Puerto Rico-Caribbean Intra-Regional Chains linked to Business Patterns: A Comparative Analysis of PR-CAFTA-DR, PR-NAFTA, PR-Colombia and PR-Panama

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Summary

Explains methodology developed by author to generate the New Integrated Database on Puerto Rico's intra-regional chains linked to U.S. Census Bureau business patterns' statistics (2008-2012). Then it presents findings for Puerto Rico-CAFTA-DR, NAFTA, PR-Colombia and PR-Panama. 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. This analysis would be the first in its kind to be carried out for Puerto Rico.

Keywords: Puerto Rico, mapping intra-regional chains; mining data sets.

Introduction

The main general objective of this research is to further develop and mine a newly created database (that this author constructed last year) on Puerto Rico-Caribbean intraregional chains linked to business patterns (2008-2014). Proposed analyses focus on Caribbean members of United States regional agreements in force in the region: the Central American Free Trade Agreement-Dominican Republic (CAFTA-DR), the North American Free Trade Agreement (NAFTA), Colombia and Panamá.

The research work has two underlying propositions. The first underlying proposition 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.

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 help 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 analyses 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 research were:

(a) to generate and compare intra-regional trade and production maps and chains (2008-2014) for Puerto Rican exports and imports for the aforementioned U.S. international trade agreements in force --P.R.-CAFTA, PR-NAFTA, PR-Colombia and PR-Panama based on the new database (2008-2014) I have created and to link these data to U.S. Census Bureau's data on business patterns for Puerto Rico.

(b) Characterize industrial sectors' potential chains, and bilateral trade analyses between Puerto Rico and CAFTA-DR, NATFA and the two bilateral agreements (Colombia and Panama), specifically for those sectors where Puerto Rico registers a superavit in intra-regional trade in exports.

(c) Identify potential growth sectors' intra-regional chains and maps where PR registers a superavit and where small and medium enterprises participate as exporting firms.

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 and Puerto Rico-CAFTA-DR's 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 Author (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 a3-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; Lall2009: 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 (Author 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. Author'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 andHamilton'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 (2011), none of them applies the methods to analyze trade-production-business relations within a regional trade agreement. In this respect, Gereffi, Spencer 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. In the second step, the author utilized the SITC to Broad Economic Categories (BEC) conversion table to convert SITC categories to BEC codes. 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. 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. 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. This analysis was complemented by qualitative methods, specifically video ethnographic methodology of GNEs involving three filming trips to Venezuela.

The trade maps and chains presented 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, Author (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.

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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).

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.[3]

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.

After evaluating the advantages and limitations of the USA Trade Online database, it was concluded that it was 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 2008-2014 for which data were available.

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.

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[3] This was certified by Arlene Adriano, an International Trade Statistics Section representative for UN Comtrade in response to my query.

Results

The results presented in this section are organized according to research's specific objectives. First, figures for intra-regional trade maps and chains for the 2008-2014 period for Puerto Rican trade with CAFTA-DR, NAFTA, and Colombia and Panama, are presented. Second, data linked to figures on business patterns and employment by industry for Puerto Rico, are illustrated. Third, a characterization of industrial sectors' potential chains and bilateral trade analyses between Puerto Rico and CAFTA-DR, NAFTA and the two bilateral agreements (Colombia and Panama), specifically for those sectors where Puerto Rico registers a superavit in intra-regional trade in exports, is presented. Lastly, some potential growth sectors' intra-regional chains and maps where PR registers a superavit and where small and medium enterprises participate and are present as exporting firms, are identified.

Graph 1 presents intra-regional trade data from and to Puerto Rico by agreement and by year for the 2008-2014 period. Exports from Puerto Rico to CAFTA-DR and NAFTA are greater than imports. The opposite holds in the case of data from PR to Bilateral countries' categories

Graph 1. Puerto Rico's Exports and Imports
By United States Agreements' Partners and by year, 2008-2014 period (in US current dollars)
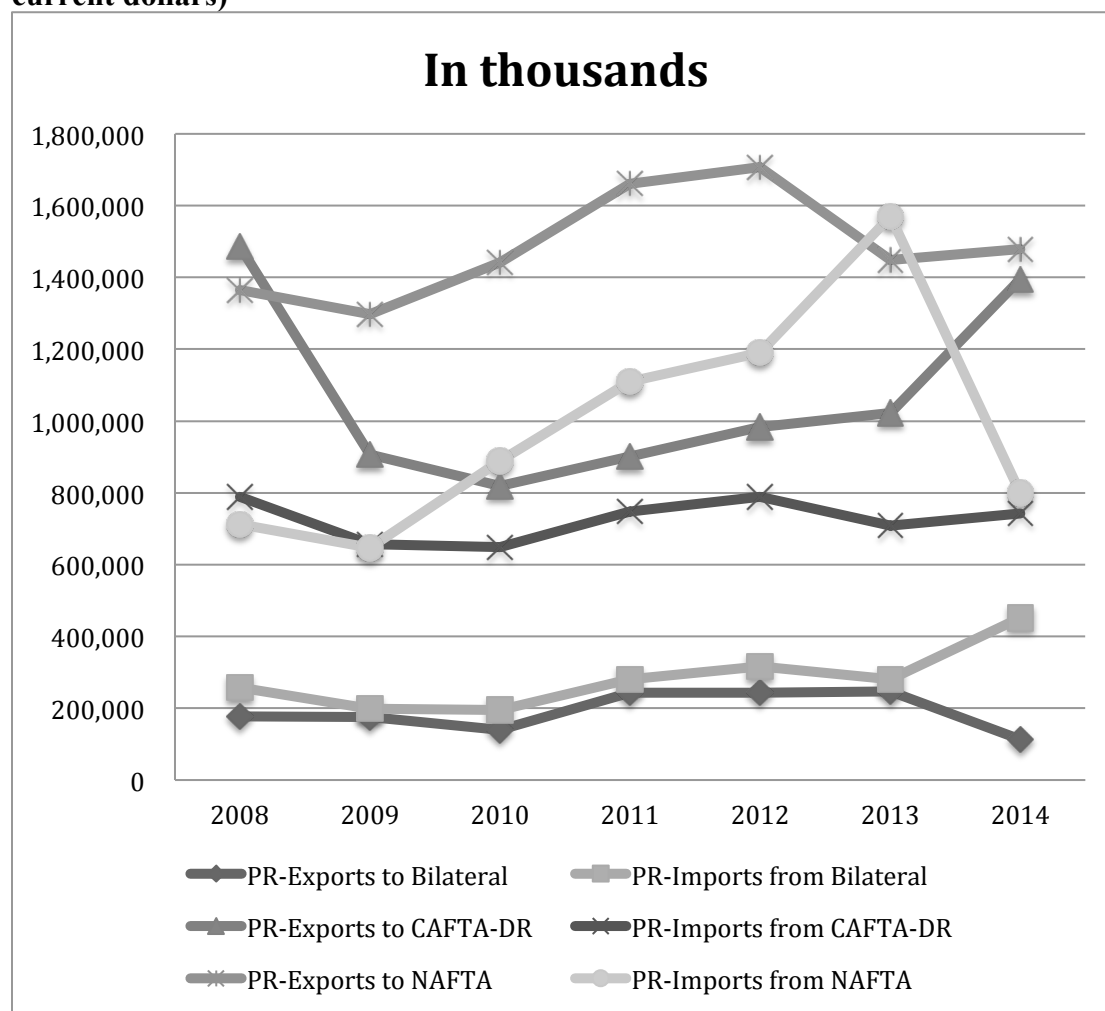
Source: Author's calculations and conceptualization based on USA Trade Online database and on United Nations Statistics Division.

Graph 2 compares intra-regional trade chains (2008-2012) for Puerto Rican exports and imports for CAFTA-DR, NAFTA and Bilateral agreements (Panama and Colombia) according to the Broad Economic Categories classification of primary, intermediate, capital, and consumption.

Graph 2. Intra-Regional Trade from and to Puerto Rico by Agreement According to Broad Economic Categories' classification of primary, intermediate, capital, and consumption (in US current dollars), 2008-2014 period
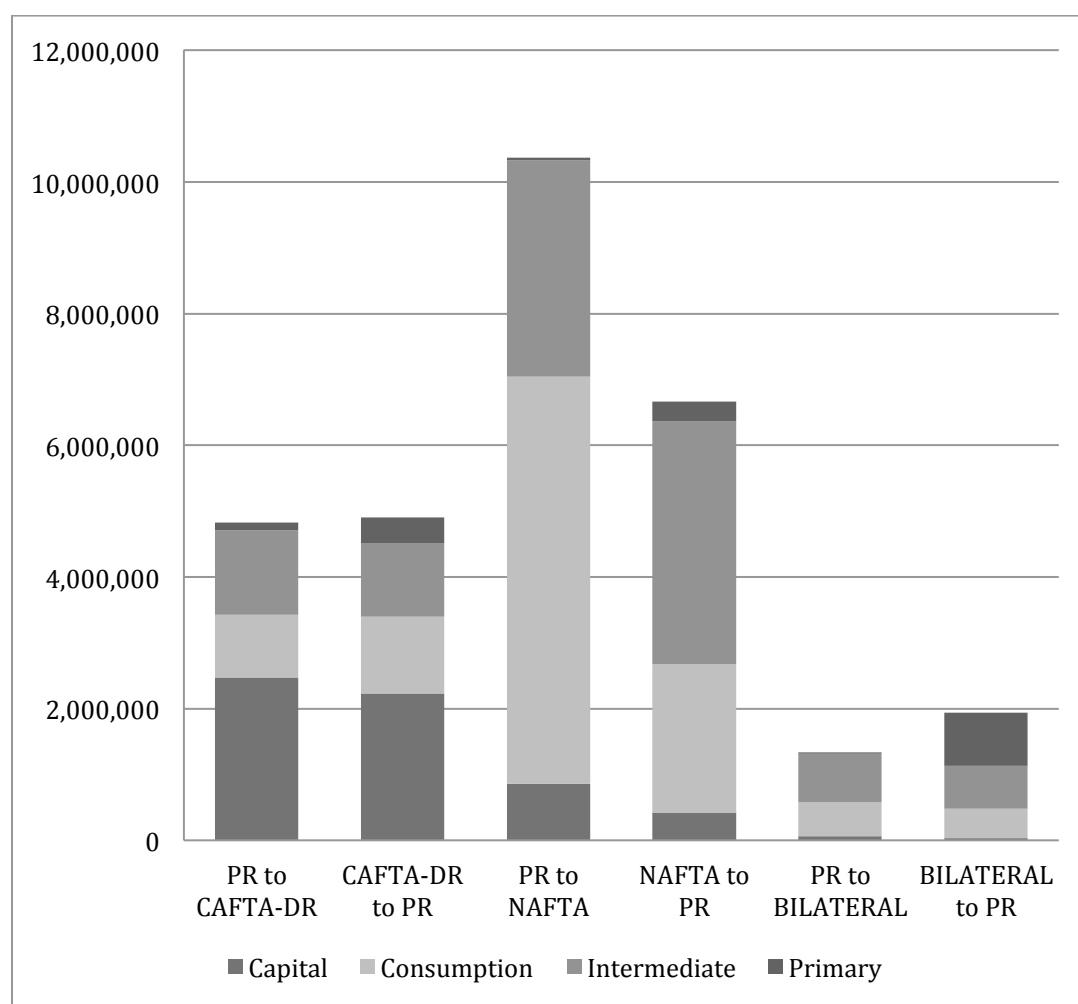
Source: Author's elaborations and calculations based on USA Trade Online, United Nations Statistics Division and the Index of Correspondence Tables of the European Commission.

Intra-regional trade (exports) from PR to NAFTA is greatest among flows, followed by Puerto Rico's imports from NAFTA. Puerto Rico's exports to and imports from CAFTA-DR are similar in volume, while exports from Puerto Rico to the Bilateral category countries is smaller than imports from it.

Different Broad Economic Categories dominate trade chains. The capital category is significant in the intra-regional trade chain of Puerto Rico's imports from CAFTA-DR. In Puerto Rico's-NAFTA trade, the consumption category is significant as well as intermediate goods' category both in exports to and imports from NAFTA.

Primary goods dominate imports from the Bilateral countries' category to Puerto Rico.

In order to characterize industrial sectors' potential chains, identification of strong growth sectors where PR registers a superavit and where small and medium enterprises participate as exporting firms, is necessary.

Table 1 below presents an integrated analysis of intra-regional trade chains with industrial and business categories. It identifies the "chain" categories (capital, primary, intermediate, and consumption) by industry (11, 21, 31, 32, 33, 92, or non-identified) and by US Trade Agreement partner (Bilateral, CAFTA-DR and NAFTA). 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 and expand intra-regional trade by promoting business relations among broad economic categories. 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. In this way, data can be linked to existent firms.

Table 1. Net trade (Exports minus Imports) by Chain categories, Industry Classification, intraregional trade category and number of Small and Medium Enterprises

Net Trade (Exports - Imports) between Puerto Rico and US Trade Agreements' Partners							
Broad Economic Classification by US Trade Agreements' Partners	**Industry Classification by NAICS Code**						
	11 Agri-culture, Forestry, Fishing and Hunting	**21 Mining**	**31 Manufac-turing**	**32 Manufac-turing**	**33 Manufacturing**	**92 Amusement and Recreation Industries**	**Non-Identified**
Capital							
Bilateral	0	0	**2,539**	**19,698**	**25,386,179**	0	**264,138**
CAFTA-DR	0	0	**419,560**	**985,122**	**239,444,022**	0	(37,674)
NAFTA	0	0	(231,067)	(31,854)	460,117,119	0	(18,843,181)
Consumption							
Bilateral	0	(16,767,711)	(91,647,122)	**329,099,746**	(6,826,340)	**129,770**	**4,274,989**
CAFTA-DR	0	(6,300)	**444,550,199**	(56,076,046)	**176,663,075**	**604,304**	(731,856,415)
NAFTA	0	0	(18,305,877)	5,242,155,041	(549,037,750)	(618,918)	(754,156,069)
Intermediate							
Bilateral	(946,541)	(219,130,697)	(7,580,734)	**414,425,104**	(88,180,115)	0	(1,601,061)
CAFTA-DR	(522,899)	**686,020,695**	**34,936,235**	(354,467,249)	(39,704,392)	0	(161,657,726)
NAFTA	(390,637)	(2,246,823,370)	(33,892,775)	**2,232,389,177**	(239,055,555)	0	(103,072,229)
Primary							
Bilateral	(74,687)	(796,604,858)	**13,000,815**	**380,491**	0	0	(9,284,475)
CAFTA-DR	(3,907,849)	(26,590,108)	**845,300**	**4,353,489**	(688,326)	0	(246,230,527)
NAFTA	(112,018)	**20,865,273**	**1,895,281**	**1,102,460**	**180,335**	0	(281,311,585)

Broad Economic Classification by US Trade Agreements' Partners	Industry Classification by NAICS Code						
	11 Agriculture, Forestry, Fishing and Hunting	21 Mining	31 Manufacturing	32 Manufacturing	33 Manufacturing	92 Amusement and Recreation Industries	Non-Identified
W/O CN							
Bilateral	0	(9,546)	(67,447)	(223,176)	(14,080,987)	(20,482,994)	(41,358,608)
CAFTA-DR	**8,090**	**33,794,321**	**5,862,262**	**2,267,560**	(7,096,230)	(123,015,253)	(371,215,640)
NAFTA	(71,133)	(255,470)	(20,068,339)	(1,100,610)	**21,259,414**	(135,412,824)	(269,037,616)
Number of Small and Business Establishment by employment size (250 or less)	18	90			3468	na	na
Employment (paid employees according to 2012 Census data	140	675			83422	na	na

Net Trade (Exports - Imports) between Puerto Rico and US Trade Agreements' Partners

Source: Author's elaborations and calculations based on USA Trade Online, United Nations Statistics Division, the Index of Correspondence Tables of the European Commission and Http://censtats.census.gov/cgi-bin/cbpnaic/PR/cbpsect.pl

Numbers in bold are superavits and numbers in parentheses are deficits. Puerto Rico, a single country, is compared with regions, to determine the capacity of the island to export to a region. The relevant result is that trade exists in the primary, processed, consumption, and capital categories. Although for some categories PR registers a deficit, trade from PR exists in almost all areas. This is a positive result because it shows that there is an existent base of exporters, even if some of these exporters are not producers but rather only involved in trade. For example, Primary net trade shows a superavit for NAFTA in industry classifications 21, 31, 32, and 33. Net trade in intermediates records a superavit for NAFTA (industry classification 32) and CAFTA-DR (industry classification 21) and Bilateral net trade (industry classification 32). Trade values that fall within the "Without Classication category" must be classified according to BEC codes in order to merge these data with the rest.

An integrated strategic trade analysis can be nurtured or generated by analyzing existing relations among industries in the different BEC categories. Primary, processed (intermediate) and consumption classifications impact regional chains differently and pose diverse challenges for Puerto Rico. Primary products include such diverse items as wheat and soybeans as well as live mules and chickens. Primary fuels and lubricants under include liquefied propane and butane. Intermediate or processed products for industry include products such as coconut oil, cereal flours, sugar, cocoa powder, wood, chemical and plastics products. Consumer products include durable goods such as musical instruments, orthopedic appliances, metal furniture, among others; non-durable goods include girdles, fungicides, disinfectants,

and medicaments; and semi-durable products include footwear, tableware, plastics, and glassware.

Although the data confirms the existence of all components of intra-regional trade categories, criteria must be developed in order to define targeted industries based on this analysis. In the next pages, two criteria are illustrated. The first is to identify industries where chain links are present and exports from Puerto Rico are significant. For instance, Table 2 lists selected cases where chains links' categories represent the greatest values traded.

Table 2. First Criterion: Industries Where Chains' Links Represent the Greatest Values Traded by HS 2007 classification code

1	2	3	4	5	6
Industrial sector by HS 2007 Code	**Country**	**Agreement**	**Categorías BEC resumidas**	**NAICS 2002 (two-digit classifi-cation)**	**Value**
844250 Print Type, Blocks, Cylinders etc. For Print Purpose	Dominican Republic	CAFTA-DR	Capital	32	322813
300490 Medicaments not elsewhere identified, measured Doses, retail pack not elsewhere identified	Colombia	BILATERAL	Consumption	32	204267946
380893 Herbicides, anti-sprout. Product and plant-growth Reg. not elsewhere identified	Costa Rica	CAFTA-DR	Consumption	32	35695911
300210 Antisera, Blood Fractions & Immunological Products	Canada	NAFTA	Intermediate	32	1375029428
330210 Mixtures Odoriferous Substance Use Food/ Drink Industries	Canada	NAFTA	Intermediate	32	446873739
382490 Products And Residuals Of Chemical Industry, not elsewhere identified	Canada	NAFTA	Intermediate	32	278967487
293339 Compounds containing unfused pyridine ring system etc. not elsewhere identified	Canada	NAFTA	Intermediate	32	212792891
293339 Compounds Containing an unfused pyridine ring etc. not elsewhere identified	Panama	BILATERAL	Intermediate	32	504513330
391510 Waste, Paring And Scrap Of Ethylene Polymers	Colombia	BILATERAL	Primary	32	100223
391530 Waste, Paring And Scrap Of Vinyl Chloride Polymers	Mexico	NAFTA	Primary	32	933346

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.

The objective is to identify and analyze: if chains exist in the industry; and which are the firms that participate in the different links of the chain that are related or responsible of exporting these goods. Column 1 identifies the product specification according to the Harmonized Tariff Schedule 2007. Column 2 identifies the country within the agreement that receives these goods. Column 3 identifies the regional trade agreement under which these goods are exported. Column 4 shows that some of these exports are classified as capital, primary, intermediate, or consumption goods. Column 5 registers all these exports as belonging to manufacturing (industry classification code 32).

It is at this point in the analysis that studies diverge. One alternative is to construct case studies in order to explore the business relations and exchanges reflected in these data. Another alternative is to develop surveys that might allow us to explore these relationships. A third idea is to obtain data by establishing collaboration with government agencies that compile data on exports by firm. A fourth alternative is to gain Access to existing data such as plant-based data or Customs data.

The second criterion is to target those cases where Puerto Rico exported goods for each year of the 2008-2014 period. This offers an opportunity to study chains related to business activity where exports are a continuous experience and not just focus on an export which is only registered for one sole year or two. Table 3 presents selected cases that illustrate this criterion.

Table 3. Exports from Puerto Rico for Categories for which products were exported for each year of 2008-2014 period, Selected Cases for Illustration Purposes

Harmonized Tariff Schedule 2007 Classification	Country	Agreement	Broad Economic Classification Category	NAICS 2002 (teo digits)	Value of exports in current US dollars
060290 Live Plants, Cuttings & slips, nesoi; mushroom Spawn	Canada	NAFTA	Primary	21	53023
261610 Silver Ores And Concentrates	Colombia	BILATERAL	Primary	21	86992
271019 Petrol Oil Bitum Mineral (nt Crud) Etc Nt Biodiesel	Panama	BILATERAL	Intermediate	21	15232112
271019 Petrol Oil Bitum Mineral (nt Crud) Etc Nt Biodiesl	Dominican Republic	CAFTA-DR	Intermediate	21	588314682
760200 Aluminum Waste And Scrap	Mexico	NAFTA	Primary	21	25761296
441011 Particle Board, Of Wood	Dominican Republic	CAFTA-DR	Intermediate	31	300592
470720 Rec (waste & Scrap) Paper & paperboard, Bl Ch Pulp Etc.	Colombia	BILATERAL	Primary	31	1788015
470790 Waste, Scrap, Including Unsorted, Paper and Paperboard, Nesoi	Colombia	BILATERAL	Primary	31	6990294
521051 Woven Cotton Fabric, Printed Plain Woven, with <85% cotton	Dominican Republic	CAFTA-DR	Intermediate	31	890157
560313 Nonwovens, Of manufactured Weighing > 70 G/m2 But <150 G/m2	Dominican Republic	CAFTA-DR	Intermediate	31	888212
621010 Garments Of Fabric Of Felts/nonwoven	Dominican Republic	CAFTA-DR	Consumption	31	438023813
621210 Brassieres, Knit Or Crocheted Or Not	Dominican Republic	CAFTA-DR	Consumption	31	1752342

621210 Brassieres, Knit Or Crocheted Or Not	Canada	NAFTA	Consumption	31	217816
621290 Braces Suspenders Garters Art Parts	Canada	NAFTA	Consumption	31	815492
630520 Sacks & Bags Kind Used For Packing Of Goods Cotton	Dominican Republic	CAFTA-DR	Intermediate	31	919482
630790 Made-up Textile Articles, Nesoi	Dominican Republic	CAFTA-DR	Consumption	31	4248008
220710 Ethyl Alcohol, Undenatured Ethyl Alcohol of >=80% by Volume	Dominican Republic	CAFTA-DR	Intermediate	32	1904416
220710 Ethyl Alcohol, Undenatured, Alcohol >=80% By Volume	Canada	NAFTA	Intermediate	32	13280890
280410 Hydrogen	Dominican Republic	CAFTA-DR	Intermediate	32	316880

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.

Conclusion

A methodology to create a new database that facilitates analyses of 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. The methodology has allowed us to link intra-regional trade chains' data to business categories of small and medium sized enterprises.

Furthermore, intra-regional trade has been presented by industrial category and by BEC code allowing for analyses focused by industries to be developed. 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 small and medium enterprises' categories to exporters; and analyzing, based on directories, the names of enterprises participating in this intra-regional trade.

References

Feenstra, R.C. and G.H. Hamilton (2006). Emergent Economies, Divergent Paths: Economic Organization and International Trade in South Korea and Taiwan, Cambridge, UK: Cambridge University Press.

Gereffi, G., Spencer, D. and Bari, J. (2002). Free Trade and Uneven Development: The North American Apparel Industry After NAFTA. Philadelphia: Temple University Press.

Helpman, E. and Krugman, P. (1985). Market Structure and Foreign Trade: Increasing Returns, Imperfect Competition and the International Economy, Cambridge, MA: MIT Press.

Hudson, R. (2005). Economic Geographies: Circuits, Flows and Spaces. London: Sage.

Kierzkowski, H. (2001). Fragmentation: New Production Patterns in the World Economy. Oxford University Press.

Lall, S. (2000). "The technological structure and performance of developing country manufactured exports, 1985-98", Oxford Development Studies, 28(3), pp. 337–369.

McGann, J. (2013). 2012 Global Go To Think Tanks Report and Policy Advice. Final Release-1.24.13. Philadelphia: University of Pennsylvania, Think Tanks and Civil Societies Program. Found at http://www.gotothinktank.com/wpcontent/uploads/2013/01/2012_Global_Go_To_Think_Tank_Report_-_FINAL1.pdf , January 25, 2013.

Michelutti, L. (2012). Small-scale farmers under socialist governments. Venezuela and the ALBA Peoples's Trade Agreement. IIED/HIVOS, London/The Hague.

Sturgeon, T. and Gereffi, G. (2009). Measuring success in the global economy: international trade, industrial upgrading, and business function outsourcing in global value chains. An essay in memory of Sanjaya Lall, Transnational Corporations, Vol. 18, No. 2, August2009, 1-36.

Sturgeon, T. and Memedovic, O. (2010). Measuring global value chains: intermediate goods trade, structural change and compressed development, UNIDO Working Paper, Vienna.

Office of the United States Trade Representative. Ambassador Ronald Kirk. (2011). 2011 Trade Policy Agenda and 2010 Annual Report of the President of the United States on the Trade Agreements Program. United States: Executive Office of the President of the United States.

Office of the U.S. Trade Representative. Executive Office of the President. (2016). Strategic Plan FY 2013-FY. Washington, D.C.: Executive Office of the President. Retrieved January147, 2013, from http://www.ustr.gov/sites/default/files/USTR%20FY%202013%20FY%202016%20Strategic%20Plan.pdf