cross-price effects. Finally, these indices are calculated only with respect to tariffs and do not take into account any restrictive effects of non-tariff measures (e.g. quotas, standards, etc.).

## **4. EMPIRICAL STRATEGY AND RESULTS**

As already mentioned, export dynamics can be qualified by looking at the evolution of the two margins of trade, namely the extensive margin and the intensive margin. However, this cannot be implemented in an integrated manner. With customs firm-level data, export dynamics can be investigated at best by considering separately the determinants of export survival (section 4.1) and the determinants of export performance (section 4.2) at the firm level.

### **4.1. TRADE RELATIONSHIPS SURVIVAL**

The length of trade relationships and its determinants can be examined using standard survival analysis techniques. The semi-parametric Cox (1972) model is the canonical model used to assess the impact of explanatory variables on the hazard rate. This model treats time as a continuous variable and has as its main advantage that it does not require specification of the survival distribution. However, despite the suitability of its properties, the use of the Cox model has been questioned when applied to the duration of trade relationships. One of the major concerns is the validity of the proportionality assumption. Generally speaking there are two major reasons why the proportional hazards assumption may fail to hold. First, the effect of explanatory variables on the hazard may be intrinsically non-

---

<sup>7</sup> Note that at the product level and in a three-country setting (one importer and two exporters), the sum of the bilateral RPMs across countries is zero (i.e. the advantage of one exporter is equal to the disadvantage of the other exporter). As the RPM is relative to all other exporters, this property is lost when allowing for more than two exporters. Still, this is a valuable property as the RPM could be used to provide some insight on the extent of trade diversion at the product level, not bilaterally, but between a given country and all other countries lumped together.

proportional. This is common, especially when time-varying covariates are included in the model, which is the case in the present study (i.e. GNI per capita, sectoral imports and market access measures). Second, unobserved heterogeneity that is not properly accounted for may cause the impact of observed explanatory variables to be a function of duration time. And this may be verified even if the underlying model is of the proportional hazards type.

Following the results and conclusions of Hess and Persson (2011), we adopt the probit model with random effects as our core estimation strategy. Probit estimation with random effects proves to be the most efficient in handling non-proportionality, but also tied duration times (many short-lived trade relations of the same size). Moreover, probit estimation can easily treat unobserved heterogeneity whenever present.<sup>8</sup> We also report results obtained with a complementary log-log regression (cloglog) model as a robustness check. A feature that makes the cloglog model a relevant model for sensitivity analysis is its built-in assumption of proportional hazards. The cloglog model with period-specific intercepts represents the exact grouped-duration analogue of the Cox proportional hazards model.

As already mentioned, we only use data starting in 2002 in order to avoid estimation issues related to left censoring.

The general empirical model is given by the equation

$$\Pr(x_{jdt,i} > 0 | X_{idt,j}) = F(\alpha_d + \delta_j + \lambda_t + d_{jd,i} + \phi \ln(TTRI_{jdt}) + \kappa RPM_{jdt} + Z_{it}\beta + D_{dt}\theta + u_{jdt,i}) \quad (3)$$

where  $x_{jdt,i}$  denotes the exports of firm  $i$  to country  $d$  in sector  $j$  at time  $t$ .  $F(\cdot)$  is cumulative distribution function of the standard normal distribution function in the case of probit model estimation and  $F(\cdot) = 1 - \exp[-\exp(\cdot)]$  in the case of the complementary log log model estimation. Both estimation strategies are with random effects, implying that the error term  $u_{jdt,i}$  has two components  $(\xi_{jd,i} + \varepsilon_{jdt,i})$ .

The set of explanatory variables retained includes as before firm-specific characteristics and destination-specific characteristics. All characteristics can be either time invariant or time varying. We include a series of fixed effects, respectively for destinations  $\alpha_d$ , sectors  $\delta_j$ , time periods  $\lambda_t$  and duration  $d_{jd,i}$ . Duration dummies are dummy variables that capture the number of previous spells of activity for any given trade relationship. Dummy variables are used since the underlying baseline hazard is unknown. Duration dummies should also capture any sort of time dependency in the pattern of export status of firms. The set of firm-specific characteristics  $Z_{it}$  includes the export value at entry into a trade relationship, whether the firm is an importer, whether the firm exports more than one product, whether the firm exports to more than a single destination and whether the firm has re-entered the export sector. The set of  $D_{dt}$  is a matrix of destination-specific variables which are essentially controls for demand conditions: the level of GNI per capita and the level of imports (computed at the sector level).

As to our measure of direct market access  $(1 + TTRI_{jdt})$  we consider in turn the trade-weighted and the unweighted versions. We then include the corresponding version of our measure of indirect market access  $RPM_{jdt}$ .

<sup>8</sup> Sueyoshi (1995) provides an extensive presentation and discussion of the use of binary responses models in the context of duration analysis.

Results are shown in table 1, table 2 and table 3.<sup>9</sup> Generally speaking there are no contrasting results between the probit and cloglog estimations. Impacts levels are also similar. A series of results are robust to any combination of our measures of market access conditions. We find that higher starting export values are associated with a longer survival. This is in line with results obtained in most empirical papers dealing with survival. Higher initial values can reflect a lower degree of uncertainty, as suggested by Rauch (1999) and Albornoz et al. (2010). As a consequence we can expect longer-lasting trade relationships. Firms which are multi-product and multi-destination are also expected to face lower exit rates. Firms with such characteristics have de facto a more diversified export strategy. Hence our results suggest a positive association between the survival of firms in the export sector and diversification. Our finding echoes the findings of Carballo and Martincus (2009) and Martinez and Tovar (2011). There are several stylized facts in the industrial organization literature that help identify the factors that affect the probability that a firm ceases to operate or exit particular markets. One of these facts is that the probability of exit falls as the number of products produced and the number of markets served increase. This could be the consequence of selling in several foreign markets.<sup>10</sup> This result is often rationalized by adopting a portfolio argument. If selling different products in different markets results in lower sales variability, then we could expect that firms exporting several products to several markets are more likely to survive in each market. Two additional stylized facts contribute to a positive relationship between product/market diversification and survival. First, more diversified firms are more likely to be more productive.<sup>11</sup> Second, more diversified firms are likely to have better access to the resources (e.g. external or internal sources of capital) necessary to avoid closure in the case of a negative shock to one product or market.<sup>12</sup>

The estimated coefficient of the multi-destination dummy can also be interpreted as evidence of path dependency. The importance of path dependency has been revealed in various papers, although it is not necessarily directly related to our approach. Manova et al. (2011) find that export experience in a market facilitates entry in other similar (geographically or economically) destinations. This implies that both the entry and exit patterns of exporting firms are path dependent. Path dependency is also a feature of the Albornoz et al. (2010) and Nguyen (2012) models, both based on the idea that a firm's foreign demands are uncertain and correlated across markets.

Being an importer negatively affects the survival of the export relationships of firms. This result is somewhat surprising and its interpretation is not straightforward. Having removed from the sample those firms that are involved in pure export-import activities with no processing, this could be seen as reflecting the impact of being part of an international network. Hence, being internationally integrated could result in higher exit rates. Unfortunately, the information necessary to further qualify the modalities of integration is unavailable. An important piece of information would be the ownership status of the firm and the identity of its trade partners. This would have allowed us to identify not only global supply chains but also the type of production relationships on an arm's length basis. A possible interpretation is that being part of an international production network is synonymous with increased volatility without generating necessarily more uncertainty. Export destinations would vary according to changes in either the organization of the overall production chain or according to demand-specific changes. This could be reflected by the fact that credit lines are likely to be more easily opened amongst integrated trade partners, especially in the context of truly established global production chains. Open account operations, including inter-firm financing, represent a non-negligible share of trade finance operations within global supply chains, as presented in Chauffour and Malouche (2011). In other words, the international integration of firms could be synonymous with less stringent credit constraints and, as a consequence, permit more frequent changes in export destinations. There is no paper testing such a relationship. However, based on a panel of bilateral exports at the industry level, Manova (2011) finds that credit constraints are important determinants of export participation.

---

<sup>9</sup> Average Marginal effects for all estimated coefficients are reported in table A1, table A2 and table A3, respectively.

<sup>10</sup> These results are discussed, for instance, in Bernard and Jensen (2002) and Bernard and Jensen (2007).

<sup>11</sup> See, for instance, Bernard et al. (2006).

<sup>12</sup> This is shown in Bernard and Jensen (2007).

The multi-spell dummy indicates whether a firm has re-entered a market during the period under investigation. This feature is associated with a diminishing probability of exiting the market a second time. Again, there are several possible interpretations of this result. One is that firms learn from past experiences and, when re-entering a market that has been previously abandoned, are more efficient in keeping the trade relationship going. Another interpretation, which does not exclude the preceding one, is that setting up a trade relationship takes time and possibly several trials. With some learning by doing, the relationship eventually survives.

Two time-varying variables are included to control for demand conditions in the destination country. The first one is the GNI per capita (in natural log). It is expected to capture the evolution of overall purchasing power in the destination country and controls for shocks to the economy. The second one is the value of imports (in natural log). It is sector specific and should reflect the demand component *strictu sensu* of market potential. Their estimated impact is intuitively coherent. Both variables negatively affect the probability of exit. Sectoral imports however have a more significant estimated coefficient.

Table 1  
Survival of exports (weighted TTRI and RPM)

	Probit	Cloglog	Probit	Cloglog
<b>ln(entry exp value)</b>	(0.08) <sup>7a</sup> (0.003)	(0.08) <sup>7a</sup> (0.003)	(0.08) <sup>6a</sup> (0.003)	(0.08) <sup>7a</sup> (0.003)
<b>multi-product</b>	-0.482 <sup>a</sup> (0.017)	-0.488 <sup>a</sup> (0.017)	-0.482 <sup>a</sup> (0.017)	-0.487 <sup>a</sup> (0.017)
<b>multi-destination</b>	-0.250 <sup>a</sup> (0.014)	-0.253 <sup>a</sup> (0.014)	-0.251 <sup>a</sup> (0.014)	-0.254 <sup>a</sup> (0.014)
<b>importer</b>	0.030 <sup>a</sup> (0.012)	0.035 <sup>a</sup> (0.012)	0.030 <sup>b</sup> (0.012)	0.035 <sup>a</sup> (0.012)
<b>multi-spell</b>	-0.258 <sup>a</sup> (0.021)	-0.239 <sup>a</sup> (0.021)	-0.257 <sup>a</sup> (0.021)	-0.238 <sup>a</sup> (0.021)
<b>ln(gni per cap)</b>	-0.119 <sup>b</sup> (0.054)	-0.128 <sup>b</sup> (0.057)	-0.117 <sup>b</sup> (0.054)	-0.125 <sup>b</sup> (0.057)
<b>ln(imports)</b>	(0.028) <sup>a</sup> (0.004)	(0.027) <sup>a</sup> (0.004)	(0.028) <sup>a</sup> (0.004)	(0.028) <sup>a</sup> (0.004)
<b>ln(1+TTRIw)</b>	0.612 <sup>a</sup> (0.165)	0.617 <sup>a</sup> (0.168)		
<b>RPMw</b>			-0.182 <sup>a</sup> (0.042)	-0.187 <sup>a</sup> (0.041)
<b>Duration dummies</b>	Yes	Yes	Yes	Yes
<b>Sector dummies</b>	Yes	Yes	Yes	Yes
<b>Year dummies</b>	Yes	Yes	Yes	Yes
<b>Destination dummies</b>	Yes	Yes	Yes	Yes
<b>Insig2u</b>	-1.550 <sup>a</sup> (0.126)	-2.001 <sup>a</sup> (0.196)	-1.556 <sup>a</sup> (0.127)	-2.016 <sup>a</sup> (0.198)
<b>Observations</b>	94314	94314	94314	94314
<b>Pseudo R<sup>2</sup></b>	0.05	0.051	0.05	0.051

**Note:** Robust standard errors clustered by firm are in parentheses. Superscript letters a, b and c denote significance at the 1, 5 and 10 per cent level, respectively.

Table 2

**Survival of exports (unweighted TTRI and RPM)**

	<b>Probit</b>	<b>Cloglog</b>	<b>Probit</b>	<b>Cloglog</b>
<b>ln(entry exp value)</b>	(0.08)6 <sup>a</sup> (0.003)	(0.08)7 <sup>a</sup> (0.003)	(0.08)6 <sup>a</sup> (0.003)	(0.08)7 <sup>a</sup> (0.003)
<b>multi-product</b>	-0.482 <sup>a</sup> (0.017)	-0.487 <sup>a</sup> (0.017)	-0.482 <sup>a</sup> (0.017)	-0.487 <sup>a</sup> (0.017)
<b>multi-destination</b>	-0.251 <sup>a</sup> (0.014)	-0.254 <sup>a</sup> (0.014)	-0.250 <sup>a</sup> (0.014)	-0.253 <sup>a</sup> (0.014)
<b>importer</b>	0.030 <sup>b</sup> (0.012)	0.035 <sup>a</sup> (0.012)	0.030 <sup>a</sup> (0.012)	0.035 <sup>a</sup> (0.012)
<b>multi-spell</b>	-0.257 <sup>a</sup> (0.021)	-0.238 <sup>a</sup> (0.021)	-0.257 <sup>a</sup> (0.021)	-0.238 <sup>a</sup> (0.021)
<b>ln(gni per cap)</b>	-0.115 <sup>b</sup> (0.054)	-0.124 <sup>b</sup> (0.057)	-0.119 <sup>b</sup> (0.054)	-0.127 <sup>b</sup> (0.057)
<b>ln(imports)</b>	(0.028) <sup>a</sup> (0.004)	(0.027) <sup>a</sup> (0.004)	(0.028) <sup>a</sup> (0.004)	(0.028) <sup>a</sup> (0.004)
<b>ln(1+TTRI<sub>lw</sub>)</b>	0.258 (0.21)	0.221 (0.216)		
<b>RPM<sub>w</sub></b>	-0.142 <sup>a</sup> (0.053)	-0.153 <sup>a</sup> (0.053)		
<b>ln(1+TTRI<sub>uw</sub>)</b>			0.29 (0.224)	0.274 (0.231)
<b>RPM<sub>uw</sub></b>			-0.109 <sup>b</sup> (0.053)	-0.118 <sup>b</sup> (0.054)
<b>Duration dummies</b>	Yes	Yes	Yes	Yes
<b>Sector dummies</b>	Yes	Yes	Yes	Yes
<b>Year dummies</b>	Yes	Yes	Yes	Yes
<b>Destination dummies</b>	Yes	Yes	Yes	Yes
<b>Insig2<sub>u</sub></b>	-1.554 <sup>a</sup> (0.127)	-2.013 <sup>a</sup> (0.198)	-1.553 <sup>a</sup> (0.127)	-2.011 <sup>a</sup> (0.198)
<b>Observations</b>	94314	94314	94314	94314
<b>Pseudo R<sup>2</sup></b>	0.05	0.051	0.05	0.051

**Note:** Robust standard errors clustered by firm are in parentheses. Superscript letters a, b and c denote significance at the 1, 5 and 10 per cent level, respectively.

Market access variables, which are also components of market potential, are first introduced separately in table 1 and table 2, then jointly in table 3 in order to test their absolute and relative explanatory power. Again, whether we consider the probit model or the cloglog model, empirical results are never contradictory. We consider both the non-trade-weighted and trade-weighted versions of our measures. In all specifications, coefficients are positive for the TTRI variable and negative for the RPM variable. The first set of results suggests that higher tariffs are associated with higher exit rates. This is consistent with theoretical findings in dynamic models of trade such as Impullitti et al. (2011). Ex-post uncertainty is a core feature of their model, which is otherwise a now standard trade model with heterogeneous firms *à la* Melitz (2003). They assume that the productivity of firms evolves stochastically as a Brownian motion. In this context, an increase in per-period variable costs, such as tariffs, decreases the average time spent as an exporter. The logic behind this result is that as variable costs increase, the probability that an exporter will be able to cover these costs decreases. If we consider the impact of our measures of relative market access, estimates of coefficients are always negative. As the advantage on competitors in terms of market access increases, the survival rate of a trade relationship increases. This empirical result is novel and does not have a proper theoretical

counterpart. This is mainly due to the fact that in standard demand set ups our RPM measure cannot be identified explicitly. The RPM's components are usually part of an aggregate theoretical price index but are not separable from the latter. There is however a straightforward explanation, although possibly not unique, for the result. A larger effective preferential margin would translate into larger market shares and larger profits. Larger profits are synonymous with smaller exit rates and thus longer survival on a specific market. The mechanism is similar to the one driving results obtained for direct measures of market access.

*Table 3*  
**Survival of exports (weighted and unweighted TTRI and RPM)**

	<b>Probit</b>	<b>Cloglog</b>	<b>Probit</b>	<b>Cloglog</b>
<b>ln(entry exp value)</b>	(0.08)6 <sup>a</sup> (0.003)	(0.08)7 <sup>a</sup> (0.003)	(0.08)6 <sup>a</sup> (0.003)	(0.08)7 <sup>a</sup> (0.003)
<b>multi-product</b>	-0.482 <sup>a</sup> (0.017)	-0.487 <sup>a</sup> (0.017)	-0.482 <sup>a</sup> (0.017)	-0.487 <sup>a</sup> (0.017)
<b>multi-destination</b>	-0.251 <sup>a</sup> (0.014)	-0.254 <sup>a</sup> (0.014)	-0.250 <sup>a</sup> (0.014)	-0.253 <sup>a</sup> (0.014)
<b>importer</b>	0.030 <sup>b</sup> (0.012)	0.035 <sup>a</sup> (0.012)	0.030 <sup>a</sup> (0.012)	0.035 <sup>a</sup> (0.012)
<b>multi-spell</b>	-0.257 <sup>a</sup> (0.021)	-0.238 <sup>a</sup> (0.021)	-0.257 <sup>a</sup> (0.021)	-0.238 <sup>a</sup> (0.021)
<b>ln(gni per cap)</b>	-0.115 <sup>b</sup> (0.054)	-0.124 <sup>b</sup> (0.057)	-0.119 <sup>b</sup> (0.054)	-0.127 <sup>b</sup> (0.057)
<b>ln(imports)</b>	-0.028 <sup>a</sup> (0.004)	-0.027 <sup>a</sup> (0.004)	-0.028 <sup>a</sup> (0.004)	-0.028 <sup>a</sup> (0.004)
<b>ln(1+TTRI<sub>lw</sub>)</b>	0.258 (0.21)	0.221 (0.216)		
<b>RPM<sub>w</sub></b>	-0.142 <sup>a</sup> (0.053)	-0.153 <sup>a</sup> (0.053)		
<b>ln(1+TTRI<sub>luw</sub>)</b>			0.29 (0.224)	0.274 (0.231)
<b>RPM<sub>uw</sub></b>			-0.109 <sup>b</sup> (0.053)	-0.118 <sup>b</sup> (0.054)
<b>lnsig2u</b>	-1.554 <sup>a</sup> (0.127)	-2.013 <sup>a</sup> (0.198)	-1.553 <sup>a</sup> (0.127)	-2.011 <sup>a</sup> (0.198)
<b>Duration dummies</b>	Yes	Yes	Yes	Yes
<b>Sector dummies</b>	Yes	Yes	Yes	Yes
<b>Year dummies</b>	Yes	Yes	Yes	Yes
<b>Destination dummies</b>	Yes	Yes	Yes	Yes
<b>Observations</b>	94314	94314	94314	94314
<b>Pseudo R<sup>2</sup></b>	0.05	0.051	0.05	0.051

**Note:** Robust standard errors clustered by firm are in parentheses. Superscript letters a, b and c denote significance at the 1, 5 and 10 per cent level, respectively.

When including both market access measures as in table 3, we observe that the impact of the RPM variable dominates the one of the TTRI variable. The sign of the RPM measure remains negative and the estimate is significant, although at a lower level. Coefficients are also smaller in absolute value compared to those obtained when the RPM variable is taken on its own. This could be the signal of a particular statistical relationship between the two sets of measures. However, their correlation is very low, too low to influence the empirical setting and results. Hence, more than direct market conditions, exporters should properly appreciate their position relative to other competitors. If exporters only look

at the tariff treatment imposed on their products, then their profitability assessment is likely to be erroneous. The predominance of relative market access over absolute market access conditions once again has not been clearly established in the theoretical trade literature. Something could be said when considering a standard demand system based on Constant Elasticity of Substitution (CES), but only under some very restrictive conditions. This is discussed in the next section. On average, the probability that a trade relationship terminates has decreased by 0.4 percentage points due to improved relative market access conditions. For markets in MERCOSUR countries, the corresponding figure is 2 percentage points. In most cases the impact remains below 1 percentage point and only in a very few cases does it stand above 10 percentage points. This is also verified if we express impacts in relative terms.

Besides random effects which are specific to a firm, sector and destination, we also include as mentioned above duration, sector, year and destination dummies. We believe that this estimation strategy minimizes the size of any possible omitted variable bias. In particular sector and destination dummies should account for the existence of fixed costs to export to a market. Impullitti et al. (2011) find that history-dependent export decisions are a salient feature when export-fixed costs are sunk upon entry in a foreign market. It is not necessarily the case when fixed costs are paid on a per-period basis. Moreover, the implications for the persistence of export status are also different. An increase in per-period fixed costs decreases the average time spent as an exporter. The opposite is true if fixed costs are sunk.<sup>13</sup>

## 4.2. EXPORT VALUE

The empirical approach implemented to identify the determinants of export performance is standard. We run a series of OLS regressions using firm-sector-destination and period-specific observations.<sup>14</sup> We estimate the following equation.

$$\ln(x_{jdt,i}) = \alpha_d + \delta_j + \lambda_t + \phi \ln(TTRI_{jdt}) + \kappa RPM_{jdt} + Z_{it}\beta + D_{dt}\theta + u_{jdt,i} \quad (4)$$

The dependent variable, taken in its natural logarithmic form  $x_{jkt,i}$ , represents the exports from firm  $i$  to country  $d$  in sector  $j$  at time  $t$ . We take the total yearly value. As we do in our survival estimation, we include a series of fixed effects. Those are for destinations  $\alpha_d$ , sectors  $\delta_j$ , and time periods  $\lambda_t$ .  $Z_{it}$  is a matrix of firm specific characteristics: whether the firm is an importer, whether the firm exports more than one product and whether the firm exports to more than a single destination.  $D_{dt}$  is a matrix of destination-specific variables which are essentially controls for demand conditions: the level of GNI per capita and that of imports (computed at the sector level). As to our measures of absolute and relative market access,  $(1 + TTRI_{jdt})$  and  $RPM_{jdt}$  respectively, we consider both their trade-weighted and non-trade-weighted versions.

Our benchmark estimation is a random effects version of (4), implying that the error term  $u_{jdt,i}$  is equal to  $(\xi_{jd,i} + \varepsilon_{jdt,i})$ . Such specification proves to be more efficient in estimating (4) compared to the fixed-effect specification. This clearly contradicts estimation results obtained in studies using country-level data. However, the cross-sectional dimension is much larger in firm-level studies and this clearly plays in favour of the random effect model. Moreover, from an economic point of view, it is easier to think that fundamental differences across firms are more likely to be randomly determined than fundamental differences across countries.

<sup>13</sup> The incidence of these costs has been tested empirically in Fugazza and Molina (2011) using disaggregated trade data for a large sample of developed and developing countries.

<sup>14</sup> As we observe only exporting firms, our estimates may suffer from some omitted variable bias as we cannot account for firms' selection into the export sector.



Our main results are reported in table 4 and table 5. Standard errors are clustered by firm. Results reveal that independently of the pair of market access measures included in the regression, the impact of other controls remains the same. Firms that are multi-product tend to export less per sector and destination (-76 per cent). This result could be surprising. On the other hand, firms that export to more than one destination tend to export more per sector and destination (+71 per cent). We also obtain that importing firms tend to export more per sector and destination (+59 per cent). This confirms the positive impact due to integration into international networks of either production or distribution or both. As we control for the level of imports in each sector and destination, the estimated coefficient could reflect once again the fact that international integration is associated with less volatility due to a lower degree of uncertainty in trade relationships and/or integrated firms having access to trade finance that is facilitated. As the overlap of the latter three groups of firms is non-negligible, multi-product firms end up exporting more than single-product firms.

Table 4

**Regression on the value of exports (weighted and unweighted TTRI and RPM)**

	(1)	(2)	(3)	(4)	(5)	(6)
<b>multi-product</b>	-1.434 <sup>a</sup> (0.028)	-1.434 <sup>a</sup> (0.028)	-1.434 <sup>a</sup> (0.028)	-1.435 <sup>a</sup> (0.028)	-1.434 <sup>a</sup> (0.028)	-1.434 <sup>a</sup> (0.028)
<b>multi-destination</b>	0.534 <sup>a</sup> (0.024)	0.534 <sup>a</sup> (0.024)	0.538 <sup>a</sup> (0.024)	0.535 <sup>a</sup> (0.024)	0.537 <sup>a</sup> (0.024)	0.535 <sup>a</sup> (0.024)
<b>importer</b>	0.466 <sup>a</sup> (0.023)	0.466 <sup>a</sup> (0.023)	0.466 <sup>a</sup> (0.023)	0.466 <sup>a</sup> (0.023)	0.467 <sup>a</sup> (0.023)	0.466 <sup>a</sup> (0.023)
<b>ln(gni per cap)</b>	0.132 (0.081)	0.138 <sup>c</sup> (0.081)	0.125 (0.081)	0.140 <sup>c</sup> (0.081)	0.121 (0.081)	0.134 <sup>c</sup> (0.081)
<b>ln(imports)</b>	0.156 <sup>a</sup> (0.008)	0.156 <sup>a</sup> (0.008)	0.156 <sup>a</sup> (0.008)	0.157 <sup>a</sup> (0.008)	0.155 <sup>a</sup> (0.008)	0.157 <sup>a</sup> (0.008)
<b>ln(1+TTRI<sub>w</sub>)</b>	-1.747 <sup>a</sup> (0.3)				-0.508 (0.409)	
<b>ln(1+TTRI<sub>uw</sub>)</b>		-1.711 <sup>a</sup> (0.312)				-0.944 <sup>b</sup> (0.393)
<b>RPM<sub>w</sub></b>			0.586 <sup>a</sup> (0.119)		0.519 <sup>a</sup> (0.141)	
<b>RPM<sub>uw</sub></b>				0.406 <sup>a</sup> (0.088)		0.284 <sup>a</sup> (0.1)
<b>Sector dummies</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Year dummies</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Destination dummies</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Observations</b>	94314	94314	94314	94314	94314	94314
<b>R<sup>2</sup> overall</b>	0.252	0.252	0.253	0.252	0.253	0.252

**Note:** Robust standard errors clustered by firm are in parentheses. Superscript letters a, b and c denote significance at the 1, 5 and 10 per cent level, respectively.

Table 5

**Regression on the value of exports with duration dummies (weighted and unweighted TTRI and RPM)**

	(1)	(2)	(3)	(4)	(5)	(6)
<b>multi-product</b>	-1.469 <sup>a</sup> (0.027)	-1.469 <sup>a</sup> (0.027)	-1.469 <sup>a</sup> (0.027)	-1.470 <sup>a</sup> (0.027)	-1.469 <sup>a</sup> (0.027)	-1.469 <sup>a</sup> (0.027)
<b>multi-destination</b>	0.524 <sup>a</sup> (0.024)	0.524 <sup>a</sup> (0.024)	0.527 <sup>a</sup> (0.024)	0.525 <sup>a</sup> (0.024)	0.527 <sup>a</sup> (0.024)	0.525 <sup>a</sup> (0.024)
<b>importer</b>	0.405 <sup>a</sup> (0.023)	0.405 <sup>a</sup> (0.023)	0.406 <sup>a</sup> (0.023)	0.405 <sup>a</sup> (0.023)	0.406 <sup>a</sup> (0.023)	0.405 <sup>a</sup> (0.023)
<b>ln(gni per cap)</b>	0.117 (0.08)	0.123 (0.08)	0.11 (0.08)	0.125 (0.08)	0.106 (0.08)	0.119 (0.08)
<b>ln(imports)</b>	0.151 <sup>a</sup> (0.007)	0.151 <sup>a</sup> (0.007)	0.151 <sup>a</sup> (0.007)	0.152 <sup>a</sup> (0.007)	0.150 <sup>a</sup> (0.007)	0.152 <sup>a</sup> (0.007)
<b>ln(1+TTRIw)</b>	-1.812 <sup>a</sup> (0.296)				-0.578 (0.412)	
<b>ln(1+TTRIuw)</b>		-1.769 <sup>a</sup> (0.308)				-0.971 <sup>b</sup> (0.396)
<b>RPMw</b>			0.591 <sup>a</sup> (0.121)		0.515 <sup>a</sup> (0.143)	
<b>RPMuw</b>				0.420 <sup>a</sup> (0.091)		0.295 <sup>a</sup> (0.103)
<b>Duration dummies</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Sector dummies</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Year dummies</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Destination dummies</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Observations</b>	94314	94314	94314	94314	94314	94314
<b>R<sup>2</sup> overall</b>	0.284	0.284	0.284	0.284	0.284	0.284

**Note:** Robust standard errors clustered by firm are in parentheses. Superscript letters a, b and c denote significance at the 1, 5 and 10 per cent level, respectively.

Demand conditions also seem to matter for export performance in terms of the value exported. Both the GNI per capita and imports at the sectoral level positively affect the value of exports. However, the coefficient on the former variable is not very precisely estimated. Imports at the sectoral level enter the regression with a highly significant coefficient even though their impact is contained. The estimated coefficient, which is also the elasticity of firms' exports with respect to imports in the sector of production observed in the destination country, is about 0.16. This implies that a 1 per cent increase in imports translates into a 0.16 per cent increase in a firm exports. This is an average effect and we may observe very heterogeneous responses to changes in sectoral imports across destination countries and across exporters.

When taken separately, table 4 shows that both measures of market access generate intuitively consistent results. All coefficients are significant at the 1 per cent level. Tariff barriers lower the level of firms' exports while preferential access increases it. When both measures are jointly included in our regressions as in table 5, we observe the same qualitative change as the one observed in our survival analysis. The preferential margin measures remain highly significant while the absolute market access measures lose part of their explanatory power. The non-trade-weighted version of the

TTRI variable remains significant but only at the 5 per cent level. All estimates of coefficients become smaller in absolute value. As in the case of survival, the dominant variable in terms of significance is the relative market access one although this pattern is less clear-cut. A 1 percentage point improvement of the RPM measure in its trade-weighted version would translate into a 0.52 per cent increase in firms' exports. The corresponding figure for the non-trade-weighted measure would be 0.28 per cent. Still, in the non-trade-weighted specification, a 1 percentage point decrease in TTRI would translate into a 0.94 per cent increase in firms' exports. This is to say that assuming that the 1 percentage point increase in TTRI taken at its mean translates into a 1 percentage point decrease in the RPM, the impact on trade for a country pair with such characteristics is about 1.2 per cent. Estimates are in line with their counterpart obtained at the country level in Fugazza and Nicita (2012). Rough computations indicate that improvements in effective preference margins in MERCOSUR markets have contributed on average to almost 20 per cent of changes in exports value from Peruvian firms exporting to those markets. The corresponding contribution for other destinations is negative and close to minus 2 per cent.

Again theoretical predictions in standard trade models are not clear about any predominant effect as they cannot straightforwardly generate a control variable such as our RPM variable, except under some stringent and unverified conditions.

Assuming that demand is derived from a CES utility function, the share of export of any single good  $hs$  from country  $o$  to country  $d$  is expressed as  $s_{od}^{hs} = \left( \frac{P_{od}^{hs}}{P_d^{hs}} \right)^{1-\sigma}$ , where  $P_d^{hs}$  is the CES ideal price index. Now, assuming that only two countries, country  $i$  and country  $j$ , have a preferential trade agreement, the share expression rewrites as  $s_{od}^{hs} = \left( \frac{P_o^{hs} (1 + \tau_{od}^{hs})}{P_d^{hs'} (1 + \tau_d^{hs})} \right)^{1-\sigma}$ . In the latter expression  $P_o^{hs}$  and  $P_d^{hs'}$  are free-of-trade costs versions and  $\tau_d^{hs}$  would be de facto the MFN rate applied on product  $hs$  by country  $d$ . The value of exports for product  $hs$  would thus be given by  $c_{od}^{hs} = \left( \frac{P_o^{hs} (1 + \tau_{od}^{hs})}{P_d^{hs'} (1 + \tau_d^{hs})} \right)^{1-\sigma} E_d$ , where  $E$  stands for expenditure devoted to tradables in destination country  $d$ . This clearly underlines the fact that exports are a function of relative domestic prices (costs of production) and relative transport costs including tariffs. Note that the previous derivation is valid only for this specific pair of countries.

### 4.3. SENSITIVITY ANALYSIS

This section presents some robustness checks results. The objective is essentially to test the consistency of the results obtained for our measures of market access by stretching the set of explanatory variables.

#### 4.3.1. Survival and export value

The set of dummy variables included in all of our estimations prevent us from testing the impact of variables such as the standard gravity ones. We thus rerun all specifications without destination dummies and add a set of bilateral indicators. We control for the existence of a common language (i.e. Spanish) and the bilateral distance. We also control for the existence of an RTA distinguishing between Andean countries, MERCOSUR countries and the rest of the world. And finally we include a dummy indicating whether the destination country is part of the GSTP scheme and another indicating whether it is a member of the WTO. Generally speaking, results on other control variables are not dramatically affected. Not surprisingly we lose some efficiency in our estimation. Coefficients of the bilateral controls are significant only for the GSTP dummy and to some extent the

common language dummy. Moreover the significance level is never lower than 5 per cent. In order to avoid any possible overlap in the dummy definition we included one by one the trade policy dummies. Changes are only minor.

We impose a linear form for our RPM measure essentially because it allows an easy quantitative interpretation of its coefficients. However, we re-estimate all relevant specification by including a natural log version of our RPM measure. Namely,

$$\text{LnRPM}_{jdt} = \ln \left( \frac{1 + T_{jdt}^w}{1 + TTRI_{jdt}} \right) \quad (5)$$

$$\text{where } T_{jdt}^w = \frac{\sum_{hs \subset j} x_{dt,hs} \epsilon_{d,hs} T_{dt,hs}^w}{\sum_{hs \subset j} x_{dt,hs} \epsilon_{d,hs}}, \quad j \neq k. \quad ^{15}$$

Results are similar to those obtained with the original RPM measure both in terms of sign and size of impact. This essentially reflects the fact that both measures are closely related. This is not surprising as in general for small values of  $\tau$ , we see that  $\ln(\tau) \approx \tau$ . Based on a similar motivation we also included our TTRI measure in levels. Once again results are only marginally modified and remain identical from a qualitative point of view. In addition, the impact of other explanatory variables remains essentially the same whatever version of our market access measures is taken into consideration.

Preferential access is often subject to stringent rules and regulations, such as rules of origin, which add to overall trade costs. The costs of using preferential access could outweigh the benefits if margins are small. As a consequence traders may find it more profitable to pay MFN rates. As a test, we check whether our results are robust to this issue by applying the simple rule that preferences are used only when the preferential margin is larger than 2.5 per cent (Estevadeordal et al (2008)). We recalculate the indices and then re-estimate all core specifications. Results show no substantial variation compared to the reference ones.

### 4.3.2. Export value

As in the case of survival analysis, periods are treated independently conditional on explanatory variables in estimating equation (4). At the firm level this could be seen as not fully realistic as the history of a trade relationship is likely to matter in explaining its continuation and the evolution of its intensity across time. For instance, using Colombian firms' data Eaton et al. (2008) observe that many domestic firms often start selling small quantities to a single neighbouring country. Those which survive, slightly more than half of them, do tend to expand their presence as time goes by in their current destinations. This again could be explained by profit uncertainty revealed through exporting and correlated across time. If a firm's export profit in a market is uncertain but correlated over time, entry allows the firm to find out its profit potential there in the current period and in forthcoming ones.

This feature, which we believe may be an important one, could be reflected in a dynamic specification where the present level of exports is a function of the first lag of it. However, the first lag of exports would capture much more than trade relationship history. Moreover, estimation of the resulting dynamic specification may end up in arguable choices, especially in terms of instruments. We thus opt for the inclusion of duration dummies in the wake of our survival analysis. Results are reported in table 5.

---

<sup>15</sup> The RPM, which is equal to  $(T_{jdt}^w - TTRI_{jdt})$ , is comparable to  $\ln \left( \frac{1 + T_{jdt}^w}{1 + TTRI_{jdt}} \right)$  when  $T$  and  $TTRI$  are small.

The first column shows the results obtained with the trade-weighted version of the market access measures. The second column refers to the non-trade-weighted version of the market access measures. Results are in line with those obtained previously. The noteworthy characteristic is the gain in significance of coefficients of the TTRI variables in both specifications. As to coefficients of duration dummies, they are all positive (the reference is duration equal to one), significant at least at the 5 per cent level and slightly increasing with duration. This is consistent with the existence of profit uncertainty which is correlated across time as mentioned previously. However, this result can also be interpreted as evidence of the positive influence of tenure in a specific trade relationship on exports in that specific trade relationship. A possible explanation is that trust among trade partners increases with the aging of the relationship itself. These two explanations are not mutually exclusive.

## 5. CONCLUDING REMARKS

The paper provides an empirical assessment of the impact of changes in tariff-wise market access conditions for Peru using firm-level customs data over the period 2002-2008. We use two indicators of tariff-wise market access. One is the average tariff level corrected for the responsiveness of foreign demand that Peruvian firms face in their destination market in their sector of activity. This indicator reflects the absolute conditions of market access. The other indicator reflects relative market access conditions. It is the average, again corrected for the responsiveness of foreign demand, between the average tariff of foreign competitors and the tariff faced by Peruvian firms in a given destination country and sector. The latter indicator closely measures the effective preference margin, which could be either positive or negative, enjoyed by Peruvian firms.

We consider both survival and export performance as dependent variables. Based on probit estimations with random effects, we find that better market access conditions increase the probability of survival of a trade relationship. However, the impact of our measure of preference margin appears to dominate that of our absolute measure of market access. Although intuitively consistent, precise insights from theoretical analysis are missing and existing ones may even be misleading. Other interesting features have emerged. For instance, diversification both in terms of destination country and products exported positively affects survival rates. Our results also show that firms that are part of some international production network, namely those which are both importing and exporting, enjoy lower hazard rates. Similar results are found in our export performance analysis. Although less marked, the predominance in influencing export performance of relative market access conditions is also observed. About 20 per cent of the increase in exports to MERCOSUR markets observed during the 2002-2008 period is due to improvements in the effective preference margin perceived by Peruvian firms. Diversification and integration into international production chains also improved export performance.

Complexity in exporting to some preferential trade partner market is often presented as the result of overlapping complicated rules of origin and administrative procedures to fulfil the latter. But complexity is also synonymous with opacity in effective tariff treatment. Taking the case of Peruvian firms facing a phase of trade integration into MERCOSUR markets, our results suggest that a fundamental component of trade creation in a trade agreement is the effective preference margin that firms in the various signatory countries would eventually enjoy. From the point of view of policymakers, this could be easily computed and should be at the core of their approach to negotiations. Other benefits could obviously be retrieved from a trade agreement, especially if it goes beyond strictly speaking market access matters. However, if trade agreements are used as a trade promotion instrument, this could only be effective if the advantage provided by preferential market access is truly effective. This is to say that with the ongoing multiplication of trade agreements of all kinds and the inherent risk of preferences erosion, the trade promotion aspect of them could never remain the core element.

## REFERENCES

- Albornoz F, Calvo-Pardo H, Corcos G and Ornelas E (2012). Sequential exporting, *Journal of International Economics*. 88(1): 17-31 .
- Alvarez R and López R A (2008). Entry and exit in international markets: Evidence from Chilean data. *Review of International Economics*. 16(4):692–708.
- Anderson JE and Neary JP (1994). The trade restrictiveness of the multi-fibre arrangement. *World Bank Economic Review*. 8(2):171–189.
- Anderson JE and Neary JP (2003). The mercantilist index of trade policy. *International Economic Review*. 44(2):627–649.
- Bernard AB and Jensen JB (2002). The deaths of manufacturing plants. NBER Working Papers 9026. National Bureau of Economic Research, Inc.
- Bernard AB and Jensen JB (2007). Firm structure, multinationals, and manufacturing plant deaths. *The Review of Economics and Statistics*. 89(2):193–204.
- Bernard AB, Jensen JB and Schott PK (2006). Trade costs, firms and productivity. *Journal of Monetary Economics*. 53(5):917–937.
- Besedes T and Blyde J (2010). What drives export survival in Latin America? An analysis of export duration in Latin America. Mimeo.
- Broda C and Weinstein DE (2006). Globalization and the gains from variety. *The Quarterly Journal of Economics*. 121(2):541–585.
- Cadot O, Iacovone L, Pierola D and Rauch F (2011). Success and failure of African exporters. Policy Research Working Paper Series 5657. World Bank.
- Carrere C, de Melo JA and Tumurchudur B (2010). Disentangling market access effects of preferential trading arrangements with an application for ASEAN members under an ASEAN-EU FTA. *The World Economy*. 33(1):42–59.
- Chauffour J-P and Malouche M (2011). Trade finance during the great trade collapse. Washington, D.C.: World Bank Group.
- Cox DR (1972). Regression models and life-tables. *Journal of the Royal Statistical Society. Series B (Methodological)*. 34(2):187–220.
- Eaton J, Eslava M, Kugler M and Tybout J (2007). Export dynamics in Colombia: Firm-level evidence. Borradores de Economía No. 3957: Banco de la República.
- Eaton J, Eslava M, Kugler M and Tybout J (2008). Export dynamics in Colombia: Transactions level evidence. Borradores de Economía No. 3957: Banco de la República.
- Eaton J, Kortum S and Kramarz F (2004). Dissecting trade: Firms, industries and export destinations. *American Economic Review*. 94(2):150–154.
- Feenstra RC (1995). Exact hedonic price indexes. *The Review of Economics and Statistics*. 77(4):634–653.
- Freund C and Ornelas E (2010). Regional trade agreements. *Annual Review of Economics*. 2(1):139–166.
- Freund C and Pierola MD (2010). Export entrepreneurs: Evidence from Peru. Policy Research Working Paper Series 5407. World Bank.

- Fugazza M and Molina AC (2011). On the determinants of exports survival. Policy Issues in International Trade and Commodities, Study Series No. 46. UNCTAD.
- Fugazza M and Nicita A (2013). Direct and relative effects of preferential market access. *Journal of International Economics*. 89(2):357-368. .
- Hess W and Persson M (2011). Exploring the duration of EU imports. *Review of World Economics* (Weltwirtschaftliches Archiv). 147(4):665–692.
- Hess W and Persson M (2011). The duration of trade revisited. *Empirical Economics*. 1–25.
- Hoekman B and Nicita A (2011). Trade policy, trade costs and developing country trade. *World Development*. 39(12):2069–2079.
- Iacovone L and Javorcik B (2010). Multi-product exporters: Product churning, uncertainty and export discoveries. *Economic Journal*. 120(544):481–499.
- Impullitti G, Irarrazabal AA and Opromolla LD (2011). A theory of entry into and exit from export markets. *Journal of International Economics*, 90(1):75-90.
- Low P, Piermartini R and Richering J (2009). Multilateral solutions to the erosion of non-reciprocal preferences. In: Hoekman B, Martin W, Primo Braga C. *Trade Preference Erosion: Measurement and Policy Response*.
- Martincus CV and Carballo J (2009). Survival of new exporters in developing countries: Does it matter how they diversify? Inter-American Development Bank Working Paper 140.
- Manova BK (2011). Credit Constraints, Heterogeneous Firms and International Trade. NBER Working Papers N9026.
- Morales E, Sheu G and Zahler A (2011). Gravity and extended gravity: Estimating a structural model of export entry. MPRA Paper No. 30311.
- Melitz MJ (2003). The impact of trade on intra-industry reallocations and aggregate industry productivity. *Econometrica*. 71(6):1695–1725.
- Nguyen D (2012). Demand uncertainty: Exporting delays and exporting failures. *Journal of International Economics*. 86(2):336–344.
- Rauch JE (1999). Networks versus markets in international trade. *Journal of International Economics*. 48(1):7–35.
- Redding S and Venables A (2004). Geography and export performance: External market access and internal supply capacity. In: Baldwin R and Winters A, eds. *Challenges to Globalization: Analysing the Economics*. CEPR-NBER Conference Volume: NBER and Chicago University Press.
- Sueyoshi GT (1995). A class of binary response models for grouped duration data. *Journal of Applied Econometrics*. 10(4):411–431.
- Tovar J and Martínez LR (2011). Diversification, networks and the survival of exporting firms. CEDE Working Papers 8.
- Volpe Martincus C and Carballo J (2009). Survival of new exporters in developing countries: Does it matter how they diversify? IADB Working Paper 140.
- World Development Indicators (2010). World databank. The World Bank Group.





## APPENDIX

Table A1

Survival of exports with average marginal effects (weighted TTRI and RPM)

<b>ln(entry exp value)</b>	-0.030 <sup>a</sup> (0.001)	-0.028 <sup>a</sup> (0.001)	-0.030 <sup>a</sup> (0.001)	-0.028 <sup>a</sup> (0.001)
<b>multi-product</b>	-0.162 <sup>a</sup> (0.006)	-0.157 <sup>a</sup> (0.006)	-0.162 <sup>a</sup> (0.006)	-0.157 <sup>a</sup> (0.006)
<b>multi-destination</b>	-0.087 <sup>a</sup> (0.005)	-0.082 <sup>a</sup> (0.004)	-0.088 <sup>a</sup> (0.005)	-0.083 <sup>a</sup> (0.004)
<b>importer</b>	0.011 <sup>a</sup> (0.004)	0.011 <sup>a</sup> (0.004)	0.010 <sup>b</sup> (0.004)	0.011 <sup>a</sup> (0.004)
<b>multi-spell</b>	-0.092 <sup>a</sup> (0.007)	-0.076 <sup>a</sup> (0.007)	-0.092 <sup>a</sup> (0.007)	-0.076 <sup>a</sup> (0.007)
<b>ln(gni per cap)</b>	-0.042 <sup>b</sup> (0.019)	-0.041 <sup>b</sup> (0.018)	-0.041 <sup>b</sup> (0.019)	-0.040 <sup>b</sup> (0.018)
<b>ln(imports)</b>	-0.010 <sup>a</sup> (0.001)	(0.009) <sup>a</sup> (0.001)	-0.010 <sup>a</sup> (0.001)	(0.009) <sup>a</sup> (0.001)
<b>ln(1+TTRlw)</b>	0.214 <sup>a</sup> (0.057)	0.199 <sup>a</sup> (0.054)		
<b>RPMw</b>			-0.064 <sup>a</sup> (0.015)	-0.060 <sup>a</sup> (0.013)
<b>Duration dummies</b>	Yes	Yes	Yes	Yes
<b>Sector dummies</b>	Yes	Yes	Yes	Yes
<b>Year dummies</b>	Yes	Yes	Yes	Yes
<b>Destination dummies</b>	Yes	Yes	Yes	Yes

Note: Superscript letters a, b and c denote significance at the 1, 5 and 10 per cent level, respectively.

Table A2

Survival of exports with average marginal effects (unweighted TTRI and RPM)

<b>ln(entry exp value)</b>	-0.030 <sup>a</sup> (0.001)	-0.028 <sup>a</sup> (0.001)	-0.030 <sup>a</sup> (0.001)	-0.028 <sup>a</sup> (0.001)
<b>multi-product</b>	-0.162 <sup>a</sup> (0.006)	-0.157 <sup>a</sup> (0.006)	-0.162 <sup>a</sup> (0.006)	-0.157 <sup>a</sup> (0.006)
<b>multi-destination</b>	-0.087 <sup>a</sup> (0.005)	-0.082 <sup>a</sup> (0.004)	-0.088 <sup>a</sup> (0.005)	-0.083 <sup>a</sup> (0.004)
<b>importer</b>	0.011 <sup>a</sup> (0.004)	0.011 <sup>a</sup> (0.004)	0.011 <sup>a</sup> (0.004)	0.011 <sup>a</sup> (0.004)
<b>multi-spell</b>	-0.092 <sup>a</sup> (0.007)	-0.076 <sup>a</sup> (0.007)	-0.092 <sup>a</sup> (0.007)	-0.076 <sup>a</sup> (0.007)
<b>ln(gni per cap)</b>	-0.042 <sup>b</sup> (0.019)	-0.042 <sup>b</sup> (0.018)	-0.042 <sup>b</sup> (0.019)	-0.041 <sup>b</sup> (0.018)
<b>ln(imports)</b>	-0.010 <sup>a</sup> (0.001)	(0.009) <sup>a</sup> (0.001)	-0.010 <sup>a</sup> (0.001)	(0.009) <sup>a</sup> (0.001)
<b>ln(1+TTRluw)</b>	0.208 <sup>a</sup> (0.059)	0.198 <sup>a</sup> (0.055)		
<b>RPMuw</b>			-0.054 <sup>a</sup> (0.014)	-0.052 <sup>a</sup> (0.013)
<b>Duration dummies</b>	Yes	Yes	Yes	Yes
<b>Sector dummies</b>	Yes	Yes	Yes	Yes
<b>Year dummies</b>	Yes	Yes	Yes	Yes
<b>Destination dummies</b>	Yes	Yes	Yes	Yes

Note: Superscript letters a, b and c denote significance at the 1, 5 and 10 per cent level, respectively.

Table A3

## Survival of exports with average marginal effects (weighted and unweighted TTRI and RPM)

<b>ln(entry exp value)</b>	-0.030 <sup>a</sup> (0.001)	-0.028 <sup>a</sup> (0.001)	-0.030 <sup>a</sup> (0.001)	-0.028 <sup>a</sup> (0.001)
<b>Multi-Zproduct</b>	-0.162 <sup>a</sup> (0.006)	-0.157 <sup>a</sup> (0.006)	-0.162 <sup>a</sup> (0.006)	-0.157 <sup>a</sup> (0.006)
<b>multi-destination</b>	-0.088 <sup>a</sup> (0.005)	-0.083 <sup>a</sup> (0.004)	-0.088 <sup>a</sup> (0.005)	-0.083 <sup>a</sup> (0.004)
<b>importer</b>	0.010 <sup>b</sup> (0.004)	0.011 <sup>a</sup> (0.004)	0.010 <sup>a</sup> (0.004)	0.011 <sup>a</sup> (0.004)
<b>multi-spell</b>	-0.092 <sup>a</sup> (0.007)	-0.076 <sup>a</sup> (0.007)	-0.092 <sup>a</sup> (0.007)	-0.076 <sup>a</sup> (0.007)
<b>ln(gni per cap)</b>	-0.040 <sup>b</sup> (0.019)	-0.040 <sup>b</sup> (0.018)	-0.042 <sup>b</sup> (0.019)	-0.041 <sup>b</sup> (0.018)
<b>ln(imports)</b>	-0.010 <sup>a</sup> (0.001)	(0.009) <sup>a</sup> (0.001)	-0.010 <sup>a</sup> (0.001)	(0.009) <sup>a</sup> (0.001)
<b>ln(1+TTRI<sub>w</sub>)</b>	0.09 (0.073)	0.071 (0.069)		
<b>RPM<sub>w</sub></b>	-0.050 <sup>a</sup> (0.018)	-0.049 <sup>a</sup> (0.017)		
<b>ln(1+TTRI<sub>uw</sub>)</b>			0.101 (0.078)	0.088 (0.074)
<b>RPM<sub>uw</sub></b>			-0.038 <sup>b</sup> (0.019)	-0.038 <sup>b</sup> (0.017)
<b>Duration dummies</b>	Yes	Yes	Yes	Yes
<b>Sector dummies</b>	Yes	Yes	Yes	Yes
<b>Year dummies</b>	Yes	Yes	Yes	Yes
<b>Destination dummies</b>	Yes	Yes	Yes	Yes

**Note:** Superscript letters a, b and c denote significance at the 1, 5 and 10 per cent level, respectively.

**POLICY ISSUES IN INTERNATIONAL TRADE  
AND COMMODITIES**

- No. 1 Erich Supper, **Is there effectively a level playing field for developing country exports?**, 2001, 138 p. Sales No. E.00.II.D.22.
- No. 2 Arvind Panagariya, **E-commerce, WTO and developing countries**, 2000, 24 p. Sales No. E.00.II.D.23.
- No. 3 Joseph Francois, **Assessing the results of general equilibrium studies of multilateral trade negotiations**, 2000, 26 p. Sales No. E.00.II.D.24.
- No. 4 John Whalley, **What can the developing countries infer from the Uruguay Round models for future negotiations?**, 2000, 29 p. Sales No. E.00.II.D.25.
- No. 5 Susan Teltscher, **Tariffs, taxes and electronic commerce: Revenue implications for developing countries**, 2000, 57 p. Sales No. E.00.II.D.36.
- No. 6 Bijit Bora, Peter J. Lloyd, Mari Pangestu, **Industrial policy and the WTO**, 2000, 47 p. Sales No. E.00.II.D.26.
- No. 7 Emilio J. Medina-Smith, **Is the export-led growth hypothesis valid for developing countries? A case study of Costa Rica**, 2001, 49 p. Sales No. E.01.II.D.8.
- No. 8 Christopher Findlay, **Service sector reform and development strategies: Issues and research priorities**, 2001, 24 p. Sales No. E.01.II.D.7.
- No. 9 Inge Nora Neufeld, **Anti-dumping and countervailing procedures – Use or abuse? Implications for developing countries**, 2001, 33 p. Sales No. E.01.II.D.6.
- No. 10 Robert Scollay, **Regional trade agreements and developing countries: The case of the Pacific Islands' proposed free trade agreement**, 2001, 45 p. Sales No. E.01.II.D.16.
- No. 11 Robert Scollay and John Gilbert, **An integrated approach to agricultural trade and development issues: Exploring the welfare and distribution issues**, 2001, 43 p. Sales No. E.01.II.D.15.
- No. 12 Marc Bacchetta and Bijit Bora, **Post-Uruguay Round market access barriers for industrial products**, 2001, 50 p. Sales No. E.01.II.D.23.
- No. 13 Bijit Bora and Inge Nora Neufeld, **Tariffs and the East Asian financial crisis**, 2001, 30 p. Sales No. E.01.II.D.27.
- No. 14 Bijit Bora, Lucian Cernat, Alessandro Turrini, **Duty and quota-free access for LDCs: Further evidence from CGE modelling**, 2002, 130 p. Sales No. E.01.II.D.22.

- No. 15 Bijit Bora, John Gilbert, Robert Scollay, **Assessing regional trading arrangements in the Asia-Pacific**, 2001, 29 p. Sales No. E.01.II.D.21.
- No. 16 Lucian Cernat, **Assessing regional trade arrangements: Are South-South RTAs more trade diverting?**, 2001, 24 p. Sales No. E.01.II.D.32.
- No. 17 Bijit Bora, **Trade related investment measures and the WTO: 1995-2001**, 2002.
- No. 18 Bijit Bora, Aki Kuwahara, Sam Laird, **Quantification of non-tariff measures**, 2002, 42 p. Sales No. E.02.II.D.8.
- No. 19 Greg McGuire, **Trade in services – Market access opportunities and the benefits of liberalization for developing economies**, 2002, 45 p. Sales No. E.02.II.D.9.
- No. 20 Alessandro Turrini, **International trade and labour market performance: Major findings and open questions**, 2002, 30 p. Sales No. E.02.II.D.10.
- No. 21 Lucian Cernat, **Assessing South-South regional integration: Same issues, many metrics**, 2003, 32 p. Sales No. E.02.II.D.11.
- No. 22 Kym Anderson, **Agriculture, trade reform and poverty reduction: Implications for sub-Saharan Africa**, 2004, 30 p. Sales No. E.04.II.D.5.
- No. 23 Ralf Peters and David Vanzetti, **Shifting sands: Searching for a compromise in the WTO negotiations on agriculture**, 2004, 46 p. Sales No. E.04.II.D.4.
- No. 24 Ralf Peters and David Vanzetti, **User manual and handbook on Agricultural Trade Policy Simulation Model (ATPSM)**, 2004, 45 p. Sales No. E.04.II.D.3.
- No. 25 Khalil Rahman, **Crawling out of snake pit: Special and differential treatment and post-Cancun imperatives**, 2004.
- No. 26 Marco Fugazza, **Export performance and its determinants: Supply and demand constraints**, 2004, 57 p. Sales No. E.04.II.D.20.
- No. 27 Luis Abugattas, **Swimming in the spaghetti bowl: Challenges for developing countries under the “New Regionalism”**, 2004, 30 p. Sales No. E.04.II.D.38.
- No. 28 David Vanzetti, Greg McGuire and Prabowo, **Trade policy at the crossroads – The Indonesian story**, 2005, 40 p. Sales No. E.04.II.D.40.
- No. 29 Simonetta Zarrilli, **International trade in GMOs and GM products: National and multilateral legal frameworks**, 2005, 57 p. Sales No. E.04.II.D.41.
- No. 30 Sam Laird, David Vanzetti and Santiago Fernández de Córdoba, **Smoke and mirrors: Making sense of the WTO industrial tariff negotiations**, 2006, Sales No. E.05.II.D.16.
- No. 31 David Vanzetti, Santiago Fernandez de Córdoba and Veronica Chau, **Banana split: How EU policies divide global producers**, 2005, 27 p. Sales No. E.05.II.D.17.
- No. 32 Ralf Peters, **Roadblock to reform: The persistence of agricultural export subsidies**, 2006, 43 p. Sales No. E.05.II.D.18.

- No. 33 Marco Fugazza and David Vanzetti, **A South-South survival strategy: The potential for trade among developing countries**, 2006, 25 p.
- No. 34 Andrew Cornford, **The global implementation of Basel II: Prospects and outstanding problems**, 2006, 30 p.
- No. 35 Lakshmi Puri, **IBSA: An emerging trinity in the new geography of international trade**, 2007, 50 p.
- No. 36 Craig VanGrasstek, **The challenges of trade policymaking: Analysis, communication and representation**, 2008, 45 p.
- No. 37 Sudip Ranjan Basu, **A new way to link development to institutions, policies and geography**, 2008, 50 p.
- No. 38 Marco Fugazza and Jean-Christophe Maur, **Non-tariff barriers in computable general equilibrium modelling**, 2008, 25 p.
- No. 39 Alberto Portugal-Perez, **The costs of rules of origin in apparel: African preferential exports to the United States and the European Union**, 2008, 35 p.
- No. 40 Bailey Klinger, **Is South-South trade a testing ground for structural transformation?**, 2009, 30 p.
- No. 41 Sudip Ranjan Basu, Victor Ognitvsev and Miho Shirotori, **Building trade-relating institutions and WTO accession**, 2009, 50 p.
- No. 42 Sudip Ranjan Basu and Monica Das, **Institution and development revisited: A nonparametric approach**, 2010, 26 p.
- No. 43 Marco Fugazza and Norbert Fiess, **Trade liberalization and informality: New stylized facts**, 2010, 45 p.
- No. 44 Miho Shirotori, Bolormaa Tumurchudur and Olivier Cadot, **Revealed factor intensity indices at the product level**, 2010, 55 p.
- No. 45 Marco Fugazza and Patrick Conway, **The impact of removal of ATC Quotas on international trade in textiles and apparel**, 2010, 50 p.
- No. 46 Marco Fugazza and Ana Cristina Molina, **On the determinants of exports survival**, 2011, 40 p.
- No. 47 Alessandro Nicita, **Measuring the relative strength of preferential market access**, 2011, 30 p.
- No. 48 Sudip Ranjan Basu and Monica Das, **Export structure and economic performance in developing countries: Evidence from nonparametric methodology**, 2011, 58 p.
- No. 49 Alessandro Nicita and Bolormaa Tumurchudur-Klok, **New and traditional trade flows and the economic crisis**, 2011, 22 p.
- No. 50 Marco Fugazza and Alessandro Nicita, **On the importance of market access for trade**, 2011, 35 p.

- No. 51 Marco Fugazza and Frédéric Robert-Nicoud, **The ‘Emulator Effect’ of the Uruguay round on United States regionalism**, 2011, 45 p.
- No. 52 Sudip Ranjan Basu, Hiroaki Kuwahara and Fabien Dumesnil, **Evolution of non-tariff measures: Emerging cases from selected developing countries**, 2012, 38p.
- No. 53 Alessandro Nicita and Julien Gourdon, **A preliminary analysis on newly collected data on non-tariff measures**, 2013, 31 p.
- No. 54 Alessandro Nicita, Miho Shirotori and Bolormaa Tumurchudur Klok, **Survival analysis of the exports of least developed countries: The role of comparative advantage**, 2013, 25 p.
- No. 55 Alessandro Nicita, Victor Ognivtsev and Miho Shirotori, **Global supply chains: Trade and Economic policies for developing countries**, 2013, 33 p.
- No. 56 Alessandro Nicita, **Exchange rates, international trade and trade policies**, 2013, 29 p.
- No. 57 Marco Fugazza, **The economics behind non-tariff measures: Theoretical insights and empirical evidence**, 2013, 33 p.
- No. 58 Marco Fugazza and Alain McLaren, **Market access, export performance and survival: Evidence from Peruvian firms**, 2013, 39 p.

Copies of UNCTAD study series on *Policy Issues in International Trade and Commodities* may be obtained from the Publications Assistant, Trade Analysis Branch (TAB), Division on International Trade in Goods and Services and Commodities (DITC), United Nations Conference on Trade and Development, Palais des Nations, CH-1211 Geneva 10, Switzerland (Tel: +41 22 917 4644). These studies are accessible on the website at <http://unctad.org/tab>.

# QUESTIONNAIRE

UNCTAD Study series on

## POLICY ISSUES IN INTERNATIONAL TRADE AND COMMODITIES

(Study series no. 58: *Market access, export performance and survival:  
Evidence from Peruvian firms*)

### *Readership Survey*

Since 1999, the Trade Analysis Branch of the Division on International Trade in Goods and Services, and Commodities of UNCTAD has been carrying out policy-oriented analytical work aimed at improving the understanding of current and emerging issues in international trade and development. In order to improve the quality of the work of the Branch, it would be useful to receive the views of readers on this and other similar publications. It would therefore be greatly appreciated if you could complete the following questionnaire and return to:

*Trade Analysis Branch, DITC  
Rm. E-8065  
United Nations Conference on Trade and Development  
Palais des Nations, CH-1211 Geneva 10, Switzerland  
(Fax: +41 22 917 0044; E-mail: tab@unctad.org)*

1. Name and address of respondent (optional):

---

---

---

---

2. Which of the following describes your area of work?

Government	<input type="checkbox"/>	Public enterprise	<input type="checkbox"/>
Private enterprise institution	<input type="checkbox"/>	Academic or research	<input type="checkbox"/>
International organization	<input type="checkbox"/>	Media	<input type="checkbox"/>
Not-for-profit organization	<input type="checkbox"/>	Other (specify) _____	

3. In which country do you work? \_\_\_\_\_

4. Did you find this publication  Very useful  Of some use  Little use  
to your work?

5. What is your assessment of the contents of this publication?  
 Excellent  Good  Adequate  Poor

6. Other comments:

---

---

---

---