The Impact of Trade Barriers on Exports: The Case of Peru, 1992-2002[1]

Mario D. Tello

mtello@pucp.edu.pe

CENTRUM CATOLICA and Department of Economics at the Pontificia Universidad Catolica del Peru.

ABSTRACT

Using a straightforward methodology, this paper assesses and estimates the trade barriers impact on exports from the Peruvian economy. The results of the analysis indicate that MFN and/or GSP tariffs rates imposed by developed countries to Peruvian exports are relatively low and, conversely, the number of NTBs and the average number of NTBs per export tariff line are relatively high. This difference produces a higher estimation of the export impact of the NTBs. An implication of these results is that the new wave of regional preferential trade agreements among developed and developing countries (which face similar trade barriers structure as the Peruvian case) may not have meaningful effects on trade flows unless it is accompanied by substantial reductions in the number of NTBs per export tariff line.

INTRODUCTION

The continual decline of tariff rates as the result of eight GATT rounds of multilateral trade negotiations[2] and the proliferation of regional preferences agreements among regions of countries has increased the relative importance of Non Tariff Barriers (NTBs[3]) both as protection and regulatory trade instruments[4] (UNCTAD, 2005, World Bank, 2005). This shift on the use trade barriers instruments has originated two branches of literature: one on the measures and quantification of NTBs (e.g., Bora-Kuwahara-Laird, 2002[5]) and the other on their trade impact. This paper deals with the second branch and provides on the one hand, a straightforward methodology (that could be used as a first hand tool by government authorities) to asses the trade impact of both tariffs and NTBs faced by exports firms from a particular developing country. On the other hand, it provides empirical evidence of the trade impact of these barriers for a medium size and middle-low income developing South American country, Peru. The empirical literature on the trade impact of NTBs starts in the 1970s where data was gathered and countries start to shift their standard tariff and quotas instruments (within the core measures) to other NTBs (within core and non-core measures). Surveys of this literature are found in Haveman-Nair-Reichert-Thursby (2003), Maskus-Wilson (2004), Maskus-Otsuki-Wilson (2001), and Francois-Reinert (1997). This in general is concentrated upon the analysis of industrialized (in particular OECD or European Community-EC) countries with mixed results in terms of the sign and the magnitude of the NTBs effects on trade flows.

This paper, by analyzing one medium size developing country and using data at 6 digits level of the NABANDINA[6] classification system of Peru, attempts to eliminate estimation errors of multi-countries methodologies due to: i) the heterogeneity of the countries analyzed in previous work; ii) the difference in the degree of competitiveness factors among countries that may affect the impact of

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[2] The share of tariff collection out of government revenues fell from 22,4% in 1975 to 16,2% by 2004 (Fernandez-Laird-Vanzetti, 2006).

[3] The NTBs' instruments used in this paper follow the UNCTAD classification reported in TRAINS (Trade Analysis and Information System, UNCTAD, 2004a). The NTBs measures are codified in the Trade Control Measures Coding System (TCMCS). The system classifies the trade measures in eight groups. Wherein the code groups (of 4 digit) called the core measure are: tariff measures (1); price control measures (3); finance measures (4); quantity controls measures (6), except: i) prior authorization for sensitive product categories (617), ii) quotas for sensitive product categories (627), iii) prohibition for sensitive product categories (637); and monopolistic measures (8). The code groups called non-core measures includes: automatic licensing measures (5); codes 617, 627 and 637; and technical measures (8).

[4] The average of the number of tariff lines per country subject to at least one NTBs rose from 1879 in 1994 to 5619 in 2004 (UNCTAD, 2006).

[5] This includes the literature on trade restrictions indices (e.g., Anderson-Neary, 1994 and 2004; Pantzios, 2000; Kee-Nicita-Olarreaga, 2006).

[6] This is a modified Harmonized Classification System for the Andean Countries (Peru, Colombia, Ecuador, Venezuela and Bolivia).

trade barriers[7]; iii) high level of data aggregation. In addition, the simple gravity model used here allows the estimation of an index of the export share impact of eliminating the NTBs. The paper is organized in four sections. Section 1 provides a summary of main trade barriers facing the Peruvian economy in 2002. Section 2 formulates the model specification and lists the variables and data used. Section 3 presents the main results. Concluding remarks are presented in the final Section 4.

1. Trade Barriers in the Peruvian Economy, 2002[8]

Tables No 1 and No 2 report the weighted averages of the most favored nation (MFN) ad-valorem tariff rates and the number of non-tariff barriers imposed by Peruvian trading partners by ISIC (International Standard Industrial Classification) sector respectively in the year 2002. The figures for each ISIC sector, only takes into account export tariff lines with positive Peruvian export values. Within each sector and export country of destination, the weights are the Peruvian export share of each export value of the export tariff line out of the value of Peruvian export goods of that ISIC sector and country[9]. Data sources used here have been diverse. These include: COMTRADE (Commodity Trade Data from UN, 2004); FTAA (Free Trade Area of the Americas, ALCA, 2004), ADUANET (The Peruvian Customs office, 2006), TARIC (The Integrated Tariff System of European Community, 2004) and TRAINS (Trade Analysis and Information System) from UNCTAD (2004a).

The figures in the tables include 31 countries and two regions of countries[10]: the European Union or Community[11] (EU) and the Andean Community (And.Com). In these two cases and the United States, two set of average tariffs have been computed: one from the MFN ad-valorem tariffs and the other from the GSP (Generalized Systems of Preferences) tariffs rates that these set of countries have granted to Peruvian exports[12]. For the Andean Community the tariffs reported are the

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[7] These factors are related to market distortions in developing countries resulting from: missing and incomplete insurance and credit markets; undersupply of public infrastructure; inadequate institutions, etc. (Stiglitz-Charlton, 2005).

[8] Note, the tariffs and non-tariffs barriers included in the computations of the figures of Tables No1 and 2, still are in force in 2006, since no new trade agreements between Peru and its export partner countries has been implemented from 2002 to 2005.

[9] Some data source contained 10 digit export tariff lines of the Harmonized and NABANDINA systems. The computations were done at the six digit level. For the 10 digit export tariff lines, a simple average of ad-valorem tariff was computed for all the ten digit export tariff lines that had the same first six digits.

[10] The Peruvian export value to these countries and the EU represents 96% of the total export value of Peru in 2002.

[11] The countries included in this group are: Belgium, United Kingdom, Finland, France, Germany, Italy, Norway, Portugal, Spain, The Netherlands, and Sweden.

[12] The European Union have granted a GSP to countries that combat drugs (UNCTAD, 2002). This SGP implied that only 54 Peruvian six-digit export tariff lines of the Harmonized System were subject to ad-valorem tariffs, which represented 2,1% of the total Peruvian export value of 2002. Similarly, the United States granted a GSP (called the Andean Trade Preferential Act, ATPA and thereafter ATPDEA, Andean Trade Preferential Drug Eradication Act) to Andean countries up to end of 2006.

TABLE No 1

Most Favored Nation Weighted Average Ad-Valorem Tariffs Faced by Peruvian Export Goods

by ISIC Sector and Country of Destination, 2002

Descripción	ARG	ARGEL	AUS	BOL	BRA	BUL	CAN	CHI	CHIN	COL	S. Kor	ECU	USA
Agricultural Products	9,6	11,0	0,0	10,0	7,9	N.E.	0,2	6,8	21,2	14,2	2,0	10,9	4,7
Livestock	N.E.	N.E.	0,0	10,0	N.E.	N.E.	0,0	3,6	17,0	10,0	N.E.	8,7	0,0
Forestry	6,0	N.E.	N.E.	10,0	7,5	N.E.	0,4	7,0	13,0	10,0	5,6	10,0	0,1
Fishing	6,1	N.E.	N.E.	10,0	N.E.	35,0	0.0	7,0	16,2	N.E.	10,5	N.E.	0,4
Mining of Coal and Lignite, Extraction of Peat	N.E.	N.E.	N.E.	10,0	N.E.	N.E.	N.E.	7,0	N.E.	N.E.	N.E.	5,0	N.E.
Extraction of Crude Petroleum and Natural Gas	0,0	N.E.	N.E.	N.E.	N.E.	N.E.	0,0	7,0	N.E.	N.E.	N.E.	N.E.	0,0
Mining of uranium, thorium and metal ores	2,0	N.E.	0,0	N.E.	3,5	0,0	0,0	7,0	4,2	5,0	1,0	5,0	0,0
Other Mining and Quarrying	0,0	N.E.	0,0	10,0	5,5	N.E.	0,2	7,0	17,0	5,0	3,0	5,0	0,4
Manufacture of Food Products and Beverages	10,8	17,5	1,1	9,9	11,2	4,6	1,7	6,9	8,5	15,1	8,9	13,7	3,9
Manufacture of Tobacco Products	N.E.	N.E.	N.E.	N.E.	21,5	N.E.	N.E.	7,0	N.E.	N.E.	N.E.	N.E.	0,0
Manufacture of Textiles	18,0	15,7	2,3	8,9	17,5	22,0	14,5	6,8	13,5	4,3	5,5	15,6	15,9
Manufacture of Wearing Apparel	34,1	20,4	9,5	10,0	21,5	N.E.	18,6	7,0	N.E.	N.E.	12,7	20,0	18,1
Tanning and Dressing of Leather; Manufacture of Luggage, Handbags, Saddlery, Harness and Footwear	11,8	N.E.	0,5	10,0	0,4	N.E.	10,7	3,4	N.E.	N.E.	8,0	15,4	5,3
Manufacture of Wood and Products of Woods and Cork	12,0	30,0	1,3	10,0	15,1	N.E.	0,3	0,0	15,0	14,9	8,0	14,4	7,8
Manufacture of Paper and Paper products	16,0	23,5	0,0	10,0	13,0	N.E.	0,0	0,0	N.E.	N.E.	N.E.	7,5	2,3
Manufacture of Coke, and refined petroleum products	0,0	N.E.	N.E.	10,0	0,0	N.E.	2,3	0,0	14,3	0,0	N.E.	0,3	0,0
Manufacture of Chemical and Chemical Products	9,5	17,0	0,0	10,0	13,0	N.E.	2,0	7,0	12,3	7,2	8,0	9,1	4,0
Manufacture of Rubbers and Plastic Products	14,1	11,1	0,1	10,0	8,8	N.E.	4,8	7,0	N.E.	N.E.	8,0	18,7	4,1
Manufacture of Other Non-Metallic Mineral products	9,8	17,0	2,3	10,0	13,5	N.E.	1,4	7,0	17,0	15,0	8,0	13,6	4,4
Manufacture of Basic Metals	6,1	N.E.	0,2	10,0	8,2	N.E.	0,7	7,0	12,9	5,0	7,9	5,7	2,8
Manufacture of Fabricated Metal Products except Machinery and Equipment	16,6	26,2	0,6	9,9	15,5	N.E.	5,7	7,0	18,0	9,3	8,0	12,5	5,9
Manufacture of Machinery and Equipment n.e.c	14,5	5,1	0,7	8,3	13,8	N.E.	0,7	7,0	8,7	10,0	8,0	11,3	18,2
Manufacture of Office Machinery	8,6	N.E.	0,0	10,0	6,6	N.E.	0,4	7,0	N.E.	N.E.	N.E.	8,0	23,3
Manufacture of Electrical Machinery, Radio and Television Apparatus	10,9	N.E.	1,2	7,4	17,5	N.E.	2,4	6,7	16,0	12,3	8,0	0,0	12,3
Manufacture of Medical and Optical Instruments, Watches and Clocks	16,2	N.E.	0,0	10,0	15,5	N.E.	1,7	6,4	12,1	0,7	8,0	13,6	20,5
Manufacture of Motor Vehicles	25,7	9,5	6,5	6,9	35,0	N.E.	5,6	7,0	N.E.	N.E.	8,0	10,1	6,6
Manufacture of Other Transport Equipment	20,0	N.E.	N.E.	10,0	N.E.	N.E.	19,9	4,7	N.E.	N.E.	N.E.	18,0	7,8
Manufacture of Furniture and and Manufacturing n.e.c.	18,4	17,7	0,0	10,0	19,5	N.E.	5,0	7,0	N.E.	N.E.	8,0	19,7	22,6
Others	0,3	N.E.	0,0	3,7	0,1	N.E.	0,2	1,8	9,6	5,2	0,9	7,7	0,1
Weighted Average (%)	7,1	10,3	0,4	9,5	7,1	0,1	1,4	6,6	7,5	10,6	1,9	11,5	6,4
Exports Value Share (%)	0,2	0,2	0,5	1,2	2,5	0,4	1,8	3,3	7,8	2,1	2,2	1,8	25,8

TABLE No 1
Most Favored Nation Weighted Average Ad-Valorem Tariffs Faced by Peruvian Export Goods
by ISIC Sector and Country of Destination, 2002

ISIC Sector	USA-GSP	ELS	PHIL	And.Com	GUA	HON	IND	INDO	IRAN	JAP	MEX
Agricultural Products	0,0	N.E.	N.E.	3,0	8,8	15,0	35,0	5,0	N.E.	4,9	22,2
Livestock	0,0	N.E.	N.E.	0,4	N.E.	N.E.	N.E.	N.E.	N.E.	0,0	11,5
Forestry	0,0	N.E.	N.E.	0,0	N.E.	N.E.	35,0	N.E.	N.E.	0,2	14,4
Fishing	0,0	N.E.	3,0	0,0	N.E.	N.E.	18,0	3,3	N.E.	4,4	20,0
Mining of Coal and Lignite, Extraction of Peat	N.E.	N.E.	N.E.	0,0	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.
Extraction of Crude Petroleum and Natural Gas	0,0	1,0	N.E.	0,0	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.
Mining of uranium, thorium and metal ores	0,0	N.E.	N.E.	0,0	N.E.	N.E.	5,0	N.E.	N.E.	0,0	13,0
Other Mining and Quarrying	0,3	N.E.	N.E.	2,3	0,0	10,0	29,5	5,0	5,0	0,0	8,9
Manufacture of Food Products and Beverages	1,7	16,6	3,0	3,2	7,9	4,1	35,0	0,1	0,0	1,6	14,7
Manufacture of Tobacco Products	0,0	N.E.	N.E.	0,0	N.E.	55,0	N.E.	N.E.	N.E.	N.E.	N.E.
Manufacture of Textiles	0,7	3,8	10,0	0,5	17,6	11,2	30,0	5,0	N.E.	2,0	27,9
Manufacture of Wearing Apparel	9,3	21,7	10,0	0,0	22,0	15,0	N.E.	15,0	20,0	6,1	35,0
Tanning and Dressing of Leather; Manufacture of Luggage, Handbags, Saddlery, Harness and Footwear	3,2	19,7	N.E.	0,0	15,0	15,0	N.E.	N.E.	N.E.	1,2	19,8
Manufacture of Wood and Products of Woods and Cork	7,5	0,5	N.E.	0,0	3,8	0,0	N.E.	N.E.	N.E.	1,6	20,7
Manufacture of Paper and Paper products	1,9	0,1	N.E.	0,0	0,1	3,1	N.E.	N.E.	N.E.	0,0	13,0
Manufacture of Coke, and refined petroleum products	0,0	0,0	N.E.	0,0	6,1	13,3	N.E.	0,0	N.E.	0,0	8,8
Manufacture of Chemical and Chemical Products	2,5	2,6	3,8	0,0	2,8	4,6	32,5	0,7	5,0	0,1	21,9
Manufacture of Rubbers and Plastic Products	0,7	6,9	N.E.	0,0	4,7	5,0	N.E.	15,0	2,5	5,4	19,6
Manufacture of Other Non-Metallic Mineral products	2,8	13,7	5,0	0,0	7,8	15,0	32,0	N.E.	N.E.	1,1	19,9
Manufacture of Basic Metals	1,5	0,0	2,3	0,0	0,1	0,0	35,0	2,6	N.E.	0,2	13,1
Manufacture of Fabricated Metal Products except Machinery and Equipment	4,4	14,8	5,0	0,0	9,2	8,5	N.E.	N.E.	N.E.	1,0	23,5
Manufacture of Machinery and Equipment n.e.c	18,0	2,0	N.E.	0,0	2,3	13,0	N.E.	N.E.	N.E.	0,0	13,1
Manufacture of Office Machinery	23,3	0,0	N.E.	0,0	0,0	N.E.	N.E.	N.E.	N.E.	N.E.	0,0
Manufacture of Electrical Machinery, Radio and Television Apparatus	12,3	12,5	N.E.	0,0	0,4	4,4	35,0	N.E.	N.E.	0,0	18.2
Manufacture of Medical and Optical Instruments, Watches and Clocks	20,5	0,5	N.E.	0,0	0,0	0,0	N.E.	N.E.	N.E.	0,0	20,1
Manufacture of Motor Vehicles	6,6	0,1	N.E.	0,0	14,9	8,0	N.E.	N.E.	N.E.	0,0	19,2
Manufacture of Other Transport Equipment	7,8	0,0	N.E.	0,6	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	30,0
Manufacture of Furniture and and Manufacturing n.e.c.	22,4	15,0	N.E.	1,5	15,0	15,0	N.E.	10,0	N.E.	1,0	21,6
Others	0,0	5,7	3,6	0,0	8,5	9,8	22,4	2,0	0,0	0,0	5,5
Weighted Average (%)	2,6	3,0	3,1	0,5	5,1	7,2	23,6	0,1	0,1	0,8	13,4
Exports Value Share (%)	25,8	0,3	0,2	6,5	0,4	0,1	0,3	0,3	0,3	4,9	1,7

TABLE No 1
Most Favored Nation Weighted Average Ad-Valorem Tariffs Faced by Peruvian Export Goods
by ISIC Sector and Country of Destination, 2002

ISIC Sector	RDOM	RUS	SING	SWI	TAIL	TAIW	TTOB	TUR	EU	EU-SGP	VEN
Agricultural Products	20,4	5,0	0,0	0,0	N.E.	4,6	0,0	7,9	1,7	0,8	13,9
Livestock	N.E.	N.E.	0,0	0,0	N.E.	N.E.	N.E.	N.E.	0,3	0,0	5,0
Forestry	N.E.	N.E.	N.E.	0,0	N.E.	9,0	N.E.	N.E.	0,8	0,0	10,0
Fishing	20,0	10,0	0,0	0,0	15,0	5,0	N.E.	N.E.	5,7	0,0	19,7
Mining of Coal and Lignite, Extraction of Peat	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N,E	N.E.	N.E.
Extraction of Crude Petroleum and Natural Gas	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	0,0	0,0	N.E.
Mining of uranium, thorium and metal ores	NE.	5,0	N.E.	0,0	1,0	N.E.	0,0	N.E.	0,0	0,0	N.E.
Other Mining and Quarrying	9,8	N.E.	0,0	0,0	4,9	1,2	N.E.	N.E.	0,0	0,0	5,0
Manufacture of Food Products and Beverages	18,2	5,1	0,0	0,0	7,0	1,3	10,6	0,0	7,5	0,3	16,9
Manufacture of Tobacco Products	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E	N.E.	20,0
Manufacture of Textiles	7,5	10,6	0,0	0,0	9,6	1,9	20,0	0,0	6,5	0,0	19,8
Manufacture of Wearing Apparel	20,0	0,1	0,0	0,0	13,7	12,3	N.E.	N.E.	11,7	0,0	20,0
Tanning and Dressing of Leather; Manufacture of Luggage, Handbags, Saddlery, Harness and Footwear	20,0	N.E.	N.E.	0,0	N.E.	15,0	20,0	0,0	0,1	0,0	18,8
Manufacture of Wood and Products of Woods and Cork	14,5	N.E.	N.E.	0,0	N.E.	0,0	N.E.	0,0	1,1	0,0	16,2
Manufacture of Paper and Paper products	9,1	N.E.	N.E.	N.E.	N.E.	N.E.	0,0	N.E.	0,0	0,0	12,8
Manufacture of Coke, and refined petroleum products	N.E.	0,0	N.E.	0,0	N.E.	N.E.	N.E.	N.E.	0,0	0,0	10,0
Manufacture of Chemical and Chemical Products	4,5	5,0	0,0	0,0	9,5	2,0	5,0	0,0	3,9	0,0	13,7
Manufacture of Rubbers and Plastic Products	12,8	N.E.	N.E.	0,0	N.E.	N.E.	10,9	N.E.	3,7	0,0	19,3
Manufacture of Other Non-Metallic Mineral products	11,5	N.E.	N.E.	0,0	N.E.	10,0	20,0	0,0	4,0	0,0	15,0
Manufacture of Basic Metals	9,7	N.E.	0,0	0,0	8,6	0,3	N.E.	N.E.	0,1	0,0	8,7
Manufacture of Fabricated Metal Products except Machinery and Equipment	14,8	N.E.	N.E.	0,0	N.E.	N.E.	2,0	N.E.	3,3	0,0	23,7
Manufacture of Machinery and Equipment n.e.c	18,8	N.E.	N.E.	0,0	5,0	2,7	18,4	N.E.	0,6	0,0	16,4
Manufacture of Office Machinery	6,0	N.E.	N.E.	N.E.	N.E.	N.E.	2,0	N.E.	1,3	0,0	5,0
Manufacture of Electrical Machinery, Radio and Television Apparatus	7,6	N.E.	N.E.	0,0	N.E.	15,5	5,0	N.E.	0,9	0,0	11,3
Manufacture of Medical and Optical Instruments, Watches and Clocks	3,0	N.E.	0,0	N.E.	N.E.	N.E.	2,0	N.E.	1,9	0,0	7,9
Manufacture of Motor Vehicles	14,3	N.E.	6,7	0,0	N.E.	N.E.	N.E.	N.E.	6,8	0,0	17,1
Manufacture of Other Transport Equipment	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	4,5	0,0	20,0
Manufacture of Furniture and and Manufacturing n.e.c.	20,0	20,0	0,0	0,0	N.E.	0,5	20,0	N.E.	2,2	0,0	18,3
Others	0,4	N.E.	0,0	0,0	1,3	0,4	1,3	N.E.	0,0	0,0	15,1
Weighted Average (%)	9,8	5,1	0,0	0,0	3,0	0,8	3,6	0,1	2,1	0,1	16,3
Exports Value Share (%)	0,2	0,3	0,0	7,3	0,3	1,4	0,2	0,1	26,3	26,3	1,5

Source: Author's elaboration. UN (2004), ADUANET (2006), ALCA (2004), TARIC (2004). N.E. means there is none Peruvian export goods in all the export tariff lines of the respective ISIC sector. N.A. Not available tariff data in the respective ISIC Sector.

TABLE No 2
Number of Non Tariff Barriers Facing Peruvian Exports by ISIC Sector and Country of Destination, 2002

ISIC Sector	ARG	ARGEL	AUS	BOL	BRA	BUL	CAN	CHI	CHIN	COL	S. Kor	ECU
Agricultural Products	0	0	2	45	99	N.A.	76	687	5	106	0	389
Livestock	N.E.	N.E.	3	21	N.E.	N.A.	3	41	3	3	N.E.	72
Forestry	0	N.E.	N.E.	1	10	N.A.	5	18	0	12	0	27
Fishing	1	N.E.	N.E.	29	N.E.	N.A.	7	207	0	18	0	N.E.
Mining of Coal and Lignite, Extraction of Peat	N.E.	N.E.	N.E.	0	N.E.	N.A.	N.E.	2	N.E.	N.E.	N.E.	0
Extraction of Crude Petroleum and Natural Gas	3	N.E.	N.E.	N.E.	N.E.	N.A.	0	0	N.E.	N.E.	N.E.	N.E.
Mining of uranium, thorium and metal ores	0	N.E.	0	N.E.	0	N.A.	0	0	4	1	0	0
Other Mining and Quarrying	0	N.E.	0	4	12	N.A.	0	18	0	0	0	15
Manufacture of Food Products and Beverages	11	0	11	272	378	N.A.	55	1002	2	165	3	496
Manufacture of Tobacco Products	N.E.	N.E.	N.E.	N.E.	5	N.A.	N.E.	0	N.E.	N.E.	N.E.	N.E.
Manufacture of Textiles	21	0	0	2	2	N.A.	67	15	7	56	0	42
Manufacture of Wearing Apparel	0	0	4	0	0	N.A.	72	0	N.E.	N.E.	0	87
Tanning and Dressing of Leather; Manufacture of Luggage, Handbags, Saddlery, Harness and Footwear	0	N.E.	0	0	0	N.A.	6	0	N.E.	N.E.	0	6
Manufacture of Wood and Products of Woods and Cork	0	0	0	0	2	N.A.	6	106	1	17	0	0
Manufacture of Paper and Paper products	13	0	0	3	1	N.A.	0	0	N.E.	N.E.	N.E.	3
Manufacture of Coke, and refined petroleum products	19	N.E.	N.E.	16	52	N.A.	0	0	16	17	N.E.	31
Manufacture of Chemical and Chemical Products	9	0	3	201	1468	N.A.	0	993	2	99	0	556
Manufacture of Rubbers and Plastic Products	4	0	0	2	35	N.A.	2	8	N.E.	N.E.	0	19
Manufacture of Other Non-Metallic Mineral products	0	0	0	0	3	N.A.	0	0	0	0	0	4
Manufacture of Basic Metals	0	N.E.	0	0	3	N.A.	14	0	3	6	0	14
Manufacture of Fabricated Metal Products except Machinery and Equipment	26	0	1	2	2	N.A.	7	0	0	3	0	14
Manufacture of Machinery and Equipment n.e.c	4	0	6	6	103	N.A.	0	27	2	3	0	22
Manufacture of Office Machinery	0	N.E.	1	0	3	N.A.	0	3	N.E.	N.E.	N.E.	0
Manufacture of Electrical Machinery, Radio and Television Apparatus	74	N.E.	0	0	87	N.A.	1	20	0	11	0	0
Manufacture of Medical and Optical Instruments, Watches and Clocks	14	N.E.	0	11	67	N.A.	0	15	0	1	0	38
Manufacture of Motor Vehicles	0	0	0	24	166	N.A.	2	64	N.E.	N.E.	0	148
Manufacture of Other Transport Equipment	0	N.E.	N.E.	0	N.E.	N.A.	0	1	N.E.	N.E.	N.E.	12
Manufacture of Furniture and and Manufacturing n.e.c.	3	0	0	0	11	N.A.	2	2	N.E.	N.E.	0	4
Others	12	N.E.	0	13	47	N.A.	1	47	6	1	0	30
Weighted Average	2,4	0,0	0,4	1,0	2,6	N.A.	0,2	2,1	0,9	7,6	0,0	4,3
Number of NTBs faced by Peruvian X's	214	0	31	652	2556	N.A.	326	3276	51	519	3	2029
Total Number of NTBs	2848	79	1415	2933	42821	N.A.	2122	14707	1566	13971	151	7750

TABLE No 2
Number of Non Tariffs Barriers Facing Peruvian Exports by ISIC Sector and Country of Destination, 2002

Descripción	USA	ELS	PHIL	AND-Com	GUA	HON	IND	INDO	IRAN	JAP	MEX
Agricultural Products	352	N.E.	N.E.	1419	0	0	1	7	N.A.	60	78
Livestock	43	N.E.	N.E.	127	N.E.	N.E.	N.E.	N.E.	N.A.	0	65
Forestry	20	N.E.	N.E.	18	N.E.	N.E.	1	N.E.	N.A.	1	14
Fishing	102	N.E.	0	96	N.E.	N.E.	1	3	N.A.	28	3
Mining of Coal and Lignite, Extraction of Peat	N.E.	N.E.	N.E.	0	N.E.	N.E.	N.E.	N.E.	N.A.	N.E.	N.E.
Extraction of Crude Petroleum and Natural Gas	2	0	N.E.	8	N.E.	N.E.	N.E.	N.E.	N.A.	N.E.	N.E.
Mining of uranium, thorium and metal ores	4	N.E.	N.E.	0	N.E.	N.E.	0	N.E.	N.A.	0	0
Other Mining and Quarrying	2	N.E.	N.E.	12	0	0	1	0	N.A.	0	0
Manufacture of Food Products and Beverages	2077	0	1	3247	0	0	2	8	N.A.	294	251
Manufacture of Tobacco Products	0	N.E.	N.E.	8	N.E.	0	N.E.	N.E.	N.A.	N.E.	N.E.
Manufacture of Textiles	497	1	0	402	0	0	1	0	N.A.	14	243
Manufacture of Wearing Apparel	1372	0	0	378	0	0	N.E.	0	N.A.	0	283
Tanning and Dressing of Leather; Manufacture of Luggage, Handbags, Saddlery, Harness and Footwear	12	0	N.E.	101	0	0	N.E.	N.E.	N.A.	0	92
Manufacture of Wood and Products of Woods and Cork	112	1	N.E.	184	0	0	N.E.	N.E.	N.A.	0	44
Manufacture of Paper and Paper products	0	5	N.E.	38	0	0	N.E.	N.E.	N.A.	0	14
Manufacture of Coke, and refined petroleum products	0	0	N.E.	150	2	0	N.E.	3	N.A.	0	10
Manufacture of Chemical and Chemical Products	258	6	0	5637	4	0	0	1	N.A.	1	107
Manufacture of Rubbers and Plastic Products	30	3	N.E.	139	0	0	N.E.	0	N.A.	0	51
Manufacture of Other Non- Metallic Mineral products	6	0	0	53	0	0	0	N.E.	N.A.	0	53
Manufacture of Basic Metals	48	1	0	132	0	0	0	0	N.A.	0	2
Manufacture of Fabricated Metal Products except Machinery and Equipment	42	1	0	49	0	0	N.E.	N.E.	N.A.	0	31
Manufacture of Machinery and Equipment n.e.c	76	6	N.E.	114	0	0	N.E.	N.E.	N.A.	0	71
Manufacture of Office Machinery	14	2	N.E.	0	0	N.E.	N.E.	N.E.	N.A.	N.E.	0
Manufacture of Electrical Machinery, Radio and Television Apparatus	144	4	N.E.	64	0	0	0	N.E.	N.A.	0	89
Manufacture of Medical and Optical Instruments, Watches and Clocks	20	1	N.E.	141	0	0	N.E.	N.E.	N.A.	0	35
Manufacture of Motor Vehicles	342	0	N.E.	331	0	0	N.E.	N.E.	N.A.	0	21
Manufacture of Other Transport Equipment	38	0	N.E.	57	N.E.	N.E.	N.E.	N.E.	N.A.	N.E.	1
Manufacture of Furniture and and Manufacturing n.e.c.	92	1	N.E.	37	0	0	N.E.	0	N.A.	0	89
Others	80	3	0	204	0	0	3	0	N.A.	1	71
Weighted Average	2,4	0,2	0,0	6,9	0,4	0,0	0,4	0,0	N.A.	1,2	2,0
Number of NTBs faced by Peruvian X's	5785	35	1	13146	6	0	10	22	N.A.	399	1718
Total Number of NTBs	10640	1704	273	29874	156	7	2199	940	N.A.	1232	14430

TABLE No 2
Number of Non Tariffs Barriers Facing Peruvian Exports by ISIC Sector and Country of Destination, 2002

Descripción	RDOM	RUS	SING	SWI	TAIL	TAIW	TTOB	TUR	EU[1]	VEN
Agricultural Products	N.A.	1	0	123	N.E.	186	0	0	42	70
Livestock	N.A.	N.E.	1	4	N.E.	N.E.	N.E.	N.E.	8	6
Forestry	N.A.	N.E.	N.E.	3	N.E.	4	N.E.	N.E.	6	15
Fishing	N.A.	0	1	0	0	1	N.E.	N.E.	12	7
Mining of Coal and Lignite, Extraction of Peat	N.A.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.
Extraction of Crude Petroleum and Natural Gas	N.A.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	1	N.E.
Mining of uranium, thorium and metal ores	N.A.	0	N.E.	0	0	N.E.	0	N.E.	0	N.E.
Other Mining and Quarrying	N.A.	N.E.	0	1	0	8	N.E.	N.E.	3	0
Manufacture of Food Products and Beverages	N.A.	0	3	98	0	173	1	0	426	326
Manufacture of Tobacco Products	N.A.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	4
Manufacture of Textiles	N.A.	0	0	1	0	0	0	N.A.	552	16
Manufacture of Wearing Apparel	N.A.	0	0	3	0	4	N.E.	N.E.	498	20
Tanning and Dressing of Leather; Manufacture of Luggage, Handbags, Saddlery, Harness and Footwear	N.A.	N.E.	N.E.	0	N.E.	0	0	N.A.	90	45
Manufacture of Wood and Products of Woods and Cork	N.A.	N.E.	N.E.	0	N.E.	0	N.E.	N.A.	17	8
Manufacture of Paper and Paper products	N.A.	N.E.	N.E.	0	N.E.	N.E.	0	N.E.	0	8
Manufacture of Coke, and refined petroleum products	N.A.	0	N.E.	14	N.E.	N.E.	N.E.	N.E.	36	53
Manufacture of Chemical and Chemical Products	N.A.	0	0	2	0	50	0	N.A.	29	146
Manufacture of Rubbers and Plastic Products	N.A.	N.E.	N.E.	0	N.E.	N.E.	0	N.E.	3	28
Manufacture of Other Non- Metallic Mineral products	N.A.	N.E.	N.E.	0	N.E.	0	0	0	17	8
Manufacture of Basic Metals	N.A.	N.E.	0	0	0	1	N.E.	N.E.	16	9
Manufacture of Fabricated Metal Products except Machinery and Equipment	N.A.	N.E.	N.E.	0	N.E.	N.E.	0	N.A.	19	25
Manufacture of Machinery and Equipment n.e.c	N.A.	N.E.	N.E.	0	0	1	2	N.E.	1	27
Manufacture of Office Machinery	N.A.	N.E.	N.E.	N.E.	N.E.	N.E.	0	N.E.	0	0
Manufacture of Electrical Machinery, Radio and Television Apparatus	N.A.	N.E.	N.E.	0	N.E.	4	0	N.E.	18	20
Manufacture of Medical and Optical Instruments, Watches and Clocks	N.A.	N.E.	0	N.E.	N.E.	N.E.	0	N.E.	2	0
Manufacture of Motor Vehicles	N.A.	N.E.	0	0	N.E.	N.E.	N.E.	N.E.	0	38
Manufacture of Other Transport Equipment	N.A.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	N.E.	0	0
Manufacture of Furniture and and Manufacturing n.e.c.	N.A.	0	0	3	N.E.	0	0	N.E.	58	35
Others	N.A.	N.E.	0	0	0	5	0	N.E.	5	4
Weighted Average	N.A.	0,0	0,0	0,0	0,0	1,5	3,6	0,0	0,7	2,0
Number of NTBs faced by Peruvian X's	N.A.	1	5	252	0	437	3	0	1859	918
Total Number of NTB	N.A.	434	206	2048	27	4691	42	768	4524	5220

Source: Author's elaboration. UNCTAD (2004), ADUANET (2006), TARIC (2004). N.E. means there is none Peruvian export goods in all the export tariff lines of the respective ISIC sector. N.A. Not available non-tariff data of the all of the Peruvian exports tariff lines of the respective ISIC sector. [1] The number of restrictions for the EU is the average of the restrictions of the eleven countries considered in the European Union.

ones established in the community trade agreement up the year 2002[13]. Table No1 also reports the external tariffs figures imposed by the individual Andean countries.

The figures reported in both tables together with the figures of the export composition and direction of trade reported in last row of Table No 1 indicate[14]:

i)   The major Peruvian export partners, which account for 70% of total exports value of Peru in 2002 are: United States (US), European Union or Community (EU), Switzerland (SWI) and the Andean Community (And.Com). Each of them has a weighted average ad-valorem (MFN or preferential) tariff rate lower than 2,7%. The rest of the major Peruvian export partner countries have an ad-valorem tariff between 2,6% and 23,6%. This latter rate correspond to India (IND);

ii) Around 70% of the Peruvian total value exports in 2002 are goods belonging to ISIC sectors such as: agricultural products, mining of uranium, thorium and metal ores, manufacture of food and beverages, and manufacture of basic metals. In most of these sectors, the average (MFN or preferential) tariff rates are practically zero;

iii) There is a negative association between export value share and the weighted ad-valorem tariff rate[15];

iv) Contrarily to the case of the ad-valorem tariff, most of the major countries/regions impose NTBs to Peruvian exports and some of them, such as the United States, the Andean Community and the European Union, impose the highest number of NTBs among the countries reported in Table No 2;

v)   Peruvian export of goods which face the highest number of NTBs belong to the following ISIC sectors: agricultural products, manufacture of food products and beverages, textiles, wearing apparels and chemical products;

vi) The total number of NTBs that trade partner countries impose to rest of the world is much higher than the number they imposed to exports goods from Peru. Thus, potential export firms from a developing economy, such as Peru, not only need to: search and exploit the country comparative advantage products, develop and create competitive advantage products, and overcome domestic market distortions but also need to deal with the extra costs caused by the NTBs imposed by trade partner countries.

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[13] In 2002, the ad-valorem tariff of 28 Peruvian export tariff lines were non-zero for the Andean Community, which their respective export value represented 8,7% out of the total Peruvian exports value to the Andean countries.

[14] According to the Central Bank of Reserve of Peru, in 2002, close to 63% of the total value of Peruvian export of goods is explained by 12 export goods: Fishing flour; Fishing oil; Cotton, Sugar, Copper; Zinc; Gold; Refined Silver; Tin; Coffee; Iron; and Lead. Textiles goods explain another 9% and other agricultural and fishing products explains 9%.

[15] The simple correlation coefficient is: -0,208.

These features of the data suggest that as a result of the GATT rounds, the regional preferential trade agreements and the generalized system of preferences (granted by large economies such as United States and the European Community), tariffs rates have been reduced close to nil for most of the main Peruvian export goods, in particular from the mining and metal ores ISIC sectors. However, the major Peruvian export partners (from both developed and developing countries) still are using non-tariff measures as alternative way to impede market access, in particular, in the agricultural and manufactured sectors wherein Peru has a relative comparative advantage. Another implication of the data and as a result of the trade agreements carried out by United States and the European Community with some Latin American Countries (such as Central America, Chile, Colombia, Peru and Mexico[16]) is that this 'new' wave of regional agreements, which started in the 1980s (Bhagwati-Panagariya, 1996; Ethier, 1998) between large developed economies and medium and small developing countries seems to be instruments used by developed countries for: i) replacing unilateral concessions such as the GSP tariffs for reciprocal concessions wherein in terms of ad-valorem tariff those countries might be the net winners[17]; ii) reinforcing the establishment of the non-tariff barriers, without eliminating them; iii) and to gain concessions in other trade related areas such as trade in services, intellectual property rights and investment.

2. The Gravity Model Specification

For the purpose of the analysis for a particular developing country that faces trade barriers in its major exports markets, the most simple and adequate way, in theoretical terms[18], to evaluate the trade barriers impact on the volume of trade is the gravity equation. The general model specification to be used is:

[1] $$VX_{ijt} = A.Y_{it}^{\alpha 1} . Y_{ijt}^{\alpha 2}.\exp(\sum_{k=1}^{K=2} \alpha 3k. R_{ikjt}). e^{\varepsilon ijt}$$

Wherein VX_{ijt} (or VM_{ijt}) is the Peruvian exports fob value (in dollars) to (or the import value of Peruvian goods of) country 'j' of goods belonging to sector or export tariff line 'i' at period 't'; Y_{it} is the gross domestic product (GDP, in dollars) of the domestic developing country (D), Peru, which export goods from sector or export tariff line 'i' at period t; Y_{ijt} is the GDP (in dollars) of the foreign country (F), j, which import goods from the Peruvian sector or export tariff line 'i' at period t; R_{ikjt} is the trade barrier instrument 'k' imposed by country 'j' to goods from sector or export tariff line 'i' at period t; for k=1 R_{i1jt} is the ad-valorem tariff rate (in percentages) and for

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[16] The United States has signed 'free trade agreements' with Mexico (1993), Chile (2002), Central America (2002) and is about to sign one with Peru and Colombia (2007). The European Community has signed free trade agreements with Mexico (2000), Chile (2003), and is negotiating free trade agreements with Central American, Andean and Mercosur countries.

[17] Ad-Valorem MFN tariff rates are in average higher in developing countries than the ones in developed countries (Table No 1 and UNCTAD, 2006).

[18] Evenett and Keller (2002) present the Heckscher-Ohlin (or factor proportions) theoretical foundation of the gravity model used in this paper. Anderson (1979), Deardoff (1998), Helpman (1998), and Bergstrand (1990, 1985) develop other theoretical alternatives that support the relevance of gravity models.

k=2 $Ri2jt$ is a the number of non-tariff barriers; εitj is the stochastic error; A, $\alpha 1$, $\alpha 2$, $\alpha 31$, and $\alpha 32$ are parameters to be estimated.

Even though, the analysis of an economy at 6 six digit level of aggregation of the Harmonized classification system may overcome errors of multi-country analysis due to heterogeneity of the countries, the level of country competitiveness and development, and the level of aggregation problems, however, other data disadvantages may arise. Usually, there are no time series data for tariffs and NTBs. This implies that the time series regression given in [1] cannot be estimated. To overcome this problem, equation [1] is estimated in two stages according to the following specifications:

[1.1]   dln(VXijt) = dlnA+ $\alpha 1$. dln(Yit)+ $\alpha 2$.dln(Yijt) + μijt ; t= 1992-2002

[1.2]   lnVXijt*e = ln(VXij(t*-1)) + dln(VXijt*)e

                        K=2
[1.3]   lnVXijt*e = αo + Σ $\alpha 3k$. $Rikjt*$ + $\varepsilon ijt*$;   i=1,..Nh
                        k=1
Wherein dln(VXijt*)e and lnVXijt*e are variables estimated using the regression estimates of equation [1.1] and equation [1.2] respectively; 't*' is the year 2002 and Nh is the number of export tariff lines of sector h. The time series first stage of equation [1] is estimated in differential of the natural logarithm to avoid spurious correlations (i.e., using [1.1]). Cross section and/or time series evidence, mostly for developed countries, yield positive signs of the estimates $\alpha 1$ and $\alpha 2$ which are consistent with the theoretical basis of the gravity equation[19]. Thus, an increase of the GDP of both exporting and importing country will increase exports (import) flows, either due to the high trade share of the differentiated and manufactured monopolistic competitive goods or to the increasing divergence in the capital and labor endowment of these countries (Evenett-Keller, 2002) or alternatively under constant elasticity of substitution between goods of the demand for imports and constant elasticity of transformation among goods in the supply of exports (Bergstrand, 1985). For developing countries with comparative advantage in natural resources and to less extent unskilled labor, and in time series data, negative signs of parameter $\alpha 1$ and $\alpha 2$ are also feasible. Thus, an increase in the domestic (foreign) GDP, due to a higher level of capital or higher price of the import substituting products, by supply or output reallocation of resources effect or because of a higher domestic demand, will decrease exports (imports).

In the second stage cross section equation [1.3], the $\alpha 3k$ parameter that measures the trade impact of NTBs, could also have different signs. In the case of tariffs (i.e., k=1), under standard comparative advantage trade models, the sign of $\alpha 31$ is negative[20]. That is, an increase in the tariff rate of the foreign country will

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[19] The gravity theoretical models require assumptions such as the standard two sectors, factors and countries general equilibrium models of perfect and/or monopolistic competition with identical consumer specific preferences and constant and/or increasing returns to scale production functions in each sector.

[20] Bergstrand (1990) also shows a gravity model, under intra-industry trade, that yields a negative parameter $\alpha 3$ for tariffs.

decrease the export (or import) value of the domestic country. The impact of NTBs on trade flows (i.e., for k=2), however, will depend upon: i) the measure of the NTBs, ii) the type or group of NTBs and iii) the type of theoretical arguments of the NTBs impact. According to Bora (2003), studies on the trade impact of NTBs related to domestic support and export subsidies, quantitative restrictions, and export cartels produces negative effects on trade flows.

Theoretical arguments, partial and general equilibrium models[21] and evidence of NTBs, related to technical standards or barriers, harmonization of international trade procedures, mostly for developed countries, yield mixture impacts. Maskus and Wilson (2004) summarize the literature for this type of NTBs. Technical standards may promote exports (imports). By adhering to compatibility requirements, countries can improve their integration with global information and telecommunications networks. On the other hand, some forms of coordination of the international harmonization of technical standards could expand market access and exports (imports) The arguments for a negative impact on exports (imports) of technical barriers are based upon: i) increasing cost of production; ii) restraining competition or create market segmentation and raising market power; iii) lack of facilities for certification and testing in developing countries; and iv) increasing transaction cost for protectionist reasons (e.g., producing inspections delays and/or imposing arbitrary fees) (Maskus and associates, 2001). The econometric and survey studies are also consistent with the theoretical mixture of trade impacts (e.g., OECD, 1999; USITC, 1998; Henson and associates, 2000; Swann, 1996; and Moenius, 1999).

An alternative approach to measure the negative impact of trade barriers on exports is by estimating, what Kee and associates (2006) called, the market access overall trade restrictiveness index. Using a multi-country complex econometric methodology and the theory of the trade restrictiveness indices (e.g., Anderson and Neary, 1992, 1994 and 1996) they compute, for the case of Peru and with trade barriers (tariffs and NTBs) data of 2000-2001, that the ad-valorem equivalent tariff[22] to the set of trade barriers faced by Peruvian exporters (from the rest of the world) increases from 10,8% to 16,5 % when NTBs are taken into account. This means that the tariff effect of NTBs increases in more than 50% the equivalent tariff resulting from the effect of tariff barriers. As it is shown below, this result is consistent with the estimations obtained with the simple one-country methodology presented in this paper.

Regardless of these different approaches and evidence, the maintained conjecture in this paper is that the trade flows impact of a NTB is always negative for firms from developing countries whenever the NTB: i) produces international markets distortion; ii) is conclusively a protectionist barrier; and iii) yields a long run benefit for firms due to standards harmonization or shared standards. In the first two cases,

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[21] In these models, technical barriers may shift up the supply and/or demand curve (under a partial equilibrium framework, e.g., Thilmany-Barret, 1997), or reduce trade cost and/or increase demand (under a general equilibrium framework, e.g., Gasiorek and associates, 1992; and Harrison and associates, 1996).

[22] This rate is equivalent to the effect of set of trade barriers faced by exporters of a country from the rest of the world that would keep exports of that country at the observed levels.

the NTB need to be eliminated. In the third case, the short run impact may be still negative due to the fact that firms in developing countries face a set of domestic distortions that limit or distort the comparative and competitive advantage of the country[23]. Standard harmonization, shared or not, and coordination among countries, even if in the long run could have a positive impact, in the short and/or transition period, it adds an extra cost for developing countries' exporters and potential firms that could deter even further the access to foreign markets[24]. In this case, due to the asymmetry among firms' degree of development and/or the potential inequality of the trade gains distribution that it might arise due to those standardization efforts, a redistributive mechanism need to be created in order to eliminate the additional costs for developing countries firms.

Trade barriers impact estimations of equations [1.1]-[1.3] can be summarized using the exports impact indexes. Here, two indices are defined: the partial impact index and the total impact index. In the first case, the index measure the change of the country export share of sector 'i' (out the total Peruvian export value) when the tariffs and/or the number of NTBs of the export tariff lines of that sector, imposed by country 'j', is reduced by one unit. The total impact index measures the changes of the same export shares when all the tariffs and/or NTBs of country 'j' are completely eliminated in that sector. When the sector 'i' is the total Peruvian export sector, the partial export impact index is defined by equation [1.7]', derived from equations [1.4]-[1.7] in the following way:

[1.4] $(dVX_{ij}/VX_{ij}) = \alpha3_{kj}. \Delta R_{kij}; k=1, 2$

[1.5] $\Delta VX_{ij} = \alpha3_{kj}. VX_{ij}. \Delta R_{kij};$

[1.6] $PEII_{ij} = \sum_{i=1}^{N}(\Delta VX_{ij}/VX_t).100;$ VXt is the total export value at period t

[1.7] $PEII_j = \alpha3_{kje}. [\sum_{i=1}^{N} VX_{ij}. (\Delta R_{kij})/VX_t].100;$ N is the number of export tariff lines in sector 'i';

[1.7]´ $PEII_j = \alpha3_{kje}. S_{kj}.S_j;$

Where Skj is the share of the exports value of the export tariff lines with positive trade barrier k out of total (Peruvian) export value to country j; Sj is the share (multiplied by 100) of the value of exports to country j out of total country export value and $\alpha3_{kje}$ are the estimated coefficients from regression equation [1.3]. The total export impact index is defined by:

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[23] These distortions are related to: institutions inefficiencies; lack of innovation capacity of domestic firms; scarcity of the physical infrastructure for exports; undersupply of human capital and skilled workers; distorting domestic and environmental policies; etc.

[24] The higher number of NTBs imposed by Peruvian trade partner countries than the ones faced by the goods exported by domestic (Peruvian) firms shown in Table No 2, indicates that there exist a high number of export products (corresponding to export tariff lines) that Peruvian firms do not export. One plausible, although not necessarily the only one, explanation factor may be the extra cost caused by NTBs imposed by trade partner countries.

[1.8] $TEII_j = \alpha3kje. Rakj.Sj;$

Wherein Rkaj is the weighted average[25] of the trade barrier k imposed by (the foreign) country j to goods from Peru (the domestic country).

The export impact indices, partial and total, for changes of the trade barriers of the h sector from country j are, analogously, defined respectively by:

[1.9] $PEII_{jh} = \alpha3khje. Skhj.Shj.Sj;$

[1.10] $TEII_{jh} = \alpha3khje. Rakhj.Shj.Sj;$

Where Skhj is the share of export value of sector h with a positive trade barrier k out of the total export value of sector h; Sh, is the share of the export value of sector h to country j out of the total export value to country j; Rakhj is the weighted average of the trade barrier k imposed by country j in sector h. It is clear from these indices, that to extent that tariffs barriers (i.e., k=1) have been reduced (i.e., $S_1hj=S_1j=Ra_1hj=Ra_1j \rightarrow 0$) the NTBs are barriers that may produce the higher levels of exports impact in developing countries.

3. Estimations and Results

Tables No 3 and 4 reports the estimated figures of the regressions coefficients of equations [1.1] and [1.3] and the computations of the exports impact indices according to equations [1.7]'-[1.10] for five Peruvian export partners which represents 75% of the total Peruvian exports value of goods of 2002. In the case of the European Union, regression equations have been estimated taken account the average of exports value of goods and the GDPs dollar value of the main eleven export partner countries of the European Union[26]. Tariff rates and NTBs are the same for any of these countries. Also, for each country and the main export partners of the European Union, have been estimated the regression coefficients of equation [1.3] from sectors with feasible number of observations (i.e., numbers of export tariff lines) for estimation purposes, and in which Peruvian exporters face variables ad-valorem tariff rates and/or meaningful numbers of NTBs.

Although, statistically the estimation results for the first stage equation [1.1] are relative weak, the sign of the estimated coefficients seem to be consistent with Peruvian comparative advantage in natural resources and unskilled labor and foreign country comparative (e.g., in capital goods or unskilled labor) and competitive advantages.

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[25] The export shares of the export value of each export tariff line are the weights.

[26] These countries include: Germany, France, Spain, Netherlands, Sweden, Portugal, Belgium, Finland, Italy, United Kingdom, and Norway.

TABLE No 3

Regressions Results[27]

Country- HS Sector	X^1- Share 2002 (%)	GDP Coefficients		No	Trade Barriers Coefficients		No
		$(\alpha_1; D)$	$(\alpha_2; F)$		$(\alpha_{31}; T)$	$(\alpha_{32}; NTB)$	
United States (US)	**25,8**	-0,680 (-1.647)*	1,133 (0.485)	7475	-0,222 (-16,8)*	-0,229 (-11,1)*	1652
Fish and Crustaceans, Molluscs and Other Aquatic Invertebrates (03)	0,29				-0,434 (-0,799)	-1,056 (-5,90)*	44
Edible Vegetables and Certain Roots and Tubers (07)	0,44				-0.283 (-2,12)*	-0,272 (-2,53)*	35
Articles of Apparel and Clothing, Accessories, Knitted or Crocheted (61)	0,80				-0,182 (-3,00)*	-0,509 (-5,73)*	79
Articles of Apparel and Clothing Accessories, Not Knitted or Crocheted (62)	0,24				-0,423 (-5,98)*	-0,306 (-4,50)*	77
Other Made Up Textile Articles; Sets; Worn Clothing and Worn Textile Articles; Rags (63)	0,02				-0,762 (-6,36)*	-0,310 (-1,64)	24
European Union (EU)	**26,3**	-0.403 (-1.13)	0.210 (0.531)	5717		-1,219 (-10.9)*	892
Fish and Crustaceans, Molluscs and Other Aquatic Invertebrates (03)	0,83					-4,20 (-3,20)*	33
Edible Vegetables and Certain Roots and Tubers (07)	0,54					-3,53 (-2,37)*	29
Articles of Apparel and Clothing, Accessories, Knitted or Crocheted (61)	0,66					-2.23 (-9.15)*	43
Articles of Apparel and Clothing Accessories, Not Knitted or Crocheted (62)	0,09					-1,82 (-6,33)*	41
Other Made Up Textile Articles; Sets; Worn Clothing and Worn Textile Articles; Rags (63)	0,01					-2,87 (-9,07)*	23

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[27] Tariffs and/or NTBs have been excluded in the regressions for countries which their figures have one or all of the following features: i) Country o sector tariff rates are zero for most of the Peruvian exports to the country (e.g., EU and SWI); ii) The tariff rate is flat for most of Peruvian exports to the country (e.g., CHI); and iii) the sector NTBs are zero for most of the Peruvian exports to the country (e.g., JAP).

TABLE No 3

Regressions Results

Country- HS Sector	Export[1]-Share 2002 (%)	GDP Coefficients		No	Trade Barriers Coefficients		No
		$(\alpha_1; D)$	$(\alpha_2; F)$		$(\alpha_{31}; T)$	$(\alpha_{32}; NTB)$	
China (CHIN)	**7,8**	-1,050 (-0,139)	1,889 (0,206)	81	-0,550 (-11,05)*	-0,375 (-0,430)	53
Mineral Products (25-27)	2,7				-0,185 (-0,859)	-2,143 (-0,404)	6
Textiles and Textile Articles (50-63)	0,11				-0,532 (-7,11)*	-0,175 (-0,882)	10
Switzerland (SWI)	**7,3**	-1,69 (-2,35)*	0,638 (1,11)	126		-0,524 (-0,952)	49
Fish and Crustaceans, Molluscs and Other Aquatic Invertebrates (03)[2]	0,13					-1,414 (-0,345)	5
Japan[2] (JAP)	**4,9**	-0,049 (-0,221)	0,358 (2,12)*	1038	-0,087 (-1,98)*	0,060 (1,62)	258
Prepared Foodstuffs; Beverages, Spirits, and Vinegar; Tobacco and Manufactured Tobacco Substitutes (16-24)[2]	1,46				-0,335 (-3,16)*	0,051 (1,25)	25
Textiles and Textile Articles (50-63) [2]	0,19				-0,174 (-2,16)*		68
Chile[2] (CHI)	**3,3**	-0,112 (-0,232)	0,575 (1,67)*	4233		-0,003 (-0,226)	281
Live Animals; Animal Products (01-05) [2]	0,02					-0,015 (-0,132)	11
Textiles and Textile Articles (50-63) [2]	0,33					-0,298 (-1,54)	5

Source: Author's estimations. [1]ADUANET (2006); [2] The second stage regression include the constant term. No= Number of export tariff lines. Number in parenthesis are t-statistics; * means at most 10% level of significance.

TABLE No 4

Exports Share Trade Barriers Impact Indexes for the Peruvian Economy: 2002

Country-HS Sector (h)	Sj (%)/ Sjh	Sjt/ Sjth	Sjntb/ Sjntbh	Weighted Average per Tariff line		Tariff Impact (%)		Non Tariff Barrier Impact (%)	
				Tariff	NTB	Partial	Total	Partial	Total
United States	25,8	0,149	0,336	2,6	2,44	0,85	14,9	1.99	14.4
Fish and Crustaceans, Molluscs and Other Aquatic Invertebrates (03)	0,012	0,067	0,999	0,17	6,5	0,01	0,02	0,33	2,1
Edible Vegetables and Certain Roots and Tubers (07)	0,018	0,371	1,0	3,7	15,0	0,05	0,48	0,12	1,9
Articles of Apparel and Clothing, Accessories, Knitted or Crocheted (61)	0,032	0,919	1,0	11,3	9,0	0,14	1,69	0,22	3,7
Articles of Apparel and Clothing Accessories, Not Knitted or Crocheted (62)	0,010	0,945	1,0	9,1	11,2	0,10	0,95	0,07	0,9
Other Made Up Textile Articles; Sets; Worn Clothing and Worn Textile Articles; Rags (63)	0,001	0,661	1,0	6,4	4,7	0,01	0,10	0,01	0,03
European Union	26,3	0,021	0,207	0,1	0,654	Na	na	6,62	20,9
Fish and Crustaceans, Molluscs and Other Aquatic Invertebrates (03)	0,033	0,002	0,011	3,6	0,669	Na	na	0,040	2,426
Edible Vegetables and Certain Roots and Tubers (07)	0,021	0,018	0,003	6,3	0,216	Na	na	0,006	0,430
Articles of Apparel and Clothing, Accessories, Knitted or Crocheted (61)	0,026	0,000	0,999	0,0	5,016	Na	na	1,536	7,707
Articles of Apparel and Clothing Accessories, Not Knitted or Crocheted (62)	0,003	0,000	0,999	0,0	4,847	Na	na	0,167	0,808
Other Made Up Textile Articles; Sets; Worn Clothing and Worn Textile Articles; Rags (63)	0,000	0,000	0,965	0,0	5,766	Na	na	0,018	0,108

TABLE No 4

Exports Share Trade Barriers Impact Indexes for the Peruvian Economy: 2002

Country-HS Sector (h)	Sj (%)/ Sjh	Sjt/ Sjth	Sjntb/ Sjntbh	Weighted Average per Tariff line		Tariff Impact (%)		Non Tariff Barrier Impact (%)	
				Tariff	NTB	Partial	Total	Partial	Total
China	7,8	0,766	0,938	7,5	0,95	3,287	32,16	2,742	2,778
Mineral Products (25-27)	0,346	0,324	0,905	4,2	0,91	0,162	2,10	5,228	5,261
Textiles and Textile Articles (50-63)	0,015	0,999	0,893	13,6	1,40	0,061	0,830	0,018	0,028
Switzerland	7,3	0,000	0,556	0,0	1,016	Nd	nd	2,127	3,887
Fish and Crustaceans, Molluscs and Other Aquatic Invertebrates (03)	0,017	0,000	1,0	0,0	1,322	Nd	nd	0,176	0,233
Japan	4,9	0,132	0,332	0,8	1,175	0,056	0,350	-0,098	-0.345
Prepared Foodstuffs; Beverages, Spirits, and Vinegar; Tobacco and Manufactured Tobacco Substitutes (16-24)	0,300	0,049	0,295	0,164	1,020	0.024	0,081	-0,022	-0,077
Textiles and Textile Articles (50-63)	0,038	0,481	0,000	1,980	0,000	0.016	0,065	Nd	nd
Chile	3,3	0,944	0,203	6,603	2,150	Nd	nd	0,002	0,021
Live Animals; Animal Products (01-05)	0.006	0.995	1,000	6.97	24.888	Nd	nd	0.0003	0.007
Textiles and Textile Articles (50-63)	0.102	0.972	0.033	6.81	0.042	Nd	nd	0.003	0.004

Source: Author's elaboration. Table No 3.

On the other hand, estimation results of the second stage equation [1.3] (with statistical significance for the majority of the regression coefficients, in particular from the two major export partners, United States and the European Union) are consistent with a negative impact of both trade barriers (tariffs and NTBs) on exports[28]. Figures from Table No 4 show a series of features of the trade barriers and their exports impact in the Peruvian export sector:

i)   Except for Chile, the share of Peruvian exports which face NTBs (out of the total export value to a country) is higher that the respective share of exports which face tariff barriers;

ii)   The main Peruvian export partners from developed countries (with or without SGP) are using NTBs as the main instruments to limit market access to Peruvian exports. On the other hand, the main Peruvian export partners from developing countries are still using tariff barriers as the main trade barrier to limit market access of Peruvian goods[29];

iii)   The main Peruvian export partners from developed countries use at least one type of trade barrier whenever the other type is reduced or eliminated. Thus, the lower the average tariff rate (or the number of NTBs per export tariff line) in a sector, the higher the average number of NTBs per export tariff line;

iv)   Elimination of all NTBs from the major Peruvian export partners from developed countries it is estimated to increase the export share value of exports in more than a double (i.e., 38,9%) that the increase of this share in the case that all ad-valorem tariff rates are eliminated (i.e., 15,2%) in those countries. This result is a direct consequence of the lower level of the tariffs rates (i.e., in average lower than 2,7%).

These results suggest that regional trade preferential agreements between developed and developing countries, with similar trade barriers structure as in the Peru economy, may not promote exports and GDPs, in a meaningful way, in these developing countries[30]. The exports impact of those agreements will be higher if both tariff and NTBs are simultaneously eliminated or alternatively, if tariffs rates and distorting NTBs are eliminated and standards harmonization and countries coordination, which produces long run positive exports impact, are implemented with some kind of transfer mechanism from developed countries to developing countries export firms that avoid the extra cost caused by the harmonization and coordination of these standards.

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[28] Only regressions coefficients from Japan produce a positive impact of the NTBs.

[29] Contrarily, the Andean countries even though has practically eliminated the ad-valorem tariff rates among members of the Andean agreement, still are imposing a high number of NTBs (Table No 2).

[30] In a previous work, Tello (2004b) using a computable general equilibrium (GTAP) model with 57 sectors of goods and services, estimates that the increase of exports of a free trade area (i.e, zero tariff rates for all the import and export tariff lines) between United States and Peru, will increase in 20% the exports value of the year 2002 and 0,28% the real GDP of the Peruvian economy. The partial equilibrium estimations result of the increase of exports of US elimination of tariffs in this paper is 15%.

4. Conclusions and Final Remarks

This paper has presented a straightforward methodology that can be used (by country authorities) as a first hand tool to assess and estimate the trade barriers impact on exports faced by a particular developing country. The methodology uses few and feasible variables that are found in standard statistics from developing countries and trade data at 6 digits level of aggregation of the harmonized classification system. The application of this methodology to the Peruvian case yields consistent results to multi-country sophisticated methodologies (e.g., Kee and associates, 2006). The main results of the trade barriers analysis and their export impact for the Peruvian economy are:

- The increased importance of NTBs (as protectionist and regulatory trade instruments) and the continual decline of tariff rates resulted from the eight GATT rounds of multilateral trade negotiations and the proliferation of regional preferences agreements among regions of countries have implied that by 2002, more than 70% of the total Peruvian exports (to the main trade partners[31]) face low levels of ad-valorem tariff rates simultaneously with relative high levels of the number of NTBs and the average number of NTBs per export line.

- Tariff and NTBs faced by Peruvian exports of goods, in particular from developed countries are concentrated on agricultural products, manufacture of food products and beverages and textiles;

- Both, tariff and NTBs, are estimated to have a negative impact on Peruvian exports of goods. This impact is consistent with theoretical arguments, partial and general equilibrium models and previous empirical evidence and with more complex methodologies which are extensive in the use of data sources and variables.

These results suggest that the new wave of regional preferential trade agreements among developed and developing countries, which face similar trade barriers structure as the Peruvian exports, may not have meaningful effects on trade flows unless that is accompanied by substantial reductions in the number of NTBs per export tariff lines.

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[31] Such as: United States and countries from the European and Andean Communities.

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