Do Trade Costs Affect the Extensive Margin of Trade?

Lessons from U.S. Fresh Fruits and Vegetables Imports

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Abstract

Recent empirical studies have estimated the trade flow effect of membership in the World Trade Organization (WTO) and its predecessor, the General Agreement on Tariffs and Trade (GATT). One important, although largely untested, conclusion from this literature is that the GATT/WTO works well if we ignore trade in agriculture - one of the institution's seemingly apparent failures. This article investigates this conclusion using a large panel of agricultural and non-agricultural trade flows. The results are impressive: the multilateral institution has delivered significant positive effects on members' agricultural trade despite its sensitive nature and the reluctance of members to undertake serious reform. These findings are robust to various slices of the data and recent advances in the specification and estimation of the gravity equation to account for sample selection issues and the extensive margin of trade.

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1.   Introduction

Recent advances in the theoretical and empirical trade literature emphasize the role of firm-level productivity differences to explain bilateral trade patterns along the intensive and extensive margins (Melitz 2003; Helpman, Melitz and Rubinstein 2008; Bernard, Jensen and Schott 2009). In many of these models, the extensive margin, defined as either the creation of new trading relationships (extensive-partner margin) and/or new product varieties (extensive-product margin), plays an important role. Hummels and Klenow (2005) developed an across exporter analogue to Feenstra's (1994) exact price index to examine cross-country differences in exported varieties. They find that the extensive-product margin accounts for 60% of the trade of larger economies. Evenett and Venables (2002) suggest that the extensive margin accounts for the vast majority of the growth of developing country exports. The authors looked at 23 developing country exports over 28 years and find that newly traded products account for ten percent of their export growth. Broda and Weinstein (2006) utilize Feenstra's (1994) framework and find that 30 percent of U.S. import growth over the period 1972-2001 was in new varieties that previously did not exist.

While most previous studies have characterized the magnitude of the extensive margin for trade growth, few studies have attempted to explain what factors influence the decision to export vis-à-vis the extensive margin (Liapis 2009; Chen and Feenstra 2008). Debaere and Mostashari (2010) investigate whether tariff reductions affect the range of goods exported using detailed U.S. imports of industrial products. Using a Probit model with country and goods fixed effects, their results indicate that tariff reductions have a small, but significant effect on new goods traded. They find that tariff reductions explain five percent of the increasing extensive margin over the period 1989-1999.

In this paper, we extend Debaere and Mostashari's (2010) framework by focusing on agri-food products and incorporate tariff changes as well as discrete changes in detailed non-tariff

measures as a key factor affecting the range of goods imported into the U.S. We use a unique and comprehensive database on tariffs and Sanitary and Phytosanitary (SPS) measures to identify the role of trade costs in explaining changes in the probability of exporting new varieties. Initially, we focus on U.S. fresh fruit and vegetable (FFV) imports, which have witnessed tremendous growth over the last 20 years (14.4% mean average annual growth rate). Furthermore, fruits and vegetables are often at the forefront of non-tariff disputes over the protection of plant and human health (Peterson, et al 2013). We examine the effect of these restrictions on two channels of US import growth. First we consider whether and to what extent changes in trade costs affect the probability of exporting new goods. Second we consider the effect of trade costs changes on the probability of trading existing products. Finally, we discuss the impact of changes in trade costs on disappearing goods. It should be noted that this version of the paper only considers changes in tariffs since these are more easily measured. Subsequent versions of this paper will incorporate SPS measures for FFVs and agri-food trade more generally.

In the current study we define the extensive margin as follows. First, we develop a benchmark year, defined as 1996 in our sample. Next we define a counterfactual year, which is 2008 in our study. If goods are differentiated by country of origin, then the extensive-product margin is defined as either new goods or new partners that export to the U.S. in 2008, but not in 1996. For instance, if Argentina exports Lemons for the first time in the U.S. in 2003, and continues to export Lemons through 2008 (the counterfactual period), we code this as new goods traded, even though there may be other exporters shipping Lemons in 1996 and 2008. Conversely, the intensive margin is defined as countries-and-products that are shipped in 1996 and 2008. Disappearing goods are defined as country-and-product combinations that were initially exported in 1996 and ceased to be exported in 2008.

2.   Background

The WTO notifications indicate that well over 690 complaints related to phytosanitary measures have been logged from 1996 to 2012 and over 18 percent of these target fruits and vegetables (WTO, The Integrated Trade Intelligence Portal (I-TIP)). DiMartio (2012) note that several factors such as geography and phytosanitary treatments have played an important role in international trade patterns for FFV. Geography is an important factor since FFVs are perishable and production is seasonal and counter-seasonal (Grant, Lambert and Foster 2010). Peterson. *et al* (2013) determine that phytosanitary treatments have a negative effect on trade, but this effect diminishes rapidly when exporters accumulate experience and vanishes if exporters attain a certain threshold. Therefore by investigating these SPS measures, we determine to what extent this restriction can change the probability of exporting newly goods traded and learn more about how this potential obstacle affects US trade along the extensive, intensive, and disappearing goods' margins.

Consumer demand for FFVs has increased due to dietary considerations, year-round access to FFVs, and demand for new varieties of these healthy products. The U.S. has become a large net-importer of FFVs, which indirectly increase the probability of importing newly products from abroad. Nzaku *et al*. (2010) note that the demand of new variety of FFV and tropical fruits increased due to growing demand of healthy diets and growing ethnic diversity in the U.S. Wainio and Krissoff (2005) also emphasize that growth in the demand for tropical and exotic fruits, high quality products that compete directly with U.S. production, and accessibility to year-round supplies have influenced the role of trade policies and market access conditions. Finally, Huang (2007) suggests rising global trade agreements as a key to growth in the volume (intensive margin) and variety (extensive margin) of U.S. FFV imports.

Krissoff and Wainio (2007) note that Canada and Mexico (NAFTA members) have the highest place among the U.S. partners of FFV trade due to geographic proximity and tariffs that are low or zero on many products. While though the global average tariff is more than 50 percent for FFVs, the U.S. applies a much lower tariff compared to its partners. Reductions of tariffs and non-tariff measures are a result of continued efforts of the World Trade Origination negotiations and the proliferation of regional and bilateral free trade agreements. One of the achievements of Uruguay Round Agreement of Agriculture (AOA) was to bind all agricultural tariffs and to negotiate the tariff reductions in agricultural products (Krissoff and Wainio, 2007). According to Broda and Weinstein (2006) consumers are wiling to pay 2.6 percent of their income to access the new variety of goods in 2001 compared to 1972. However, we know much less about how tariff liberalization through the WTO and regional free trade agreements affects the selection into exporting in agri-food trade. Therefore, in this study, we examine the effects of tariff changes on the probability of exporting goods only the intensive and extensive margins.

U.S. Fruit and Vegetable Trade

Imports of fresh fruits and vegetables have significantly grown during the past two decades. The growth in fresh fruits increased at annual rate of seven percent from $1.5 billion in 1989 to 2.5 billion in 1996, and increased to $6.8 billion in 2010. Fresh vegetables imports have increased at annual rate of 8.3 percent from $801 million in 1989 to $1.7 billion in 1996, and $5.1 billion in 2010 (U.S. International Trade Commission). Figure 1 compares US imports in 1996 and 2008 for existing goods, newly traded goods and disappearing products. Total US imports in 2008 reached $10.2 billion compared to just $4.2 billion in 1996. Interestingly however, the increase in US FFV imports appears to be dominated by trade along the intensive margin - increasing imports of existing products that were also traded in 1996. At $10.1 billion, the share of existing products in total US

imports is 98 percent. Only $184 million (or 2%) of the total value of US imports in 2008 came from newly traded FFV products and 22 million products were traded in 1996 but not traded in 2008. This suggests that the extensive-product margin may be a small factor in the growth of US fresh fruit and vegetable imports. However, if the 183 million in newly traded goods is concentrated on a couple of suppliers then the extensive-product margin may be relatively important.

2.1.   U.S. trade liberalization

Tariff reduction can be ascribed to several bilateral Free Trade Agreements (FTAs) or being a member of World Trade Organization (WTO). Johnson (2008) indicates that the United States has changed from a net exporter in the early 1970s to a net importer of FFVs more recently. Factors driving this transformation include a relatively open domestic import regime and significant reductions in average import tariffs. Free Trade Agreements allow imports to the U.S. to enter duty-free or at tariffs below the Most Favored Nation rates (Johnson, 2008). After establishing the North American Free Trade Agreement (NAFTA) in 1994 between Mexico, Canada and the U.S., the cost of imports from Mexico and Canada have significantly reduced or eliminated most tariffs on U.S. fresh fruit and vegetable imports (Krissoff and Wainio, 2007). In industrial products, Hillberry and McDaniel (2002) found that US trade with NAFTA partners increased by 78 percent since 1993 due to both quality and variety upgrading effects, particularly with respect to US trade with Mexico. They argue that trade in new varieties (extensive margin) should be considered when estimating the effects of FTAs since these agreements often lead to changes in the extensive margin of trade.

Important examples of tariff liberalization in our sample include grapes from Nicaragua, Mushrooms and Truffles from EI Salvador, Avocados from Colombia, Oranges from Peru, Cherries from China and Pineapples from Peru. These products experienced the highest absolute reduction in tariffs relative to the benchmark year of 1996. Moreover, some of these products experienced

relatively high growth rates at the extensive margin. Peruvian Oranges comprises 8.2 percent of the share of newly traded goods. Chinese Cherries accounts for a 7.4 percent share of newly traded goods, whereas Mexico, Chile and Canada simultaneously account for the largest source of U.S. imports and share of intensively traded products, according to our data. For example, Mexico is one of the largest exporters of fresh fruits and vegetable to the U.S., shipping 50 products in total with only six percent of these (three goods) being new products.

Table 1 highlights some important trends in the composition of US imports of FFVs. Columns 1 and 2 following the country labels reports the total value of bilateral imports from each partner and the number of products traded, respectively. Columns 3, 4 and 5 report the share of newly traded goods, disappearing goods (imported in 1996 but disappearing in 2008) and continuously traded goods between 1996 and 2008. While Mexico, Canada and Chile are our largest trading partners, they have been omitted from the table because almost all of their trade is along the intensive margin. Colombia has the highest share of newly goods traded in our study period at 95 percent of the value of its 1996 trade level. Columbia ships 22 FFV products in total and 18 percent of these are classified as newly goods traded. Interestingly, Columbia also had the highest turnover rate. Nearly 32 percent of its goods exported in 1996 were not exported in 2008, even when we account for changes in the classification of product codes in the Harmonized System.

Figure 2 plots the share of newly traded FFVs, defined as the fraction of new goods traded in 2008 divided by the total number goods traded for each exporting country, versus the average changes in tariffs between 1996 and 2008, for each country. The average change in the tariff is computed by finding the natural logarithm of the minimum of the three simple average applied tariffs for 2008 from the World Integrated Trade Solutions (WITS) database consisting of a reported MFN rate, a bound rate, and a preferential tariff where applicable, and then subtracting the natural

logarithm of the minimum tariff in 1996. For each country, the differences are then average over all products. However, previous iterations of this paper will refine this to compute averages in levels and logarithms and only over the set of newly traded goods. AS of this writing, the figure shows that there is very little relationship between tariff reductions and newly traded goods. However, there is a wide variation across countries, even those without a free trade agreement with the U.S.

2.2. PhytoSanitary Regulations

In this study, we use SPS regulations for country eligibility and treatment requirements from Peterson *et al*. (2013). Specifically, we plan to investigate how and to what extent non-tariff phytosanitary treatments affect the extensive margin of fresh fruits and vegetable trade. Peterson *et al*. (2013) consider all possible types of phytosanitary measures as described by the U.S. Code of Federal Regulations, Fruits and Vegetable Import Manuals used by Plant Protection and Quarantine Officers with the Animal Plant Health Inspection Agency (APHIS) such as product treatments, destination restrictions, origin restrictions, pre-clearance procedures, and systems approaches to pest risk management.

3.   Empirical Model and Methods

The theoretical structure follows a probabilistic model that Eaton and Kortum (2002) used by developing a Ricardian model of international trade. The Ricardian model identifies the technological differences between countries as a source of comparative advantage. The Ricardian model is the most basic general equilibrium model of international trade, which explains the comparative advantages of countries in producing and exporting specific goods (Deardorff 2007). Dornbusch, Fischer and Samuelson (1977) applied a Ricardian model for a continuum of goods. They used a Ricardian model for a two-country framework with a range of goods traded.

Eaton and Kortum (2002) added geography to the Ricardian model and extended Dornbusch, Fisher and Samuelson to multiple countries. They develop a conditional Logit model that determines "the probability of a good being exported by a particular country". Debaere and Mostashari used Eaton and Kortum's model and identified a Probit model that represents an improvement to the conditional Logit model since it can be applied to disaggregated trade and tariff data. Their model explains the probability of supplying a specific good by a country to another country with country-specific differences in technology, factor cost, and geographic barriers. To this they append different goods-specific factors, like tariff changes to investigate the effect of trade liberalization on the probability of exporting along the extensive margin.

Debaere and Mostashari (2010) estimated the link between tariffs and the extensive margin of countries' exports to the United States. They found that tariff reductions increased the extensive margin of trade by five percent between 1989 and 1999. Their work differs from Kehoe and Ruhl (2003) who only considered those countries that are formally involved with FTAs. Helpman, Melitz and Rubinstein (2007) applied a Probit model as a function of observable variables, which specifies the probability that country j exports to i. They found that WTO membership has a very strong and significant effect on trade flows. They also estimate the impact of common currencies and free trade areas in their model.

The theoretical structure of this paper follows closely the probabilistic model developed by Eaton and Kortum (2002) in a comparative advantage (i.e., Ricardian) framework. A probit model with a full vector of goods specific dummy variables determines the probability of a good being exported by a particular country conditional on country-specific differences in technology (i.e., GDP), factor costs (i.e., distance), and geography. We extend this framework to determine whether

changes in the extensive margin are systematically related to trade policy changes in agri-food trade vis-à-vis changes in tariffs and non-tariff measures for the period 2008 (relative to 1996) as follows:

$$y_{iz} = 1[y_{iz}^* > 0] \qquad (1)$$

$$y_{iz}^* = \beta_1 + \beta_2 Status_{iz}^{96} + \beta_3 \Delta \ln(1 + \tau_{iz}) + \beta_4 SPS_{iz}^{08} + \beta_5 Exper_{iz}^{96-08} + \beta_6 SPS * Exper_{iz} \qquad (2)$$
$$+ \beta_7 \Pr eFTAs_{iz}^{begore\,96} + \beta_7 PostFTAs_{iz}^{af\,ter96} + X_i' \lambda + \alpha_z + \varepsilon_{iz}$$

where, y_{iz} is an indicator variable equal to one when country i exports FFV goods z to the U.S. in 2008 and zero otherwise. y_{iz}^* is a latent variable whose value depends on whether exports of goods z were strictly positive in 2008. $Status_{iz}^{96}$ is an indicator variable equal to one if country i exported goods z to the U.S. in 1996, X_i is a vector of origin-specific explanatory variables to take care of Ricardian-based differences in production, factors costs and geographical characteristics (i.e., production values, GDP per capita, distance, common borders, and landlocked status), α_z is a comprehensive set of goods specific dummy variables, and ε_{iz} is a well-behaved error term. The policy variables of interest are changes in the *ad valorem* tariff ($\Delta ln(1+\tau_{iz})$) between 1996 and 2008, new SPS regulations that did not exist in 1996 (SPS_{iz}^{08}) and the interaction between SPS_{iz}^{08} and exporters' accumulated phytosanitary treatment experience ($Exper_{iz}$) since 1996 (i.e., the cumulative number of products a country has treated). The interaction term is designed to capture possible "learning effects" associated with the fixed cost of phytosanitary treatments that may reduce the likelihood of countries exporting new goods (i.e., Methyl Bromide fumigation, irradiation, quick freeze, vapor heat, water treatment, etc.). Pre and Post FTAs variables capture the effect of Free Trade Agreements such as NAFTA, CAFTA and U.S.-Chile agreement. Thus, not only will we be able to capture the direct effect of tariff liberalization on the extensive margin, but also the impact of non-tariff measures and how new goods trade is impacted as exporters accumulate treatment experience.

4. Data

Bilateral U.S. import data are obtained from the US International Trade Commission at the 6-digit level of the Harmonized System (HS). Tariff data are from the World Integrated Trade Solution database (WITS) and include effectively applied rates inclusive of preferential duties. MAcMaps data from Centre d`Etudes Prospectives et d`informations Internationals (CEPII) will also be considered in future versions of this paper since this database has a more comprehensive treatment of preferential rates. Production data is retrieved from the Food and Agricultural Organization (PROD-STAT). All remaining variables controlling for factor costs and geography are from CEPII. SPS regulations for country eligibility and treatment requirements are from Peterson *et al*. (2013). The authors have constructed one of the definitive datasets on U.S. phytosanitary measures for 52 FFV products over a long time series (1996-2008). SPS information in Peterson *et al*. (2013) was collected from official APHIS Customs and Port Manuals, the Code of Federal Regulations and the Federal Registrar and contains information, by country, product, and year, on the requirements for product entry.

Table 1 provides summary statistics for our data. The average import value was $4842.6 in 2008 and $1980.1 thousand dollars in 1996. The standard deviation is $41694.9 thousand dollars in 2008. The natural logarithm of the tariff reduction (or increase in some cases) from 1996 to 2008 shows a range between -3.22 to 3.19.

5. Results

We estimate the model using different approaches. First, we estimate a linear probability model (LPM). Since, the dependent variable in the model is binary, a linear probability model is favorable when most of independent variables in the model are discrete and the majority of data is centered in the middle of the distribution. In this study, we consider the goods-specific effects to

capture those variables in the error term that are either correlated with tariffs or other explanatory variables in the model. Table 3 column (1) depicts the results of a linear probability model with a full vector of goods-specific effects.

We estimate a model to investigate the effects of the change in the U.S. tariff and other explanatory variables by using the difference between data collected in 2008 and in 1996 instead of focusing on 2008 data alone. We estimate the linear probability model with goods-specific dummy variables for several specifications of full sample size, selected sample size as well as estimating a random effects logit model in tables 3 and 4, respectively. Since most of the explanatory variables vary across countries, we cluster robust standard errors by country in all estimations. In these models, we used the change in the natural log of tariff imposed by U.S. That is "Dtsa = $\ln(1+\tau^{2008})$ - $\ln(1+\tau^{1996})$" as well as the change in the natural log of GDP of exporting countries between 1996 and 2008 "lnDgdp". We also introduce two dummy variables to capture the effect of being a member of WTO before and after 1996 as "Dumwto96" and Dumwto08".

The Marginal effects of variables for the full sample are computed and the results are in column (1) of table 3. The sign of the parameters estimated is as we expected. However, some of them are not significant. For example, the natural log of distance "lndist" has a negative sign, since it captures the cost of trade but it is insignificant. Being a member of WTO has a positive effect on the probability of goods traded but both parameter estimates are insignificant. Conversely, the marginal effect of the change in the U.S. tariffs is economically plausible, at -0.23, and statistically significant. A one unit increase in the natural log of U.S. tariffs implies approximately a 14 percentage point increase in the tariff rate. Therefore, one percentage point decrease in the tariff rate, from 4.5 to 3.5 (the sample mean in 1996 and 2008 respectively) would increase the probability of exporting by 0.046. This shows that tariff reforms has a relatively small but statistically significant

effect on increasing the probability of goods exported to the U.S. Columns 2, 3, 4 and 5 are the result of linear probability with goods-specific fixed effects on selected samples of data. We also include a 1996 status dummy equal to one if there is positive imports of goods in the benchmark year ("Status96").

Table 4 depicts the result of the random effects Logit model. Column (1) of table 4 shows the coefficients of the model. In order to measure the magnitude of the impact of tariff reduction on the extensive margin we also estimate the marginal effects of the tariff and other explanatory variables (column 2, 3, 4, 5 and 6). The results are mostly similar with the results of the linear probability model with goods-specific effects. The parameter estimates of the tariff change are significant and the sign is also consistent with the theory. Tariff reductions of one percentage point increases the probability of exporting goods to the U.S. by 0.052.

Column 3 and 4 of table 4 shows the result of two separate sub-samples, depending on whether the good is traded in 1996. The parameter estimated for tariff change is -0.37 and significant when the good is not traded in 1996 but it is -0.26 and significant when the goods is traded in 1996. This says that, one percentage point decrease in the tariff rate (at the sample mean) of newly traded goods increases the probability of exporting by 0.064 and percentage point decrease in the tariff rate (at the sample mean) of sub-sample of goods that were traded in 1996 would increase the probability of exporting by 0.056. This says tariff reductions have slightly more effect on the probability of newly traded goods compare to continuously traded goods.

We also estimate the model for both high and low-income countries in the sample. We define high-income countries as a member of OECD and non-OECD countries as low-income countries. The results demonstrate that tariff reductions have a greater negative effect on low-income countries compared to high-income countries. In other words, the effect of tariff liberalization on the

probability of goods exported in low-income countries is much higher than in high-income countries. A one percentage point decrease in the tariff rate (at the sample mean) of OECD and non-OECD countries increases the probability of exporting by 0.03 and 0.05, respectively.

5.   Conclusion

In this preliminary analysis, we investigated the effect of tariff reductions on U.S. imports of fresh fruits and vegetables. Using detailed product-line trade flows and corresponding tariff rates the results indicate that tariff reductions have a larger effect on the probability of a new goods exported to the U.S. It shows that tariff reductions imposed by the U.S. and other factors in the model such as the GDP of exporting countries can increase the extensive margin of trade in fresh fruits and vegetables. However, the magnitude of the results are relatively small which suggests that the tariff changes between 1996 and 2008 were small or that tariff changes have relatively little influence on countries's decision to export new products. Further analysis will be undertaken to identify those products where tariff changes are large relative to the sample mean to see how these changes affect the probability of exporting. Other sectors with relatively larger benchmark tariff rates will also be considered as will the important role of non-tariff measures.

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7.   Figures and Tables

Fig. 1: U.S. imports of Fresh Fruits and Vegetables in 1996 and 2008 (million dollar)
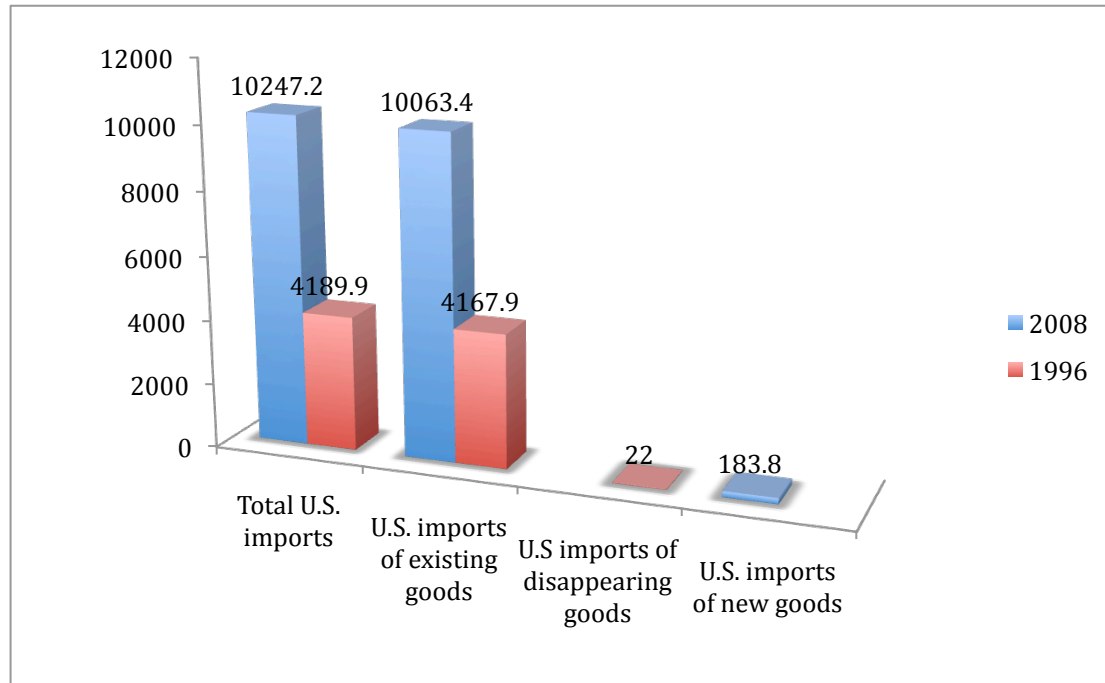

**Table 1: U.S. Fresh fruits and vegetables imports, 1996-2008.**

Exporting country/group	Value of export million dollar	All exported goods[a]	Newly traded goods[b]	Disappearing goods[c]	Continuously traded goods[d]	Disappearing goods share of 1996 trade volume	Newly traded goods share of 1996 trade volume
Peru	250	30	0.533	0.1	0.366	0.0006	0.10409
Colombia	183	22	0.182	0.318	0.5	0.00659	0.955
China	96	32	0.219	0.156	0.625	0.05374	0.14113
Argentina	85	17	0.412	0.235	0.353	0.00839	0.02028
Brazil	74	13	0.615	0	0.385	0	0.08789

[a] Number of goods exported either at the beginning or end of the frame.
[b] Share of goods exported at the end of the time frame but not the beginning.
[c] Share of goods exported at the beginning but not the end of the time frame.
[d] Share of goods exported both in the beginning and end of the time frame.

Fig. 2: Newly traded goods and tariff changes for 70 countries, 2008
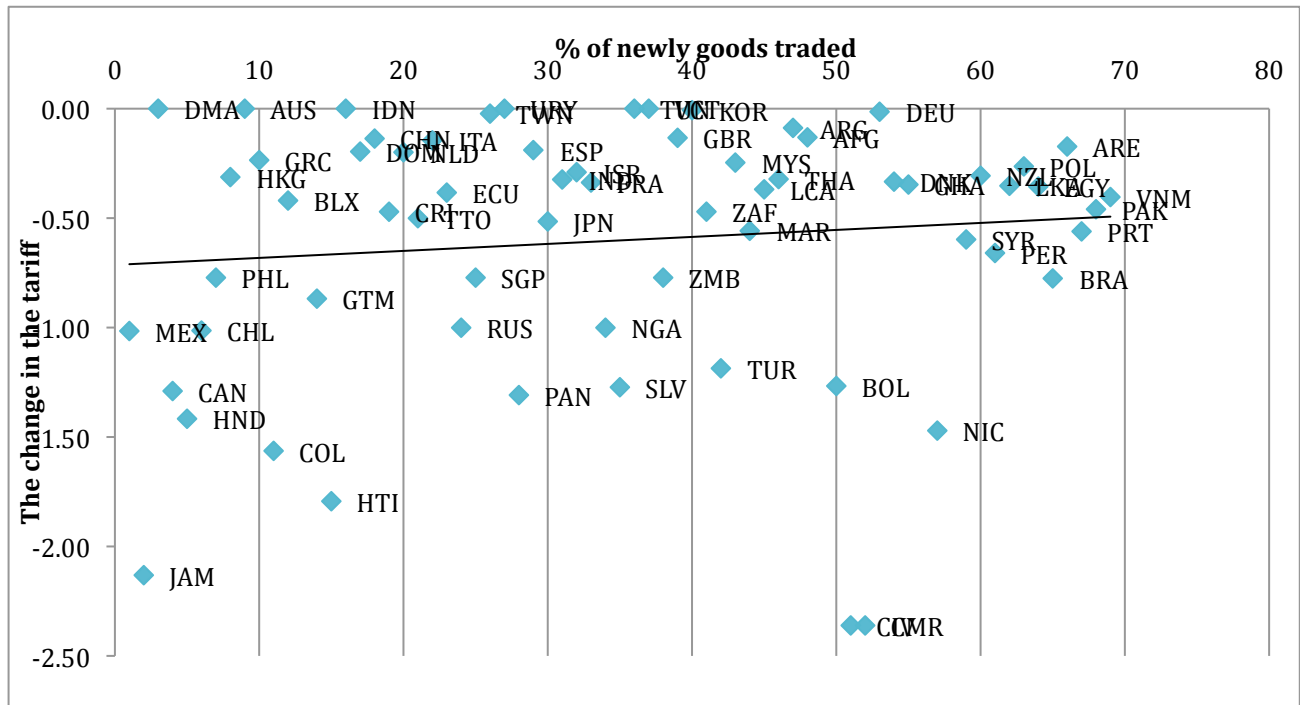
Table 2: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Import value 2008	2116	4842.622	41694.86	0	1199782
Import value 1996	2116	1980.09	19674.22	0	588571.8
Tariff rate 2008	1865	3.523115	5.615482	0	23.36
Tariff rate 1996	2018	4.519604	5.7973	0	24.04
Difference in tariff rate 1996-2008	1862	-0.2540029	0.6083962	-3.220474	3.192942

Source: authors' calculations

Table 3

Linear probability with goods-specific estimate for the effect of tariff reduction on export status

	1996-2008 Export status				
	Full sample	Selected sample			
		Not traded in 1996	Traded in 1996	Upper income (OECD)	Low income (Non-OECD)
	(1)	(2)	(3)	(4)	(5)
Variables	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect
Status96	0.38***	-	-	0.36***	0.40***
	(0.06)			(0.04)	(0.04)
Dtsa	-0.23***	-0.46***	-0.17***	-0.13**	-0.27***
	(0.03)	(0.03)	(0.03)	(0.06)	(0.02)
lnDgdp	0.02**	0.02***	0.03**	-	-
	(0.01)	(0.01)	(0.01)		
Dumwto96	0.04	-	-	-	-
	(0.07)				
Dumwto08	0.01	-	-	-	-
	(0.09)				
lndist	-0.04	0.04	-0.10***	-0.08	-0.0004
	(0.04)	(0.05)	(0.03)	(0.06)	(0.04)
Goods-specific	Yes	Yes	Yes	Yes	Yes
Number of observation	1854	1161	693	697	1157

Robust standard errors clustered by country.
[a] Country/good pairs that were exported in 1996 are omitted
[b] Country/good pairs that were not exported in 1996 are omitted
[c] OECD countries are considered as a Upper income
[d] Non-OECD countries are considered as a lower income
*** Indicates significant at the 1% level
** Indicates significant at the 5% level
* Indicates significant at the 10% level

Table 4
Random effect logit estimate for the effect of tariff reduction on export status

	1996-2008 Export status					
	Positive exports in 2008					
	Full sample		Selected sample			
			Not traded in 1996[a]	Traded in 1996[b]	Upper income (OECD)[c]	Low income (Non-OECD)[d]
	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Coefficient	Marginal effect	Marginal effect	Marginal effect	Marginal effect	Marginal effect
Status96	1.75***	0.41***	-	-	0.36***	0.44***
	(0.12)	(0.03)			(0.04)	(0.3)
Dtsa	-1.11***	-0.26***	-0.37***	-0.21***	-0.16***	-0.28***
	(0.12)	(0.03)	(0.07)	(0.04)	(0.04)	(0.03)
lnDgdp	0.11***	0.03***	0.02***	0.04***	-	-
	(0.03)	(0.01)	(0.01)	(0.01)		-
Dumwto96	0.26	0.06	-	-	-	
	(0.29)	(0.06)				
Dumwto08	0.10	0.02	-	-	-	
	(0.34)	(0.08)				
lndist	-0.25***	-0.06***	0.04*	-0.15***	-0.13***	0.009
	(0.09)	(0.02)	(0.03)	(0.03)	(0.04)	(0.03)
Goods-specific	Yes	Yes	Yes	Yes	Yes	Yes

Robust standard errors clustered by country.
[a] Country/good pairs that were exported in 1996 are omitted
[b] Country/good pairs that were not exported in 1996 are omitted
[c] OECD countries are considered as a Upper income
[d] Non-OECD countries are considered as a lower income
*** Indicates significant at the 1% level
** Indicates significant at the 5% level
* Indicates significant at the 10% level