Intra-Regional Chains linked to Business Patterns: Methodology and Preliminary Findings with applications to Puerto Rico-CAFTA-DR

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Summary

Its main objective is to create a new database on Puerto Rico's intra-regional trade with the U.S. and with countries with which the U.S. has current international trade agreements in force; and to link these data with U.S. Census Bureau business patterns' statistics. It describes the methodology to generate the New Integrated Database on Puerto Rico's Intra-Regional Chains linked to Business Patterns. Then it presents preliminary findings with applications to PR-CAFTA-DR intra-regional chains. The underlying proposition is that as a U.S. territory, Puerto Rico is not technically excluded from participating in these agreements. Therefore, a new database is needed that allows businesses and government officials to create trade strategies. Work is located within global value chain (GVC) literature that approaches the mining of existing datasets to create new ways to identify GVCs not dependent only on case studies. A conclusive design with quantitative descriptive methods was employed. Proposes methodology that bridges gaps in GVC literature. This analysis would be the first in its kind to be carried out for Puerto Rico.

Keywords: Puerto Rico, intra-regional trade; global value chains; production maps; mapping trade; U.S. Trade Online; strategic trade policy.

Introduction

Facing the international crisis with an outdated development model, and constrained by lack of sovereignty in international trade agreement negotiations, Puerto Rico needs to construct new pathways to growth within its current political status.

This work has two underlying propositions. The first is that as a U.S. territory with alarming unemployment and negative growth rates, Puerto Rico has two important potential growth strategies: increase intra-regional trade with the U.S. and increase intra-regional trade with countries with which the U.S. has trade agreements in force. The second underlying proposition is that export growth must be linked to employment generation and to business growth patterns that benefit small and medium sized enterprises and not only larger firms.

The main general objective of this article is to carry out analyses based on a newly created database on Puerto Rico's intra-regional chains linked to business patterns (2008-2012), specifically as applied to the Caribbean members of the Central American Free Trade Agreement-Dominican Republic (CAFTA-DR).

Puerto Rico, as a U.S. territory, can't negotiate international trade agreements. This research work proposes that Puerto Rico's weakness –lack of sovereignty to negotiate international trade agreements— can be turned into a strength by focusing on what it has: duty free trade with the U.S. and the possibility of participating in the international trade agreements that the U.S. has in force worldwide. Opportunities linked to developing its strengths should be linked to employment generation and small and medium enterprise (SME) growth.

In order to formulate growth strategies consonant with the proposed argument, a new database was created and is utilized to identify which sectors and industries could be targeted as growth engines so that trade strategies can be developed for Puerto Rico within these trade agreements and also to stimulate employment generation and small and medium sized enterprises' growth.

What is the problem under study and why is it important?

This article focuses on two interrelated problems: the lack of global value chain analyses based on trade databases and the lack of an integrated database on intra-regional trade for Puerto Rico.

Experts recognize that quantitative measures and methods based on database analysis are lacking within the Global Value Chain framework. The consequences are that GVCs' analyses are based on case studies, are mostly descriptive and data can't be generated to analyze trade and production patterns within a regional bloc.

A group of researchers have responded to the first gap by presenting an argument for the collection of new statistics, and for reworking, mining and linking existing data sets (Sturgeon and Gereffi 2009: 5). No work has been presented to address the second gap pertaining to Puerto Rico.

The proposed work is located within the global value chain (GVC) literature that approaches the mining and linking of existing datasets to create new ways to identify GVCs not dependent only on case studies. Within the GVC literature, the intellectual merit of the project is that it proposes alternatives to the conceptual and methodological problem stated above. It purports to achieve this by linking trade data of the United States Trade Online database with data from the U.S. Census Bureau on Business Patterns; by mining the newly integrated

database; and by analyzing the database for intra-regional chains, production and business patterns.

Specific Objectives

The specific objectives of this article are:

(a) to generate intra-regional trade and production maps and chains (2008-2012) for Puerto Rican exports for the aforementioned U.S. international trade agreements in force --P.R.-CAFTA based on the new database (2008-2012) I have created on Puerto Rico's intra-regional trade with countries with which the U.S. has current international trade agreements in force linked to U.S. Census Bureau's data on business patterns for Puerto Rico. A characterization of industrial sectors, industries and business patterns by employment and size will be presented based on the integrated database.
(b) to nurture/generate strategic trade analysis and policies for businesses and government officials in Puerto Rico based on the intra-regional trade and production maps.

Literature Review

This project is based on the subcomponent of the Global Value Chain literature that focuses on providing quantitative measures and methods based on database analysis within the global value chain framework. The project's approach and method is derived from an analysis of how researchers have approached the problem.

This section presents a brief literature review focused on the lack of an integrated database followed by a detailed analysis of the proponent's method developed to understand ALBA intra-regional trade and production maps. It is this method that will be applied to the case of Puerto Rico and that is why it is explained in detail.

Lack of an Integrated Database. For the objectives of this research project, the most significant works are those of Lall (2000), Kierzkowski (2001), Feenstra and Hamilton (2006), Sturgeon and Gereffi (2009), Sturgeon and Memedovic (2010), and Aponte-García (2011) because they all contributed conceptualizations that linked trade to global chain analyses utilizing statistics from existing databases, specifically the United Nations Commodity Trade Database.

Lall (2000) classified products based on their technological requirements according to a 3-digit standard industrial trade classification categorization. He then established five groupings "…listed in ascending levels of technological content: primary products, resource-based manufactures, and low, medium and high tech manufactures (Sturgeon and Gereffi 2009: 7; Lall 2009: 341). Lall concluded that 'increases in 'high technology' exports suggest that learning and industrial upgrading is taking place in the exporting country" and related his research to GVC's 'upgrading' implications for developing countries.

Kierzkowski (2001) contributed an analysis of 'fragmentation of production'. He utilized the United Nations Commodity Trade database to classify exports by distinguishing between two

categories: final goods and parts and components. Instead of classifying exports by its high technology content, as did Lall, Kierzkowski analyzed trends in exports and concluded that the parts and components category had grown.

Feenstra and Hamilton (2006) contributed the concept of trade-data archaeology and "…tracked detailed export flows from Korea and Taiwan to the United States over long periods of time. They concluded that 'specific products, rather than broad industries, have been key to upgrading in these countries (microwave ovens, computer monitors). They then tied exports to strategies of US retailers to show how buyer driven Global Value Chains (GVCs) have influenced development outcomes in East Asia" (Sturgeon and Gereffi 2009: 7).

Sturgeon, T. and O. Memedovic (2010) classified goods by the Broad Economic Categories' (BEC) codification of consumption, capital and intermediate goods and calculated that global trade in intermediate goods has far outpaced other categories. They present this outcome as evidence of the emergence of GVC. They stress that patterns are greatly dependent on the characteristics of specific products and industries and that, therefore, general policies must be avoided.

These contributions have provided new conceptual frameworks and methodologies. Significant amongst the conceptual frameworks are the contribution of Fragmentation of Production (Kierzkowski 2001); International Trade, Global Value Chains, Industrial Upgrading and Business Function (Sturgeon and Gereffi 2009); and that of Intra-Regional Trade and Production Maps and Chains (Aponte-García 2011).

Kierzkowski's concept of fragmentation of production is different from that of the GVC framework. His analysis of the growth in parts and components was viewed as a confirmation of the spread of global value chains, although he doesn't provide a link to a business category or concept. Sturgeon and Gereffi (2009) argue in favor of the collection of establishment-level economic data according to business functions that can provide a map of the value chain. Among these functions are: strategic management, product or service development, marketing, sales and account management; intermediate input and materials production; procurement; operations (industry code; transportation, logistics and distribution; general management and corporate governance; human resource management; technology and process development; firm infrastructure; and customer and after-sales service (Sturgeon and Gereffi, 2009: 23). These authors have devoted efforts in the United States, the World Bank and the United Nations to lobby for these data to be collected by such institutions as the U.S. Census Bureau. However, these data is still not being collected, and some of their business functions' categories might be difficult to operationalize in a quantitative manner. Aponte-García's concept classified intra-regional trade data in upstream and downstream categories along the chain and linked these data to industries and business categories by focusing on mining existing data sets and creating conceptual links to business categories.

New descriptive quantitative methods have provided advances in research: Lall's (2000) new classifications of exports based on their technological requirements; Feenstra and Hamilton's (2006) trade-data archaeology tying export performance to changes in retail and the rise of the 'big buyers'; Sturgeon and Memedovic's (2011) intermediate goods trade growth at the world level as proof of strengthened global value chains; and Aponte-García's (2011) intra-regional trade classification of exports by broad economic category to establish regional maps and chains of production in the Bolivarian Alliance (ALBA).

In general terms, although all these contributions advance research on the posed question, except for Aponte-García's work (2011), none of them applies the methods to analyze trade-

production-business relations within a regional trade agreement. In this respect, Gereffi, Spener and Bair (2002) studied GVC in NAFTA but did not utilize existing databases to analyze relations; instead, they used secondary data from previous studies.

Author's Method developed to understand ALBA intra-regional trade and production maps. Aponte García (2011) used UN Comtrade data plus qualitative data on regional enterprises. She converted data on intra-regional exports within the Bolivarian Alliance (ALBA) --from standard industrial classification to broad economic category code; and then classified data by ten categories all belonging to a new multilatina concept of grandnational enterprise (GNE). The GNEs emerged within the context of the Bolivarian Alliance as regional mixed state enterprises between ALBA-member countries. In this way, export trade data is linked to the range of activities encompassed by a specific business category, that of the GNEs.

This process required four steps and followed an original methodology developed by Aponte-García (2011). In the first step, the author, utilizing data from the United Nations Commodity Trade database (UN Comtrade), classified and organized data on exports for ALBA member countries according to the Standard International Trade Classification (SITC) code (see column 4 of table 1). In the second step, the author utilized the SITC to Broad Economic Categories (BEC) conversion table to convert SITC categories to BEC codes (see column 5 of table 1). The BEC code classifies goods according to whether these are primary, processed, capital goods, transport equipment and parts and accessories thereof, consumer goods and goods not elsewhere specified (mostly military). These categories were used to position/locate export categories along the production and distribution chains by industry.

Primary goods were positioned/located upstream in the chain, processed goods were positioned along the chain, and consumption goods were positioned downstream. In the third step, the author created a codification for each record in order to classify exports according to Grandnational Enterprises (GNEs) categories (see column 8 of table 1). These GNE categories were matched to exports by industry and subsector classification according to the author's original codification. In the fourth step, then, regional production chains were created as SITC-BEC matrices by industry and country (see table version of matrix as table 2 or as graph version in figure 1). As an outcome, data classification of intra-ALBA trade in exports allowed us to analyze, for each record on exports, the following information: period, reporter country, partner, SITC code, BEC code, commodity description, industry, link to grandnational enterprise, and trade value. This type of data classification allowed to analyze what each ALBA member was producing and exporting to the bloc; and also, how trade maps and regional production chains were being formed by industry (see table 1 and figure 1). This analysis was complemented by qualitative methods, specifically video ethnographic methodology of GNEs involving three filming trips to Venezuela.

Table 1. Example of data analysis obtained from application of Aponte García's methodology

1	2	3	4	5	6	7	8	9
Period	Reporter	Partner	SITC Code	BEC equiv	Comm. desc.	Industry	GNEP link	Trade value
2009	Cuba	Venezuela	S3-54293	63	Medicaments,	Medicine-phar	Health and Me	141895514
2009	Cuba	Venezuela	S3-54219	63	Medicaments (	Medicine-phar	Health and Me	31857290
2009	Cuba	Venezuela	S3-54213	63	Medicaments (	Medicine-phar	Health and Me	20261871
2009	Cuba	Venezuela	S3-54292	63	Medicaments (	Medicine-phar	Health and Me	9955427
2007	Cuba	Venezuela	S3-54213	63	Medicaments (	Medicine-phar	Health and Me	8222007
2004	Venezuela	Ecuador	S3-54293	63	Medicaments,	Medicine-phar	Health and Me	6823735
2008	Cuba	Venezuela	S3-54213	63	Medicaments (	Medicine-phar	Health and Me	6516937
2005	Venezuela	Ecuador	S3-54293	63	Medicaments,	Medicine-phar	Health and Me	6345320
2004	Ecuador	Venezuela	S3-54219	63	Medicaments (	Medicine-phar	Health and Me	6098076
2002	Venezuela	Ecuador	S3-54293	63	Medicaments,	Medicine-phar	Health and Me	6031007
2003	Venezuela	Ecuador	S3-54293	63	Medicaments,	Medicine-phar	Health and Me	5732843

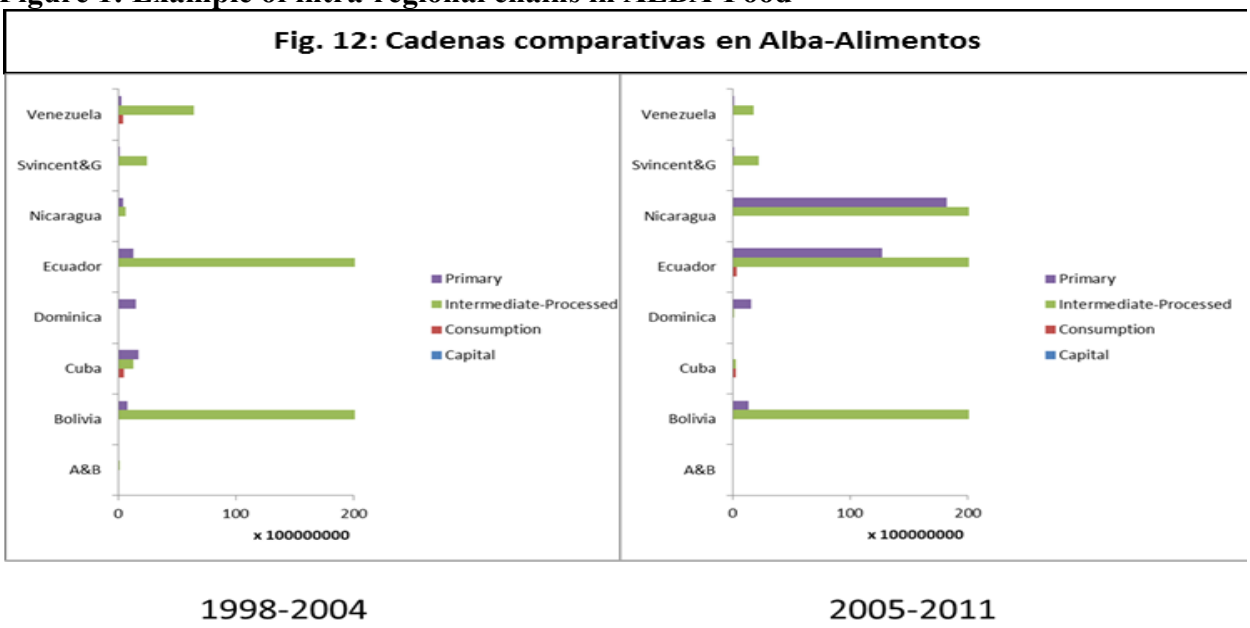
Source: Author's calculations and conceptualization based on UN Comtrade database.

Table 2. Intra-ALBA Regional Chains in Food by Exporting Country, 2005-2009 Period (in current US dollars)

Trade Value for the 2005-2009 Period (in current US Dollars)								
BEC Code	**Anti-gua and Bar-buda**	**Bolivia**	**Cuba**	**Dominica**	**Ecuador**	**Nicaragua**	**Saint Vincent and the Grenadines**	**Venezuela**
Primary								
21	0	2,073,760	37,175	0	34,748,828	17,103,213	30	19,849
Intermediate-Processing								
111	4	7,602,256	14,118	395,270	3,406,886	78,770,592	676,716	799,317
22	0	712,522,590	10	278	40,677,561	11,646,968	2,056,205	149,900
121	0	285,777,224	516	78,715	202,491,287	11,799,307	11,867,517	2,406,671
Capital								
41	0	0	0	0	0	730,311	0	0
Consumption								
112	0	3,452,749	0	10,652,980	6,588,944	75,128,796	76,838	54,094
122	22410	56,790,452	1,842,130	823,716	554,679,438	270,635,737	3,455,716	18,696,197
63	0	46,173	2,859,886	170,940	989,247	4,925,672	0	367,135

Source: Author's calculations and conceptualization based on UN Comtrade database and United Nations (2002).

Figure 1: Example of intra-regional chains in ALBA-Food



Source: Author's calculations and conceptualization based on UN Comtrade database.

The trade maps and chains presented in table 2 and figure 1 can be made more specific by analyzing particular sectors within industries. For example, in the case of the food industry in ALBA, upstream, the category BEC code 21 refers to primary products that are exported without much processing, such as maize seed and hides and skins. Along the chain, the BEC categories 111, 22, and 121 refer to those phases of intermediate processing including primary exports destined mainly for industry, industrial supplies processed and those goods processed mainly for industry. Capital goods are identified by BEC code 41 and comprise livestock genetics as well as machinery. In this case, for instance, Nicaragua's contribution of genetic material proves significant. Downstream, BEC categories 112, 122 and 63 refer to consumption. Some of these goods are either primary or processed but for household consumption whilst others are consumer goods non-durable.

As stated by Michelutti (2012: 7): "Using UN Comtrade data plus qualitative data on regional production, Aponte García (2011) is pioneering a new framework of analysis to understand how ALBA is working in practice". The objective is to apply the methodology designed and applied to analyze intra-regional trade in ALBA, to Puerto Rico. The type of analysis proposed has never been carried out for Puerto Rico.

The proposed theorization and methodology can influence the discipline because at present, experts recognize that quantitative measures and methods are lacking within the Global Value Chain framework. The consequences are that GVCs' analyses are based on case studies, are mostly descriptive and data can't be generated to analyze trade and production patterns within a regional bloc. Moreover, the proposed methodology would allow researchers to compare data across time, regional blocs, industries and countries.

The lack of an integrated database impairs the formulation of strategic trade policy analysis argued for since Elhanan Helpman and Paul Krugman's[1] seminal work of the 1980s built the foundations for a new trade theory[2] (Helpman and Krugman 1985). The argumentation proposed that it was the strategic trade and industrial policies tied to the targeting of firms and the advantages created by path dependence that explained the success of specific industries in particular regions (Aponte-García 2013: 2).

Revamped after the recent post-2007 international crisis, cries for taking up again the strategic trade and policy analysis were put forth by the United States government. In 2013, the Executive Office of the President, Office of the U.S. Trade Representative, published its fourth strategic plan in four consecutive years, the FY 2013-FY2016 Strategic Plan. This plan sets as one of its goals the development of a strategic and transparent trade policy (USTR 2013: 6). The plan purports to double U.S. exports by 2015 thus supporting millions of additional American jobs (USTR 2011: 2) In this document, Puerto Rico is not mentioned once.

Research Challenge

Developing a methodology to link trade and production statistics was approached by proposing a conclusive descriptive research design with quantitative methods. This research has generated a conceptualization and an original methodology to link the level of analysis of international trade to that of regional production chains, as explained above.

Application to Puerto Rico's analysis: Utilization of the UN Comtrade was considered as a first option. But this option was discarded because Puerto Rico's export data is reported as part of US export data and can't be disaggregated, as certified by Arlene Adriano, an International Trade Statistics Section representative for UN Comtrade in response to my query.

Therefore, an alternative approach was proposed that applies and adapts the methodology developed by the author in using the UN Comtrade database, to the USA Trade Online database.

USA Trade Online is a database belonging to the Foreign Trade Division of the Census Bureau (http://data.usatradeonline.gov/usatrade/View/dispview.aspx). It provides export and import data by State (including Puerto Rico), Commodity, Country, and Year. It has the advantage that it presents data for Puerto Rico's exports to the following US Trade Agreements' partners: CAFTA-DR including the Dominican Republic and Central American countries; NAFTA: Mexico and Canada; Australia, Bahrain; Chile; Colombia; Israel; Jordan; South Korea; Morocco; Oman; Panama; Peru; and Singapore. This facilitates carrying out an analysis of exports from Puerto Rico to groups of countries that have international trade agreements with the United States.

USA Trade Online has some limitations. Exports from Puerto Rico to the United States or to individual states of the U.S. can't be tracked through this database. Data obtained at the 5-digit SITC level requires a special request, for which there is a charge; and no data by company, exporters, etc. is available since Congressional law prohibits US from disclosing such information.

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[1] For which Paul Krugman later obtained the 2008 Nobel Prize in Economics.

[2] New trade theory stated that once the firm and imperfect competition were introduced into the international trade model, the pattern of trade ensuing turned unpredictable (Mikic, 1998: 174).

After evaluating the advantages and limitations of the USA Trade Online database, it was concluded that it is feasible to carry out an analysis similar to the one used in the ALBA study. Steps followed are summarized in table 3.

When analyzing the Country Business Pattern data to carry out this analysis, it was important to state the following caveat: US County Business pattern data does not allow us to distinguish between exporting and non-exporting firms.

Steps. First, the author extracted data from USA Trade Online by Harmonized System 2007 code. Second, data was converted from HS 07 to SITC 3 codes and then to BEC 4 categories in order to define the position along the chain. Third, in order to generate a column on county business patterns by employment and size according to industries, data had to be converted from BEC 4 categories to NAICS since the US Bureau of the Census provides information on business patterns according to NAICS industry codification. These conversions were performed for the period 2008-2012 for which data were available.

Table 3. Concept and Steps of the Proposed Method by Intra-Regional Trade Analysis Category

Concept and Steps in Proposed Method	**Puerto Rico with Countries with which the United States has International Trade Agreements In Force**
1- Exports	HS 2007
2- Conversion and position along the chain	From HS 2007 to BEC 4 ; BEC 4 to NAICS
3-Position along the chain	
4-Business category by employment generation and by size of establishment (number of employment number)	Country Business patterns by employment and by employment-size class, Industry NAICS

Source: Author's elaboration.

Once all these steps and conversions were completed, the new database was created and the author proceeded to carry out analyses of intra-regional trade and chains by partners, industry, and business patterns. Preliminary results are presented next.

Results

Table 4 presents results according to the Broad Economic Categories classification of primary, intermediate, capital, transportation and consumption. In addition, it distinguishes between goods destined for industry and those destined for households.

			industrial							consumption			
			BEC category	PR to CAFTA	CAFTA to PR	DIF ENTRE PR Y CAFTA				BEC category	PR to CAFTA	CAFTA to PR	DIF ENTRE PR
primary indust	PRIFBMI	primary, food and beverages, mainly for industry	111	236432	166500	69932	primary hh co	PRIFBHHC	primary, food and beverages, mainly for household consumption	112	4919937	221375837	-216455900
primary indust	PRIISNES	primary, industrial supplies not elsewhere specified	21	462884374	81155195	381729179							
primary fuels	PRIFL	primary, fuels and lubricants	31	0	133658310	-133658310							
processed indu	PROFBI	processed, food and beverages, mainly for industry	121	7701888	133274001	-125572113	processed hh c	PROFBHHC	processed, food and beverages, mainly for household consumption	122	69507730	712223250	-642715520
processed indu	PROISNES	processed, industrial supplies not elsewhere specified	22	427609625	637252744	-209643119	processed fuel	PROFLO	processed, fuels and lubricants, other	322	752326	997317	-244991
capital goods	CAPGETEPA	capital goods (except transport equipment), parts and accessories	42	1547728363	1685732229	-138003866							
capital goods	CAPGETE	capital goods (except transport equipment)	41	582743153	1044145759	-461402606							
							consumption	CONGNESSD	consumer goods not elsewhere specified, semi-durable	62	453085024	141785232	311299792
							consumption	CONGNESND	consumer goods not elsewhere specified, non-durable	63	122831830	145536341	-22704511
							consumption	CONGNESD	consumer goods not elsewhere specified, durable	61	37812628	147840965	-110028337
transportation	TRANEPAOI	transport equipment, and parts and accessories thereof, other, industrial	521	28216802	0	28216802	transportation	TRANEPAPMC	transport equipment, and parts and accessories thereof, passenger motor cars	51	189522577	0	189522577
transportation	TRANEPAPA	transport equipment, and parts and accessories thereof, parts and accessories	53	9946426	7628649	2317777	transportation	TRANEPAONI	transport equipment, and parts and accessories thereof, other, non-industrial	522	1235487	145853	1089634
gnes	GNES	goods not elsewhere specified	7	96405	0	96405							

Source: Author's calculations and conceptualization based on USA Trade Online database and on United Nations Statistics Division.

Primary, processed (intermediate) and consumption classifications impact regional chains differently and pose diverse challenges for Puerto Rico. Primary products for industry under category 111 include such diverse items as wheat and soybeans as well as live mules and chickens. Primary products for household consumption under category 112 for include such goods as dried beans, sweet potatoes, and spices. Primary products not elsewhere identified under category 21 include such items as live plants, furskins, and wood in the rough. Primary fuels and lubricants under category 31 include liquefied propane and butane. Processed products for industry under category 121 include products such as coconut oil, cereal flours, sugar and cocoa powder. Processed products for industry under category 22 include animal feed preparations as well as wood, chemical and plastics products. Processed products for household consumption under code 122 include meat and vegetable products while code 322 includes processed fuels and lubricants. Consumer products for households include durable (code 61) such as musical instruments, orthopedic appliances, metal furniture, among others; non-durable (code 63) include girdles, fungicides, disinfectants, and medicaments; and semi-durable (code 62) products include footwear, tableware, plastics, and glassware. Other relevant codes include transport equipment for industrial uses (codes 521 and 53); and transport equipment for consumption such as passenger cars (code 51) and parts and accessories for non-industrial use (code 522).

For the analysis of intra-regional chains, the relevant result is that trade exists in the primary, processed, consumption, capital and transportation categories. If there is significant activity in these realms, then intra-regional chains can be identified either because they already exist or because they can be created.

Results in red represent deficits for PR-CAFTA's intra-regional trade. Results in green represent superavits for PR-CAFTA's intra-regional trade. Although for some categories PR registers a deficit, trade from PR exists in all categories. This is a positive result because it shows that there is an existent base of exporters, even if some these exporters are not producers but rather only involved in trade. Puerto Rico, a single country, is compared with a region CAFTA-DR, to determine the capacity of the island to export to a region.

Puerto Rico registers a superavit in two primary industrial categories (codes 111 and 21) and in semi-durable consumer goods (code 62). As the island is known for its large pharmaceutical production, the superavit in categories 111 and 21 was unexpected. Also, because the Puerto Rico-CAFTA-DR intra-regional trade includes members which are strong primary goods' producers.

Table 5 in the next page identifies the "chain" categories by industry and by intra-regional trade category (PR-CAFTA-DR and CAFTA-DR-PR). It provides information on what each industry trades by BEC code. Those industries with existing trade in primary, intermediate and consumption categories by BEC code can be targeted to build intra-regional trade. The last row in this table provides information on the number of small and medium enterprises that the U.S. Bureau of the Census identifies for each Puerto Rican industry participating in the PR-CAFTA-DR intra-regional trade.

		PR to CAFTA	CAFTA to PR	PR to CAFTA	CAFTA to PR	PR to CAFTA	CAFTA to PR	PR to CAFTA	CAFTA to PR	PR to CAFTA	CAFTA to PR	PR to CAFTA	CAFTA to PR	PR to CAFTA	CAFTA to PR	PR to CAFTA	CAFTA to PR
		Agriculture, Forestry, Fishing and Hunting	Agriculture, Forestry, Fishing and Hunting	Mining	Mining	Manufacturing	Manufacturing	Manufacturing	Manufacturing	Manufacturing	Manufacturing	Information	Information	Arts, Entertainment and Recreation	Arts, Entertainment and Recreation	Other Services (except Public Administration)	Other Services (except Public Administration)
		11	11	21	21	31	31	32	32	33	33	51	51	71	71	81	81
primary, food and beverages, mainly for industry	111	236432	166500					0	0	0	0	0	0	0	0	0	0
primary, food and beverages, mainly for household consumption	112	1700007	214124258			3219930	7251579	0	0	0	0	0	0	0	0	0	0
processed, food and beverages, mainly for industry	121	0	0			7701888	133274001	0	0	0	0	0	0	0	0	0	0
processed, food and beverages, mainly for household consumption	122	13041	6545			69496713	712216705	0	0	0	0	0	0	0	0	0	0
primary, industrial supplies not elsewhere specified	21	71479430	23698371	335332195	46298016	120375	402743	366023117	7373735	0	3382330	0	0	0	0	0	0
processed, industrial supplies not elsewhere specified	22	395403	61653	0	0	57474802	28542844	309773422	328908599	58074348	275228023	752116	4292019	0	0	1139534	219606
primary, fuels and lubricants	31	0	0	0	25585	0	0	0	133632725	0	0	0	0	0	0	0	0
processed, fuels and lubricants, other	322	0	0	0	0	0	0	752326	997317	0	0	0	0	0	0	0	0
capital goods (except transport equipment)	41	10000	10000	0	0	0	0	267518	34476	582465635	1044101283	0	0	0	0	0	0
capital goods (except transport equipment), parts and accessories	42	0	0	0	0	211632	28514	5027312	190966	1542077465	1685467455	0	0	0	0	411954	45294
transport equipment, and parts and accessories thereof, other, industrial	521	0	0	0	0	0	0	0	0	28216802	0	0	0	0	0	0	0
transport equipment, and parts and accessories thereof, other, non-industrial	522	0	0	0	0	0	0	0	66584	1235487	79269	0	0	0	0	0	0
transport equipment, and parts and accessories thereof, parts and accessories	53	0	0	0	0	0	0	602374	7380398	9344052	248251	0	0	0	0	0	0
consumer goods not elsewhere specified, durable	61	0	0	0	0	0	825	3261742	28316974	32011583	8359858	0	0	2539303	111163308	0	0
consumer goods not elsewhere specified, semi-durable	62	0	0	0	0	432590615	36987160	18503665	104212881	546978	533961	1443766	51230	0	0	0	0
consumer goods not elsewhere specified, non-durable	63	0	6300	0	0	13057236	15672846	107106747	92687443	1201659	29505496	1360618	7417492	105570	246764	0	0
goods not elsewhere specified	7	0	0	0	0	0	0	0	0	96405	0	0	0	0	0	0	0
transport equipment, and parts and accessories thereof, passenger motor cars	51	0	0	0	0	0	0	0	0	189522577	0	0	0	0	0	0	0
CANTIDAD DE PYMES POR INDUSTRIA		8		48		1748						544		390		3376	

Source: Author's elaborations and calculations based on USA Trade Online, United Nations Statistics Division and the Index of Correspondence Tables of the European Commission.

Conclusions

A methodology to analyze existing and potential intra-regional trade between Puerto Rico and countries with which the Unites States of America has trade agreements in force has been constructed. A new database has also been constructed to carry out these types of analyses. Puerto Rico reflects trade surpluses with CAFTA-DR in several categories. Furthermore, intra-regional trade has been presented by industrial category and by BEC code allowing for analyses focused by industries. Lastly, the quantity of small and medium enterprises by industry has been linked to these analyses. The next steps in developing the methodology would include: linking SMES's categories to exporters; and analyzing, based on directories, the names of enterprises participating in this intra-regional trade.

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