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**CABOTAGE: THE EFFECTS OF AN EXTERNAL NON-TARIFF MEASURE ON THE  
COMPETITIVENESS OF AGRIBUSINESS IN PUERTO RICO**

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## ABSTRACT

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Cabotage: The effects of an external non-tariff measure on the competitiveness of agribusiness in Puerto Rico

**Keywords:** Food Vulnerability; Small Island Developing States; Agrifood Supply Chain; Food Imports; Grain; Fresh Produce; Anti-Competitive Measures; Maritime Transportation; US Jones Act; Efficiency.

Small islands developing states (SIDS) sustainability is a United Nations' aim. Their markets are often influenced by external policies imposed by larger economies. Could an anti-competitive measure affect the food vulnerability of a SIDS?

This research examines the effects of an external non-tariff measure (NTM) on Puerto Rico's (PR) agribusinesses. It explores the effects of a maritime cabotage regulation (US Jones Act) on the affordability and accessibility of produce and grains. PR imports 100% of their needs of grain and over 85% of fresh produce. PR's food imports are generally from the US and the trade service is restricted to the use of the US maritime transportation. As a result, the supply chain of these two sectors although different, are limited by the US Act that may impact the cost of food, its availability, firms' efficiency and other structures of production. Using a mixed convergent design, PR's agrifood supply chains were explored and analysed in relation to the maritime cabotage regulation.

Oligopolistic structures and collusion between maritime transporters and local agribusinesses importers limit the access to data, but other internal factors also have a role. Fieldwork shows that while the cabotage regulation itself is a constraint, interaction with others NTM and the current political framework between US and PR are relevant. Factors such as lack of efficiency, poor innovation and a self-limitation of the agribusinesses firms were found. The novelty of this research is the use of mixed methods to evaluate the effects of cabotage on the agrifood supply chain.

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## LIST OF ABBREVIATIONS

<b>3PL</b>	Third party logistics
<b>3PCs</b>	Third party container contractor services
<b>AAA</b>	Spanish acronym of Aqueduct and Sewer Authority
<b>ACMs</b>	Anti-competitive non-technical, non-tariff measures
<b>ASEAN</b>	Association of Southeast Asian Nations
<b>BB</b>	Billions of USD
<b>CAFTA-DR</b>	USA, Central American and Dominican Republic, Free Trade Agreement
<b>CARICOM</b>	Caribbean Community Market.
<b>CIF</b>	Cost, insurance and freight
<b>CEO</b>	Chief executive officer or Executive Director or Executive President
<b>CEPAL</b>	Comisión Económica para América Latina y el Caribe/ UN-Economic Commission for Latin American
<b>CSCMP</b>	Council of Supply Chain Management Professionals
<b>CVS</b>	Pharmacy franchise. In the US mainland it is the second largest chain after Walgreens. There, CVS have more than 7,600 stores.
<b>CTS</b>	Container tracking system
<b>Dwt</b>	Deadweight tonnage
<b>ECORYS</b>	Ecotec Research & Consulting (global think tank)
<b>ELA</b>	Estado Libre Asociado de Puerto Rico/Official name of the Puerto Rico's Government
<b>ETA</b>	Estimated time arrival
<b>FAO</b>	Food and Agriculture Organisation, United Nations
<b>FCC</b>	Federal Communication Commission
<b>FCL</b>	Full container load
<b>FDI</b>	Foreign direct investment
<b>FEU</b>	Forty feet equivalent unit
<b>FOB</b>	Free on board
<b>FTA</b>	Free Trade Agreement
<b>FY</b>	Fiscal Year (in PR is between 1 <sup>st</sup> of July to 30 <sup>st</sup> of June)
<b>GATT</b>	General Agreement on Trade and Tariffs
<b>GDP</b>	Gross Domestic Product
<b>GFI</b>	Gross Farm Income
<b>GHG</b>	Greenhouse gas
<b>GINI<sub>c</sub></b>	Coefficient to measures the inequality among values of frequency distribution (by Corrado Gini)
<b>GNI</b>	Gross National Income but it is used as a synonym of GNP
<b>GNP</b>	Gross National Product, but it is used as a synonym of GNI
<b>gcw</b>	gross cargo weight
<b>GTM</b>	Grounded Theory Method
<b>ha</b>	Acres (4,046.86 square meters)
<b>IDA</b>	Industrial District Approach/ Short name Marshallian's Industrial District Approach
<b>IICA</b>	Instituto Iberoamericano de Cooperación Agrícola
<b>IMD</b>	Institute of Management Development
<b>ITC</b>	International Trade Centre a joint agency of the WTO & the UN
<b>LCL</b>	Less than a container load
<b>LDC</b>	Less developed country (es)

<b>LNG</b>	Liquified natural gas
<b>LO-LO</b>	Lift on/Lift off methods; ships which are capable of loading and stowing cargoes on-board via lifting gear.
<b>MARAD or MarAd</b>	US Maritime Administration, a division agency of the US Department of Transportation that maintains the National Defence Reserve Fleet (NDRF)
<b>MAST</b>	Multiagency Support Team
<b>MIDs</b>	Marshallian's Industrial District Approach. Synonym of IDA
<b>MIDA</b>	Cámara de Mercadeo Industria y Distribución de Alimentos de PR
<b>MSP</b>	Maritime Security Programme. It is administered by the MARAD
<b>MT</b>	Metric ton is the most common volume measure used in cargoes and dry bulk commodities. It is equivalent to 1,000 Kg or 2,206 pounds.
<b>n.m.</b>	Nautical miles
<b>NnTMs</b>	Non-technical measures to trade
<b>NTMs</b>	Non-tariff measures to trade
<b>OECD</b>	Organisation for Economic Cooperation and Development
<b>PAN</b>	In Spanish it means 'Programa de Asistencia Nutricional', which translated is Nutritional Assistance Programme.
<b>PPP</b>	Power Purchase Per Capita
<b>PSI</b>	Pre-shipment inspection
<b>PR</b>	Puerto Rico
<b>PRPA</b>	Puerto Rico Port Authority
<b>PRPB</b>	Puerto Rico Planning Board / Junta de Planificación de Puerto Rico
<b>PREPA</b>	Puerto Rico Electric Power Authority
<b>RIA</b>	Regulatory Impact Assessment
<b>RO-RO</b>	Roll-On/Roll-Off cargo vessels, mainly loaded rolling cargo below deck, while containers are primarily stowed on deck. In high traffic regions container handling is carried out by on-shore gantry cranes.
<b>SCM</b>	Supply Chain Management
<b>SIDS</b>	Small island developing state or territory
<b>SMEs</b>	Small and Medium-sized Enterprises and/or Farmers
<b>SNA</b>	System National Accounts
<b>SPS</b>	Sanitary and phytosanitary measures
<b>STEM</b>	Science, technology, engineering and math curriculum programme
<b>TEU</b>	Twenty feet equivalent unit
<b>TMT</b>	Technical measure to trade
<b>UN</b>	United Nations
<b>UNCTAD</b>	United Nations Conference for Trade and Development
<b>US</b>	The United States of North America
<b>USD</b>	US dollar (\$)
<b>US-CBP</b>	US Custom and Border Patrol
<b>US-DoT</b>	US Department of Transportation
<b>US-GAO</b>	US General Accountability Office
<b>US-ITC</b>	US International Trade Commission
<b>US-MarAd</b>	US Maritime Administration (see MARAD)
<b>USVI</b>	US Virgin Islands (St. Thomas, St. John, St. Croix)
<b>VER</b>	Voluntary export restraints
<b>WEF</b>	World Economic Forum
<b>WTO</b>	World Trade Organisation

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# CHAPTER I

## INTRODUCTION

### 1.0.0 Overview

Food is one of the pillars upon which society is built. It is important as an economic activity due to its direct and indirect benefits. Its direct impacts can be summarized as the production of economic goods, a source of income for producers and workers, the generation of employment and a source of foreign currency (González & Gregory, 2014). Indirectly, it is essential for health and happiness. However, farmers are price takers since they do not have complete control of the production process, especially in the short run (González, 2014). Therefore, when the ability to deliver provisions affects the supply chain, the food security of individuals and the nation must be the first priority (Hoorfar et al, 2011; Bourlakis & Weightman, 2004).

Food supply chains operate in a complex, dynamic and time-critical environment in which product integrity is vital. The chain's competitiveness level could be affected by multiple factors – endogenous and/or external – and trade policy instruments are one of them. Trade policies may also have a direct or indirect impact on supply chain competitiveness and sustainability at the firm, cluster, region or country level.

Generally, it is believed that between one-third and two-thirds of enterprises' logistics costs are spent on transportation (Tseng et al, 2005). Hence, the application of restrictive policy frameworks to this sector could increase costs early in the supply chain process, consequently affecting producers' competitiveness and consumers' welfare. Non-tariff measures (NTMs) in the maritime transportation sector could affect companies' competitiveness, but, if other measures are limiting trade, they may also increase the economic vulnerability level in a market. In addition, food availability should be considered relevant if the NTM imposes a framework in which the access to food is limited by physical<sup>1</sup> restrictions to trade. Similarly, access limitations may reduce product availability as a result of a lack of production or an increase in cost, affecting the affordability of food for people. The following sections on this chapter define and introduce concepts that base the stance of this research of the effects of

---

<sup>1</sup> Such as a lack of vessels or operators, containers' weight restrictions and so on.

the US Cabotage Act as an NTM, exploring the case of Puerto Rico's agribusiness. Accordingly, two main research questions were formulated:

1. What are the effects of US Cabotage for the Puerto Rico's agribusinesses supply chain?
2. What challenges and opportunities does the Cabotage policy present for the competitiveness of the Puerto Rico's agricultural sector?

### **1.0.1 Sustainability and food insecurity**

Von Braun (2007) argues that the world will experience at least three gigantic challenges in the next decades: matching the demand for food to a larger and more affluent population; implementing this in environmentally and socially sustainable forms; and ensuring that the most vulnerable countries or people are no longer hungry. Achieving these aims will require new forms of trade, product or system harmonisation, market liberalisation and trade integration in a more complex arrangement.

Economists tend to limit the concept of sustainable development to its narrow conception associated with environmental aspects (Stiglitz & Charlton, 2007:p.136). In this respect, international trade has enormous potential to foster or frustrate sustainable development. Nevertheless, its original definition is much wider: 'growth that meets the needs of the present without compromising the ability of future generations to meet their own needs' (World Commission on Environment and Developments, 1987:No.27). Sustainability includes aspects of security and stability, cost efficiency, production economics, consumer perception and environmental impact (Hoorfar et al, 2011). Achieving sustainable development requires the creation and maintenance of wealth, which demand the best and most profitable use of resources to guarantee the social protection of the present as well as potential future citizens (Meier & Rauch, 2005:p.622). Therefore, in this sense the term sustainability applies to a system in space and over time.

In the literature so far, agriculture vulnerability analyses are associated with failure to anticipate risks in the supply chain, such as contamination, the food supply chain

quality process, weaknesses in the capacity to trade (Peck, 2006) and climate change factors. As a result of climate studies and the climate's substantial influence on food chain sustainability, vulnerability factors are being incorporated into the analysis of route distances for trade. The literature suggests that distances are proportional to the level of risks or threat to satisfy consumers' needs and therefore also the vulnerability level (Comas, 2009).

### **1.0.2 Non-tariff measure (NTM) issues**

Although tariff measures have been steadily declining since the mid-twentieth century, an increasingly diverse and creative array of non-tariff policies for trade have been established (Ferrantino, 2012b). The literature discussing the pros and cons of NTMs and the welfare effects caused by protectionist measures or barriers to trade is vast. However, since the beginning of free-trade agreements, different forms of NTMs have been documented and classified more (Friel et al, 2013; UNCTAD, 2013a). It is believed that those measures affect no less than 15% of the total trade and more than 60% of agricultural products (Nicita & Gourdon, 2013). In the food sector, technical and/or sanitary and phytosanitary measures are common and highly complex (Beghin, 2013).

Academic publications relating to less developed countries (LDCs) regularly analyse the topic of NTMs on agriculture from the perspective of a lack of resources to comply with developed countries' trade requirements. Generally, LDCs' lack of technical personnel, appropriate technologies and sources of funding exposes them to higher costs of compliance and/or low production rates (Trabelsi, 2013). Nevertheless, the most important aspect of NTMs in the literature is related not to their use but to their impact.

Every protectionist action invites retaliatory reaction. The costs of a tit-for-tat escalation are so high that in the long run all countries are likely to lose from the adoption of restrictive policies ... Even when trade restrictions are used to curtail unfair foreign competition, they can still impose costs to consumers. (Economic report for the US President, in Barfield, 1997:p.47)



### **1.0.3 Islands with small economies and small islands developing states or territories**

In recent decades it has become increasingly common to produce goods in a number of geographically dispersed stages linked by international trade, hence the increasing interest among policymakers in addressing barriers to trade (Ferrantino, 2012b). It is believed that the trade policies imposed by large economies on these small economies in defence of market liberalisation have had negative impacts on their already-limited local food production (Melville, 2003). For instance, external NTMs as a requirement for trade are generally designed for the domestic market but are not necessarily suitable for LDCs' or small economies' realities (Stiglitz, 2010). The greater the incidence of these, the more exposed a country is to forces beyond its control and thus the more vulnerable it is. Consequently, its national agribusiness activity could eventually be undermined. Since the Mauritius Meeting in 2005, similar issues for small islands developing states (SIDSs) have been under discussion (UNDESA, 2010).

The weaknesses of food chain sustainability and the high level of food import dependency of SIDSs could reduce their capacity to respond to food scarcity, volatility impacts on food prices and/or unexpected factors. Understanding the effects of non-tariff measures on their economy may help in reducing vulnerabilities as well as in improving their trade access. However, the literature is apparently silent on the issue for the agricultural sector in the US territories.

Unlike tariffs, quantifying the effects of NTMs is not easy. Their effects are indirect and often very case-specific or technical, and the monitoring of NTMs at the international level seems to be affected by poor transparency (UNCTAD, 2013a). Hence, these factors make it difficult to understand their implications, which is troubling for policymakers, trade negotiators and development agencies. It is believed that a number of these NTMs have raised costs and caused losses in competitiveness, acting as barriers to trade. Others may have excluded suppliers or goods, besides discouraging some sectors of the domestic market (Galvão de Miranda & Schuh, 2008). Although the study of NTMs' effects seems to be more present in the literature published in the last decades, the area associated with transportation restrictions in SIDSs has received less attention, particularly concerning the effects on the agribusiness sector. Consequently, the study of the effects of maritime transportation

NTMs on the competitiveness of the PR's agribusiness' supply chain combines angles that may fill the gap in the literature.

One reason for the lack of research could be the relatively low economic percentage that the agricultural sector represents in small countries' GDP. Furthermore, so far the effects of free-trade agreements on the needs of small countries' markets seem to be positive, probably because the topic of food sustainability as a national aim is a relatively recent issue in the research community (FAO, 2011). Nevertheless, it is well known that GDP growth from agriculture is at least twice as effective in reducing poverty as growth in the non-agricultural sectors (World Bank, 2012). Agriculture has the most direct impact on the development of other aspects of social protection, such as food security, natural resources and the environment, but it is clear that major transformations in food systems will take time and involve many trade-offs (UNSDSN, 2014). However, any reduction in productivity growth means that more resources will be needed to meet the rising food demand, hence raising the cost of food and thus SIDSs' economic vulnerability level (Godfray et al, 2010).

In this thesis some islands (archipelagos) with small economies such as Ireland, Hong Kong and New Zealand were included. Although they are not classified SIDSs by the UN, their experiences associated to cabotage and food-supply chain were valuable in our analysis. Besides, there were selected by its relationship with large economies and the size of their agrifood markets (population, GDP and volume of containers). The availability of publications about cabotage was another factor.

#### **1.0.4 Defining cabotage**

The word 'cabotage' has a Latin etymology, derived from the French word '*caboter*', associated with sailing along the coast. Basically it means transport or navigation along the coastal areas of a country and its territories. It is the carriage of goods and passengers within the coastal waters of a particular country (Bello-Olowookere, 2011; Liu, 2009). Its regulatory roots come from the British Empire and the Dutch Empire (Santos-Santos, 1997). In the eighteenth century, they established cabotage laws to protect their shipping between their colonies. The House of Lords, with the Southern Seas Act, created the first sea private monopoly to trade between Britain and

America. The private South Sea Company was heavily supported by the Crown and other important members of parliament to trade exclusively between the British colonies. Eventually, corruption and many other factors created a financial bubble that in the end affected Britain's market.

Later, in the 1950s, through US scholars in the GATT, 'trade liberalisation' was reformulated based on the theory that nations can mutually benefit from it. In regard to cabotage, it was restricted at international trades but not on domestics. A NTM on maritime transportation may have effects on trade; thus, it should be proportionate to its market. Small markets with limited transportation access tend to be more affected than bigger markets with geographic access to transport. Therefore, restrictions to trade imposed by larger economies may aggravate the cost to trade for SIDSs.

#### **1.0.5 Liberalisation**

Nations rise to power and wealth through free trade and decline when protectionism takes over (Bartlett, 1997:p.18). Freedom to trade was the strongest pillar of Britain's general free-market policy. Germany, in the mid-nineteenth century, acted in the same way for its agricultural sector, and much later Japan became more economically integrated with the rest of the world. Nowadays, in the era of free-trade agreements (FTA), SIDSs such as Bahrain, Cyprus, Jamaica, Mauritius, Puerto Rico and Singapore have reached levels of market (NTMs) liberalisation, increasing their level of development (WEF, 2013b) (Table 1). Interestingly, all of them are directly or indirectly affected by large countries or regional economies. However, a common challenge is to reach levels of social protection to ensure sustainable access to adequate food for their citizens (FAO, 2010).

Although cabotage opposes the classical economic approach of free-market forces, pro-liberalism countries, such as the US, see it as an acceptable tool for achieving set economic goals, invoking national security issues. In the last decade, various countries have reformulated their policies associated with cabotage. However, the vast majority of coastal countries with more modest economies than the US are supportive of the

concept that global maritime transportation competition is fair to them but unfair if dominance is prevalent.

Table 1: SIDSs<sup>2</sup> with high levels of market liberalisation and agricultural production in their GDP

SIDS	Population (M)	Area in km <sup>2</sup>	Prevalence of trade barriers*	Estimated GINI <sub>coef</sub>	% of GDP in agriculture	General GDP billion USD	Agriculture GDP in million USD	Rank agriculture policy cost**
Hong Kong	7.5	1,104	5.8	0.53	0.10%	263	263	4.5
Singapore	5.2	700	5.6	0.47	0.09%	274	246.6	4.9
Mauritius	1.3	2,040	4.8	0.39	3.50%	10.5	367.5	4.4
Bahrain	1.4	765.3	4.9	0.39	0.30%	34.9	104.7	4.2
Cyprus	0.307	9,250	4.9	0.31	2.30%	22.9	526.7	3.8
Ireland	4.5	70,273	4.9	0.34	1.60%	210	3,360.00	4.7
Jamaica	2.7	10,991	4.8	0.46	6.80%	14.8	1,006.40	3.8
Puerto Rico	3.6	9,104	4.8	0.57	0.80%	103	824	3.6

Extracted from: Heritage Foundation (2014), WEF (2013), and World Bank (2012). \*Rank of NTM is between strong limits=1 to not limited at all=7. \*\* Rank is between excessively burdensome=1 and balanced=7.

Shipping liberalism, according to Hudgins (1997), recognises the principle of free and fair competition in sea transport, irrespective of the flag that the ship is flying (Bello-Olowookere, 2011). Under such policy, shippers have the right to a free choice of carrier: either a home or a foreign-flag vessel. On the other hand, the way in which forms of policy are adopted, aiming to give preference to the locals in some kind of discrimination against the foreigners, is called protectionism. These policies include cargo reservation or preference, cargo sharing, crew restrictions, restrictions to owners, flag discrimination, maritime subsidies and state intervention, among many others.

‘Countries do not trade, individuals do’ (Hudgins, 1997:p.2), but to do so, good economic policies for competitiveness are required. In the global market era, countries’ economy becomes more integrated and accessibility to transport is required to compete but at a fair cost. Highly protected sectors, such as industry and agriculture, by their nature are challenging to trade, but it is their significant dependency on transportation that affects them more (Chase, in Vincenti, 2013; Xiong & Beghin, 2012). Domestic production in SIDSs is proportionally more import

<sup>2</sup> Although Hong Kong and Ireland are not considered SIDS under the UN official classification, in this thesis they were included as comparative markets.

dependent than that in large economies due to their natural limitations, remoteness and lack of farmland to produce enough raw materials. Therefore, their economies become more vulnerable to the costs of transportation.

To be competitive, frequent identification of strength, improvement of efficiency and eradication of inefficiencies throughout the supply chain are required. In the case of local small and medium enterprises (SMEs), there is a lack of understanding of the factors affecting competitiveness, particularly in small island developing states (SIDSs) (Briguglio, 2014). Although SMEs have been acknowledged as important drivers of regional development due to their capacity to generate employment, they might be limited by NTMs to trade. Bearing this in mind, this research is particularly focused on the exploration of cabotage restrictiveness in maritime transportation.

### **1.1.0 Area of research**

Internal and external factors may affect competitiveness. Regarding cabotage as an NTM, most studies focus on the welfare cost and a few on the market relations; little is said about the business environment in which chain actors operate. To analyse the effect of the US Cabotage Act as an NTM, this thesis considered three key elements: the network structure of horizontal and vertical market channel relationships; the supply chain, as related to the key competitive aim of any business chain; and governance, covering some institutional elements related to the participants (firms, the public sector, NGOs and third parties). The element of infrastructure was considered in the process too.

In this exploratory research, cabotage was considered as an external regulation on SIDS. As a result, the political relationship between Puerto Rico (PR) and the US and the vulnerability of PR's food security are also presented as the basis on which to study this phenomenon. It is important to clarify that this thesis does not assume a stance against the relationship between PR and the US. On the contrary, the posture presented in this thesis is to approach the phenomenon of the US Cabotage Act in relation to PR's economy from the viewpoint of a better commercial relationship with the US market but increasing the production potential of PR from a very wide perspective. It is believed that the local businesses are experiencing a 'comfort zone',

making their main trades with only one market; while this provides certain benefits to trade, it brings higher costs and inefficient processes that affect competitiveness and market openness.

The researcher started from the premise that PR – as an SIDS – is a nation or society with beliefs, culture, traditions and views that are different from those of its main, larger trade partner economy, which in this case is the US. As a result, this research focused on those elements – internal, external or cultural – associated with the NTM that may increase the inefficiencies at the level of firms, affecting their supply chain. Therefore, exploring and identifying opportunity areas may promote efficiency and competitiveness in the agribusiness (perishable and raw-material) importer sector not only to supply the internal market but also to add value to produce for other markets.

### **1.2.0 Background**

Since 1917 the relationship between Puerto Rico (PR) and the United States (US) has been regulated by the Jones Act. In the 1920s the US Cabotage Act was implemented as an amendment to restrict access and reserve maritime trade between the US and its territories for US-registered carriers. Unlike other non-incorporated US territories,<sup>3</sup> in Puerto Rico (PR) the Jones Act only permits trade using ships operated by US citizens and constructed, repaired and registered under the US flag.

Since NAFTA, CAFTA-DR and the current multiplicity of US free-trade agreements (FTAs), PR's producers have become less competitive, and it is believed that the maritime transportation policy (US Cabotage Act) is one of the reasons (Irizarry-Mora, 2011; Herrero et al, 2010; Alameda, 2002). Due to the US–Caribbean market openness, the domestic cabotage became a more important issue during the last decade (Collazo, 2012). Indeed, the scenario seems to be more relevant now as PR is currently struggling with an extremely high level of national debt, 14.5% unemployment and reduced national competitiveness (Federal Reserve Bank of New York, 2014). Therefore, if the US Act is acting as a non-tariff measure, it could restrict PR's domestic trade to its local maritime capacities.

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<sup>3</sup> American Samoa, Mariana Island and the Virgin Islands.

Of the US states, the last two incorporated into this nation (Hawaii and Alaska) are the only ones with 'similar' restrictions, but just one (Hawaii) is an archipelago like PR. Therefore, the consumerist market of 3.7 million Puerto Ricans, who import around 14 million tonnes/year by sea, seems to be confined to using only US maritime transportation for its domestic trade. By value, approximately 8% of all the imports from the US are in the form of food and farm products. For PR this represents around 80% and 90% annually of its national needs for food and agricultural supplies, respectively (Comas, 2009).

PR's national agricultural sector is diminishing, and it is believed that the cost of freight could be one of the problems. Although the study of the Cabotage Act's effects on PR's economy is not new, in the last five years the discussion has been central due to the alleged negative indirect effects on PR's development. This thesis is the first study of the effect of this phenomenon on PR's agriculture. Aligned with the main research questions previously formulated (1.0) the following questions were generated: How does an external NTM influence the small country's food vulnerability? Could this measure affect SIDS sustainable development and limit the citizens' right to adequate food? What impact does the Cabotage Act have on PR's agribusinesses supply chain and producers?

In spite of the limited coverage of SIDSs, this topic is worth researching because it provides complementary views for policymakers. Although the topic is multidisciplinary, it is important to highlight that this thesis is an exploratory conceptualisation of a non-tariff measure on the maritime transportation that allegedly affects the US offshore territories' competitiveness. To investigate the effects of an NTM on the food supply chain and its various pricing puzzles adequately, a pragmatic stance was adopted in this thesis to allow flexible frameworks to identify the distortions. Whilst we do not present a particular model here, we do demonstrate why the cost to trade agricultural perishable produce of PR is affected by multiple elements that are generally associated with the Cabotage Act but not exclusive to it. This constitutes an implicit vital element in the case for the agribusiness sector. By decomposing the food supply chain's elements, a new angle of study of the effects of the US Cabotage Act on PR's economy contributes to the wider study of NTMs. Finally,

as an exploration of the competitive potential of SIDSs' agribusiness, this study provides a new perspective on the supply chain, exploring the level of corporate global interaction in this traditional sector.

### **1.3.0 Research stances**

#### **Philosophical**

In general, the research philosophy of this thesis adheres to realism. However, ontologically, a critical stance of this philosophy is integrated on an epistemological and methodological pragmatic structure.

A critical realism view considers that 'there is a real world that exists independently of theories, offering a challenge to the status quo' (Creswell and Plano-Clark, 2011:p.45). In this research this is particularly observed in the qualitative phase. On the other hand, the practicality used to address research questions; experience-centred view to assess the particular dimensions into the phenomenon under study; and real world practice oriented through combining qualitative and quantitative data mixing terms or styles, are formally linked to pragmatism.

Carter (2000) suggests critical realism may reconcile the threatened 'divorce between social theory and empirical research' (p.1). However, the methods employed for building and validating the conceptual framework combined deductive and inductive thinking. This thesis details the particularities and ethical considerations that justify the use of diverse approaches and valuing both objective and subjective views. The methodology described is consistent with the guidance on mixed methods design of Creswell and Plano-Clark (2011), and grounded theory of Strauss and Corbin (1990).

#### **Sustainable development**

Development is a very complex process in which as many as five structures interact: physical, social, institutional, knowledge and nature. They should be taken into account in evaluating the consequence of structures' interaction and sophistication during the process of development. A sustainable development consists in a balance of economic development, social inclusion and environmental structure (UN, 2012;



Kates, Parris & Leiserowitz, 2005) and the agricultural sector is influenced by each of those three pillars. It is tied to progress in many other areas of development, such as gender equality, health, climate change, water and energy, and peace and security (UNSDSN, 2014). Over the past century, the level of food production has provoked – on average – a reduction in gross food prices, but early in this century rapid and sustained spikes were reported. It is believed that the rapid development of big LDCs will prompt more volatility and a rise in food prices in the next decades.

Food chain sustainability, as a research paradigm, seeks to build diverse supplies of food geographically close to populated centres. It is focused on improving the local management of food systems rather than constraining the global food supply chains (FAO, 2011:p.6). The interactions of local and global food supplies should be governed in ways that promote fair trade and local procurement to improve the conditions for small and limited-resource farmers in all regions. It is believed that the costs between the first and the third step in the food chain could reach between 170% and 900% of the original price (Anderson & Van Wincoop, 2004; Tempest, 1996). However, this will depend on the NTM effect. Therefore, how do we identify the non-tariff measures' effects on agribusiness competitiveness in an SIDS? Does small-country vulnerability analysis consider the impact of external NTMs for imported raw materials on the food supply chain?

### **Vulnerability**

The term has its roots in the Latin word 'vulnus' which mean easily hurt. It has regularly known by its bidimensional acceptations: external vs. internal. In literature is not rare its use in topics such as social risk management, fragile ecosystems, susceptibility to natural disasters, supply chain analysis, agrifood contexts and also in economics. For instance, Briguglio (2004) assumed it to describe the needs of special policy approaches to effectively address the sustainable development issues on SIDS and islands with small economies. However, Scaramozzino (2006) applies the topic to analyse the limitations in food accessibility and affordability that could be provoked by economic and political factors. This research adopts Briguglio's (2003: p.2) definition in a wide perspective as 'proneness to harm or damage originated from external forces'.

Exploring the US cabotage on PR's agrifood system the researcher aims to identify its effect and some strategies that importers and/or public institutions may adopt in order to reduce vulnerabilities.

### **Competitiveness**

This term is multidimensional and spans economic, cultural, political and environmental factors. It is important for all national economies and businesses but especially vital for small economies. In chapter 4 this topic will be discussed. Nevertheless, this research adopts Garelli's (2014: p.506) competitiveness definition in an ample view: 'a field of economic knowledge, which analyses the facts and policies that shape the ability of a nation (firm) to create and maintain an environment that sustains more value creation for its enterprises and more prosperity for its people'.

### **Efficiency**

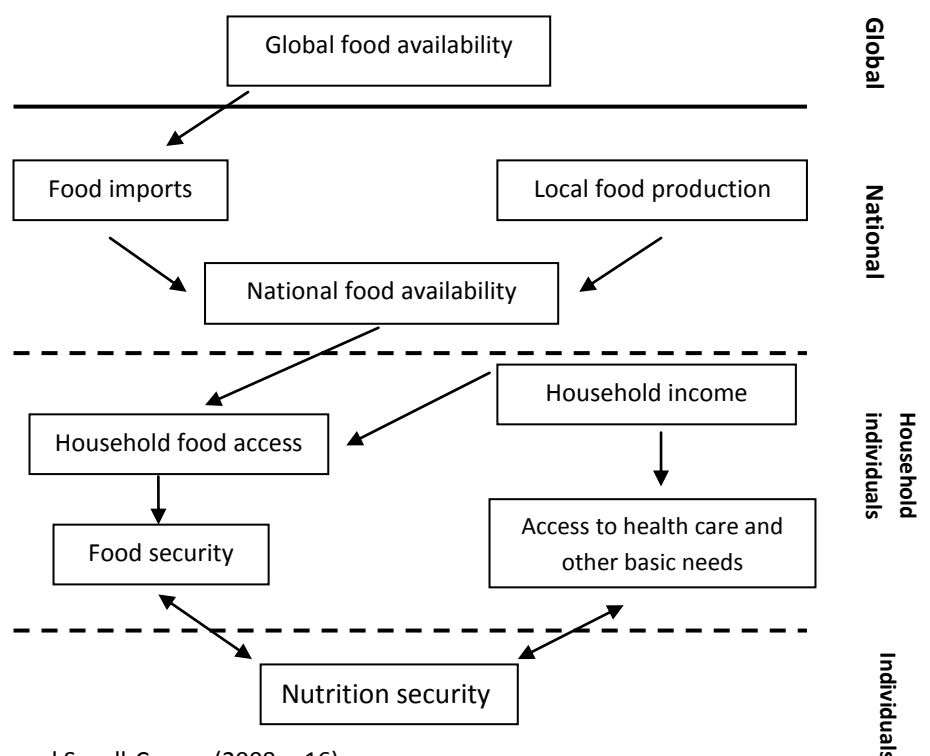
Whilst connected to productivity, both are generally agreed to be a part of competitiveness, albeit not regularly cited as such in empirical studies. Due to its multiple applications the OECD (2010b:p.17) delineates it as an optimal scale of operation to give an indication of whether firms are able to use the existing technology, resources (infrastructure, materials or people) and allocation in the best way. Therefore, for this research, the concept will be associated to the potential of improvement relative to a reference.

### **Food insecurity**

Food insecurity levels – a problem more associated to LDCs – could raise, also affecting vulnerable populations in developed societies and becoming worse for those populations for which food access is limited (Chilton & Rose, 2009). However, basic elements that are intrinsically associated with food chain sustainability, such as a country's consumption pattern and internal food production balance, seem to be useful in measuring resilience capacity (UNCESCR, 1999). Godfray et al (2010) argue that the patterns in food prices could be indicators of trends in the availability of food for those who can afford it and have access to it on the world markets. According to them, the balance between constant availability and price stability in the market could

be considered as part of the product’s sustainability. Perez-Escamilla and Segall-Correa (2008) posit that a sustainable food supply is essential for ensuring food security. Using multi-form analysis, they argue that sustainable household food security and individuals’ nutrition security depend on local, regional, national and global factors and on chain integration (Fig. 1).

Figure 1: Distal, intermediate and proximal determinants of food and nutrition security



Source: Perez-Escamilla and Segall-Correa (2008:p.16).

According to the figure below, an increase in food prices could affect income, access and security. However, it could also stimulate global investment in food production to guarantee food for human well-being and national stability (Gordfray et al, 2010). Nevertheless, the integrity of food chains is no longer determined only by the intrinsic quality – including safety and healthiness – of the foods but also by intangible qualitative aspects (e.g. sustainable development) emerging from social protection claims and corporate social responsibilities (Verbeke, 2011). For instance, the United Nations (UN, 2012:Nos.108 & 110) posits that guaranteeing access to sufficient, safe and nutritious food is one vital aspect of countries’ sustainable development. However, considering SIDSs’ limitations, to accomplish this will demand high levels of

planning, execution and liberalisation to ensure the right of access to food for their citizens (Monge-Roffarello et al, 2011). Any problems in food chain integrity may rapidly provoke distortions in the rest of the chain participants (Hoorfar et al, 2011).

Food insecurity discussions have been historically more associated with sub-Saharan countries and more recently integrated into SIDSs' sustainability aims. Since 2005 SIDSs' sustainability has remained a special topic on the United Nations agenda. Due to their limited resources and export base and their high level of exposure to external shocks, the Mauritius Strategy concludes that SIDSs have made less progress than other LDCs in achieving sustainable levels of development (UN, 2012:No.178). Therefore, more studies and coordinated actions should be executed to address the sustainable development challenges facing SIDSs.

### **Agribusiness**

The term used in this thesis refers to a wide range of firm structures: food processors and manufacturers, input suppliers, producers that may be smallholder farmers, wholesalers or traders and other intermediaries in a supply chain that connects retailers or processors to producers.

### **Case study**

PR's efforts to develop strong, sustainable native food production have been practically abandoned for decades. It is assumed that the importation of food will always be a better and cheaper possibility, more so when production is accessed from LDCs, the dollar (USD) is a strong currency and there is a belief that the US will support its citizens. Although these aspects are not easily found in PR's publications, they are not contrary to the social and economic context of its development. However, the global food production is changing along with the US market. It is believed that the current level of production is insufficient to feed the world at affordable prices (FAO, 2015; Comas, 2012). Consequently, the more dependent countries will be highly restricted by the economic strategies and supply chain controls of transnational corporations, market instability, the reduction of producers, the increase in the population in more lucrative markets and the climatic changes.

#### **1.4.0 Theoretical stance: Supply chain competitiveness**

Ensuring the availability of food for future generations, considering climate, cultural and other sociological factors must be the basis of a state's sustainable vision (FAO, 2010). In a globalised economy, external trade measures imposed by large countries or regions could diminish small countries' native food supply chain and therefore their national sustainability level.

Supply chain complexity has been revolutionised by market liberalisation and globalisation. Its evolution has resulted in a high level of interdependence between sovereign nations; as a consequence, no nation is totally self-sufficient nowadays. The notion of interconnectivity in business is important today to achieve competitiveness (OECD, 2011b). Insularity and/or remoteness is one factor described by Briguglio et al (2010:p.6) in their evaluation of countries' dependency on international trade. Maritime transportation represents the most common and cost-effective method to supply markets, but the ratio of transport and freight costs to import is considered significant for competitiveness. Could systematic corporate planning provide a possible solution to the maritime costs of trade?

The Organisation for Economic Cooperation and Development (OECD, 2011a) defines competitiveness as the 'ability of companies, industries, regions, nations, and supranational regions to generate, while being exposed to international competition, relatively high factor income and factor employment levels on a sustainable basis' (Hatzichronoglou, 1996). The United Kingdom's Department of Trade and Industry defines it as 'the ability to sustain high and rising levels of income per head'. Five factors are identified as drivers of competitiveness: innovation; quality of management; quality of human capital; an enterprise culture; and discerning and informed consumers (DEFRA, 2002). Porter (1990) is one of the first to underline the importance of firms' competitiveness through the development of strategies and internal structures. Other authors incorporate performance indicators such as cost, profitability, productivity and efficiency (Latruffe, 2010). Competitiveness would then be the ability to sell products that meet the demand requirements (price, quality and quantity) and, simultaneously, ensure profits over time to enable the firm to thrive

(OECD, 2010b:p.4). As a result of these approaches, it is not surprising that organisations such as the OECD describe competitiveness *as just a net relative measure*.

Ensuring food availability to citizens is one goal that every country should accomplish, including SIDSs. Novel initiatives, such as greenhouse production, hydroponics, rooftop gardening and other innovative agribusiness, seem to be potential solutions to mitigate the lack of natural space for production (Gilbert, 2014). Inevitably, to produce at agro-industrial levels, small countries will require large amounts of imports of raw materials at the lowest possible cost. Due to their lack of economies of scale, the costs for them on the global market will tend to be higher, affecting their domestic resource cost ratio for exports, and onerous if the cost of shipping is not competitive. As a result, there will be greater risk for their domestic market's competitiveness, product scarcity and/or higher prices reducing citizens' purchasing power.

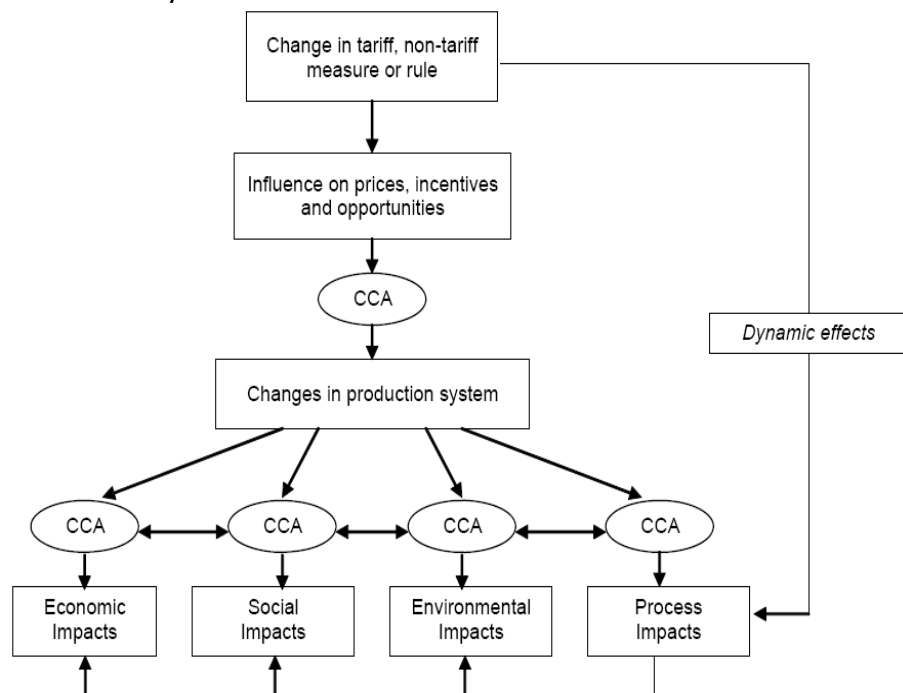
Korinek and Sourdin (2009b) indicate that the higher shipping costs of grains to the poorest developing countries are principally due to their lack of farmland and remoteness from major grain-exporting countries. Shipping grains to smaller markets, such as lower-income countries and some net food-importing developing countries, has traditionally been particularly expensive, in some cases comprising up to 20% of the imported value. In addition, regulations and a lack of supply chain competitiveness could increase the cost to trade much more. Therefore, in a cabotage restrictive scenario, what common strategies to reduce trade costs have been implemented by PR's agribusiness or food importers to be competitive?

Brandon-Jones et al (2014) highlight that, to identify systemic risks, sharing information and optimising the supply chain's visibility through cross-industry collaboration could improve the supply chain competitiveness. To be competitive, SIDSs' national companies should be highly interactive globally and gain access to more options. It is believed that small countries' companies without a global interconnection tradition between firms and suppliers are more vulnerable or at least less competitive. Thus, promoting high levels of intercommunication between producers and suppliers is one factor to improve supply chain sustainability. On the

other hand, countries' trade occurs first between near markets that are psychologically related, and after this it could be open to others (May, 2015; Johanson & Vahlne, 1977). Arguably, this psychological state of confidence could confine traditional companies to their recurrent markets rather than encouraging them to look for better options at the global level. Therefore, could this psychological state of the agribusiness producers be a limiting factor in their search for global non-traditional options?

Aspects related to less competition in the transportation time spent unloading cargo at the portside and a large imbalance in trade are endogenous variables that could affect the net cost to trade. Furthermore, the lack of competition on routes and remoteness are important aspects of the cost variables. These variables could be causal to chain analysis (CCA) affecting small countries' trade competitiveness negatively, and the situation may be worse when firms are not able to build agile, transformable and resilient supply chains to trade (Stochniol, 2011) (Fig. 2). However, the literature also discusses the effects of policy instruments on trade as limits to competitiveness affecting the cost of goods.

Figure 2: Causal chain analysis



Source: Kirkpatrick and George (2006: p. 328).

### **1.5.0 Research objectives**

The theoretical approaches of competitiveness, supply chain competitiveness and non-tariff measures are the bases for the following research objectives:

1. To explore if the US Cabotage could be considered as a barrier, affecting cost of production for the native agribusiness and livestock producers.
2. To clarify and quantify, if possible, how an external non-tariff measure could affect the food sector in a small island developing nation.
3. To identify areas of opportunity in the supply chain competitiveness of the sectors under exploration.

### **1.6.0 Research approach**

According to the World Economic Forum (2013a), reducing the supply chain barriers to trade could increase the GDP up to six times more than removing tariffs. The agricultural sector, for instance, is well known for the level of technical measures restricting trade. However, if we add to this other protectionist measures related to transportation, it is highly probable that other segments in the chain will be affected too. Moreover, if these factors converge in SIDSs, the impact on their economic vulnerability could be significant (Briguglio et al, 2010). Therefore, in this exploratory study, we will analyse whether the US sea transportation policy might be considered as a barrier, discouraging the agricultural production in PR. Additionally, importers' competitiveness strategies for dealing with the maritime costs are investigated.

Secondary data were collected from multiple sources to present a multidimensional profile of the phenomenon and to contextualise the scenarios of PR, its agricultural sector and the firms under study. In addition, this study applied qualitative methods to the case study research through content analysis as well as quantitative methods through comparison cost analysis of feedstuff formulations. Primary data were generated, coded and analysed through semi-structured questions using the grounded theory method. In this process the techniques of case study, action research and grounded theory were applied as part of the research methodology.



### **1.7.0 Importance of research**

Previous analyses published about the effects of cabotage show data generalisation, presuming similar behaviour between participants, and none of them consider the agricultural sector. This thesis highlights differences in infrastructures, procedures associated with the phenomenon, cultural issues of the participants attached to the US systems, and lack innovation to potentiate their own market. Unlike previous analyses, this research identifies patterns on raw materials, in contrast to the container process, taking into account the areas that require more attention to avoid inequalities.

### **1.8.0 Thesis outline**

This thesis is divided into seven chapters. The thesis general layout follows a sequential order to give the reader a logical structure of the multidimensionality of cabotage. In the first four chapters the topic is contextualised by the reviewed literature. The last three chapters explain the methodology and fieldwork's findings. The following paragraphs detail each of the thesis chapters.

In this first chapter was introduced and, highlighted the key arguments of the study. It presents the study's objectives and brief outlines, the research's philosophy and its theoretical stance.

Chapter two describes the motivation for the topic in context and provides the historical background, including an explanation of why the agribusiness importers' sector was chosen for the case study. The aim of this chapter is to outline the context of the study and to describe the motivation for the research. For this reason the discussion is based on a review of PR's socioeconomic background, agricultural scenario and the culture within the industry investigated.

Chapter three is a literature review which introduces the technical topic of maritime management to clarify concepts. The chapter is focused on the analysis that is relevant to justify the research gap. Using secondary data, various issues and selected case studies are analysed by applying synchronous inductive and deductive theory

building. The phenomenon of cabotage is contrasted with different jurisdictions in the US and abroad.

In chapter four the approaches presented in the academic literature are explained and reviews of the theoretical frameworks of competitiveness in general and in agribusiness are presented, highlighting the supply chain. The SIDSs' particularities are considered. The main concepts and approaches are analysed critically to contrast the key areas of literature that provide insights into the character of and influences on productivity and efficiency in the food chain. In addition, the non-tariff measure concept described in the literature and different methods and reviews of the theories for its analysis are explained. Limited discussion of supply chain strategies and developments seems to take place at the academic international level. However at the domestic level, the publications available are not commonly published for academic peer review scrutiny and focus on the issue of modelling the cost of well-being. The methodologies reviewed cover empirical techniques (price analysis and some archival research). The majority of the analyses published in the last decade use econometric modelling techniques to evaluate the effects of cabotage. None of these previously published methods and methodological approaches aims to address the supply chain as a problem. The complexity of the subject, entailing multiple environments, dimensions, elements and concepts, resulted in a research process that does not set any limits on the conceptual, analytical or empirical nature. The review is then considered to develop an understanding of the relationship between agribusiness, supply chain strategy and competitiveness.

Chapter five outlines the research methodology applied in this thesis. The framework is devised in part through the ideas arising from applying the research approaches and in part from concepts identified in the literature review. This chapter also explains the approaches reviewed in the academic literature and appraises the theories or methods related to grounded theory (GTM). The key research questions, objectives and related procedures are discussed. In addition, the detailed secondary data used for the analysis are presented along with the sampled population, including a brief description of its activities. Although the research instruments used for the interviews to collect data are attached in the appendices, the coding used is explained in this

chapter (also Appendix I). Finally, the ethical protocols used and the scope of the study are provided.

Using the primary data collected in the fieldwork, chapter six contextualises the external dimensions, the salient dimensions and the elements, factors and forces that exert an impact on the food supply chain, the efficiency strategy and its effects on the other chain segments. In this chapter the quantitative and qualitative data is merged and discussed by group of agribusinesses. The differences between domestic and foreign maritime transportation used by the traditional agribusiness importers in PR in comparison with other sectors are established. In addition, is outlined a basic profile of the importers and their level of dependency on US maritime services versus other providers. Specifically, in the context of a traditional livestock sector, four dimensions are explained in this section: vulnerabilities, managers' perception of business competitiveness, the level of supply chain visibility and the basic strategies implemented to deal with the maritime transportation costs. Critically, the chapter analyses the conversion of implicit ideas into explicit figures aimed at capturing the real-world strategies and activities from the supply chain participants and generalising the findings of the thesis.

Finally, chapter seven presents the overall research conclusions and final remarks. The chapter focuses on the study's main findings from the application of the conceptual framework, identifies the key strengths and limitations of the research and concludes by making recommendations for future research.

### **1.9.0 Conclusion**

This chapter introduced the study of this thesis which in a mixed design research examines the effects of an external (US) maritime non-tariff measure (NTM) on Puerto Rico's (PR) agribusinesses to explore its effects on the affordability and accessibility of produce and grains. Some particularities (supply chain, entrepreneurship and innovation) of the economic sector of agriculture and the effects of NTMs were presented to investigate other forms of food vulnerabilities that may affect a SIDS. The next chapter contextualise the PR's socioeconomic reality.

## CHAPTER II

### CONTEXT OF THE STUDY

#### 2.0.0 Introduction

This chapter is divided into four sections. The first section provides a summary of the historical–political background of PR from 1800 until the present. The colonial period is divided into the Spanish and the US ruling, highlighting their particularities. The second section focuses on PR's competitiveness and its economic aspects more specifically during the last 50 years. The third section discusses the effect of the US Cabotage Act on PR's economy. Finally, the last part of this chapter presents an overview of PR's agriculture.

With an area of 9,104 km<sup>2</sup>, Puerto Rico<sup>4</sup> is geographically located in the Caribbean in the north of the Caribbean Sea, between the Dominican Republic and the Virgin Islands. It was discovered by Christopher Columbus in 1493. The Spanish Kingdom colonised and ruled PR for 400 years, but in 1898 it was invaded by the US. Borinquen, the smallest of the Greater Antilles, was a major military post during numerous wars between Spain and the other European powers (sixteenth and late nineteenth centuries) and was eventually used by the US to control the region<sup>5</sup>. Although its economy and sociology are different from those of the US, PR has been politically and economically associated with that nation for 117 years.

PR occupies a trivial space within the academic postcolonial debates, partly because it is not a classic colony and it is a relatively prosperous nation with a strong national culture but it is not recognised as either a country or as a colony (Duany, 2009). However, as an overseas US territory, with a common currency, interstate commerce and the same environmental regulations and minimum wage, it has relatively costly labour and challenges to production and exporting.

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<sup>4</sup> Borinquen was the native name for the biggest island. Originally, Christopher Columbus named the island St. John the Baptist, but after a few years it was changed to Porto Rico (Latin for Puerto Rico), which means Rich Port. During the first 30 years after the colonisation, the extraction of gold and other products was a substantial activity for the Spanish conquerors.

<sup>5</sup> The period of it was between late nineteenth century and the end of twentieth century.

### **2.1.0 Historical background of Puerto Rico's political relationship**

Sociologically, the Commonwealth of Puerto Rico should be considered as a nation (language, traditions, beliefs<sup>6</sup> and other unique cultural structures) and at the international sports<sup>7</sup> level it has been treated as a country since the 1930s (Rivera, 2007). However, it is not politically recognised; hence, it is not a participant member of the United Nations or of many other political forums. Consequently, to understand the context of its development, it is crucial to look at its history, which is relatively unusual in relation to other peripheral nations but with some aspects of SIDSs.

#### **2.1.1 Puerto Rico under the Spanish rule**

Throughout most of the nineteenth century, Puerto Rico (PR) and Cuba remained the last two Spanish colonies in America and served as the final outposts in its strategies to regain control of the continent. New parties were formed in the colonies and the first representative of PR<sup>8</sup> in the Spanish Parliament (Cortes) was elected in 1809. The Spanish Government in PR was granted plenary power to rule the colony and mitigate any possibilities of rebellion. In 1815 the colonials petitioned for actions to King Fernando VII, who, particularly for PR, conceded a Royal Decree of Graces ('la Real Cédula de Gracia') actively to promote diversified agriculture, commerce and industrialisation, tariff reductions and an increase in the population (Dietz, 1989). As a result, openness in trade policies and migration<sup>9</sup> were initiated. These development strategies produced enough to support the Spanish regional military forces there, to increase the revenues for the Spanish crown and to balance its administrative costs in the colony.<sup>10</sup> In general, it was a positive way to achieve growth in PR's economy as well as being potentially lucrative for its participants (Dietz, 1989).

For the Spanish Crown, the years between 1860 and 1898 were highly turbulent. Nevertheless, the Spanish offshore colonies promoted the development of public

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<sup>6</sup> For instance, Puerto Ricans are considered as a Latin-identity communitarian people, a Catholic Christian society that is proud of its culture. The majority of the population is opposed to the death penalty as a method of punishment and class or race discrimination and does not consider bearing firearms to be a general right.

<sup>7</sup> Since 1948 the International Olympics Committee (IOC) has officially recognised Puerto Rico's Olympic Committee (COPUR).

<sup>8</sup> Don Ramón Power y Giralt was the first elected representative of Puerto Rico of the Spanish Parliament and the first Vice-President some years later.

<sup>9</sup> European entrepreneurs from Spain and particularly from non-Spanish origins: Ireland and Scotland, Italy, Malta and Corsica, France, Germany and the Netherlands. Besides Criollos from the other colonies, they were allowed to live and invest in PR tax free for 10 years. This interest in potentiating the production in Cuba and particularly in PR was motivated by the instabilities in the French colonies – especially in Haiti, which until its independence was a very important exporter. At this time, both colonies' production was sold in Europe and in Spanish ex-colonies in America as well as in the west and south of the current US, which were Spanish territories until the 1820s (Mirón-Murciano et al, 2012; Dietz, 1989).

<sup>10</sup> From the 1830s to the 1890s, the population grew from around 300,000 to 1 million people (Mirón-Murciano et al, 2012).

agencies, such as the Ministry of Treasury, the Office of Accountability, the Lottery Office and the Postal Service, the regionalisation of public services and better measures of public administration. In PR, as the supportive location for the Spanish Armada in America, all of these measures were implemented. As a result, a submarine cable was laid to improve communications by telephone, sea businesses and transshipping commerce increased. In addition, the currency was stabilised, and in ports the customs structure was better organised (Mirón-Murciano et al, 2012).

In the late 1870s, the import tariffs, wharfage, fees for storage in ports and freight rates for trade were reduced. Besides, the cabotage between Spain and its colonies and ex-colonies was liberalised or at least made more flexible. The new norms supported the principle of 'easy pass-on trade'<sup>11</sup> between the ports of the Spanish Crown; thus, no inspections were required for trade between Spanish territories or Spain and its business partners. According to Mirón-Murciano and colleagues (2012), these reciprocal actions were beneficial to Spain and to Puerto Rico as a colonial transshipping location. On the contrary, González and Matés (2007) suggest that this action involved significant profit reductions for the Spanish crown. Nevertheless, these researchers agree that PR's government expenses were around 4 million pesos<sup>12</sup> per annum and more than 20 million in total commerce.<sup>13</sup>

In the same period, two parties (the conservative party and the liberal party) in PR came together behind the idea of political autonomy, leaving behind the notion of assimilation with Spain (Bras, 2011). The liberal reforms in Spain extended to its colonies the right to establish a status of 'Diputación Provincial' (making the island an Autonomous Province of Spain) and paved the way for the establishment of the first national political movement (Dietz, 1989). Although the Puerto Rican representatives in the Spanish Parliament (Las Cortes) succeeded in their efforts to obtain political reforms, in practice the local Spanish authorities in PR were reluctant (Bras, 2011). As a result, some political exiles from the Spanish colonial regime (various Puerto Ricans among them) settled on the US mainland, particularly in New York City (Duany, 2009).

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<sup>11</sup> Its level of liberalisation is not clear in the available literature; however, it seems to be a primitive system of the currently well-known free-trade agreement (FTA).

<sup>12</sup> During that period the Spanish–Puerto Rican peso (SPRP) and the USD were almost equivalent.

<sup>13</sup> Dietz (1989:p.35) presents historical value data of the imports and exports from 1870 to 1894 (19,814,000 to 27,900,000 pesos). On average, the value per capita was around 30 pesos (SPRP).

Puerto Ricans were finally granted self-government by Spain when the 'Carta Autonómica' (a form of constitutional autonomy) was approved by the Spanish Parliament (Cortes de España) and signed by the Crown late in 1897. A short-lived experiment in plenary autonomy under Spanish rule started. A few months afterwards, in a democratic election, the first autonomous government of Puerto Rico was elected.

Historians believe that, during the last decade of the 1800s, the US offered to buy the colonies of Cuba and PR from Spain, but without reaching any agreement the Spanish–American War began in 1898. In this year the US annexed Hawaii. The Spanish colonies of Cuba, the Philippines and PR<sup>14</sup> were invaded by the US and eventually legally transferred<sup>15</sup> by the Spanish authorities. Subsequently, the territories of Guam and the Northern Mariana Islands were ceded. The island's value to US policy makers was as an outlet for excess manufactured goods as well as a key naval station in the Caribbean.

### **2.1.2 Puerto Rico under US rule**

Some authors (Rivera, 2007; Dietz, 1989) agree that many Puerto Ricans, among them politicians and academics, endorsed the arrival of the US troops. They suggest that it was thought that more liberties, better labour conditions, real democracy, more development and economic growth (the American dream) would follow for all. Nevertheless, the new power mostly articulated the interest of the absent ruling class as well as the interest of the local propertied classes and intermediary groups of a different and structured westernised society outside the mainland.

Immediately, by implementing the Foraker Act, the US took control of the Spanish colonial apparatus in PR, designating a Military Governor and a group of advisors. The existing political structures of PR were dismissed, property taxes were raised and the currency<sup>16</sup> was dramatically devaluated, swiftly reducing the share of power of the

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<sup>14</sup> Of all the Spanish colonial possessions in America, Puerto Rico is the only territory that never gained its independence.

<sup>15</sup> By the Peace Treaty of Paris, signed in December 1898, the Spanish Empire surrendered its control of Cuba, ceding PR and all the small islands in the Caribbean and in the Pacific to the control of the US. The accession of the Philippines involved a payment of \$20 million USD to Spain. These colonies then become US possessions.

<sup>16</sup> Although the Puerto Rican–Spanish peso (PRSP) was the formal currency between 1811 and 1909, in 1902 the USD was circulated in PR. The PRSP was totally eliminated, hence resulting in a dollarised economy. Though of equal international value, in PR each PRSP was declared to be worth only \$0.60 USD after 1902 (Dennis, 2015).

Puerto Rican 'hacendados'.<sup>17</sup> A republican form<sup>18</sup> of government was formally established by reforming the previous colonial institutions. These were not significantly<sup>19</sup> different from the previous structures under Spanish rule. However, the Foraker Act was not only a political document but also a powerful economic instrument. Consequently, in 1901 the first legal case was presented under the consideration of the US Supreme Court. It established the first jurisprudence, defining PR as 'foreign to the US in a domestic sense',<sup>20</sup> because the island was neither a state nor a republic (Duany, 2009).

The first decade after the US invasion was marked by a deadly hurricane, earthquakes and a tsunami, dramatically damaging the territory's economy and its society. The Puerto Rican agricultural plantations and a substantial portion of the infrastructure were devastated, and consequently hundreds of disrupted labourers migrated. Furthermore, PR's most famous and lucrative products on the European markets were suddenly not able to be competitive because of the new tariffs imposed on trade with non-European partners. For instance, Dietz (1989) reports that, in the Spanish period, the tariff on PR's tobacco was around 20 cents per pound; however, with the US control, it was significantly increased to 5 dollars (USD). Besides that, PR's products were not suitable for the US consumers' palate, which preferred other flavours (Bernabe, 1996). Farmers were forced to borrow from US banks at usurious rates and many lost their land to foreclosure (Dennis, 2015). Consequently, the land in use was managed on behalf of absentee owners. Eventually, the majority of the biggest haciendas and factories in the colony were controlled by US corporations. The once-diversified island harvest (coffee, tobacco, sugar, fruits, etc.) was turned into a one-crop (sugar)-dependent economy. Once the monoculture system was established, the imports from the US increased dramatically. The native entrepreneurial class, although small but becoming stronger during the Spanish time, was broken before it had properly developed. In addition, from the political stance, PR's elected Commissioner to Washington was not allowed to participate in the US Congress. The

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<sup>17</sup> Wealthy Criollos were associated with haciendas' owners; vast areas of land were devoted to agriculture (polyculture or multiple crop), leather and mining production for exportation to the European and American markets (Dennis, 2015).

<sup>18</sup> The form of government in which the power is divided among three branches: the Executive, the Legislative and the Judicial.

<sup>19</sup> It is necessary to highlight that, during the last decade of the Spanish rule, the right to vote was more inclusive than that in the US; thus, this was a setback. Similarly, many differences should be highlighted if this new scenario is contrasted with the Carta Autonómica.

<sup>20</sup> US Supreme Court, *Insular Cases*, *Downes v. Bidwell* (1901).



Commissioner was only allowed to communicate PR's needs through the President; thus, the future of PR was in the hands of the US Congress but had no voice.

Internationally, the people of PR were no longer citizens of Spain or its colonies. PR's citizenship was not recognised, but they were also not US citizens, so the native population was strictly confined to the island without the right to travel legally (Dietz, 1989). As a result, in 1914 the recreated<sup>21</sup> House of Representatives of PR, in a unanimous vote, demanded independence from the US.

To appease the islanders' wish for independence, around the time of the historical event of the First World War (WWI), the US Federal Government agreed to amend the legislation concerning PR and to incorporate some representativeness proposals. As a result, the US Congress replaced the Foraker legal framework by the Jones–Shafroth Act of 1917 (Jones Act), conceding US citizenship to PR's residents. Therefore, Puerto Ricans could join the US military corps and could trade freely on the US market or migrate to the United States.

Although between 1917 and 1930s the Jones Acts were subject to some confusive versions<sup>22</sup> the framework facilitates the US economic control over PR to this day. Various authors (Rivera, 2007; Dietz, 1989) agree to classify the Jones Act statements into 'seven judicial pillars': 1. in any international trade agreement, PR is represented by the US only; 2. tariffs on trade are under the control of the US Federal Government; 3. the US Customs ruled to guarantee the first two points and free interstate commerce between PR and all the US states; 4. although foreign products pay the tariff taxes in PR, the fees are decided by the US Federal Government; 5. the USD is the only official currency; 6. PR's autonomous fiscal system and its citizens are excluded from paying federal taxes; and 7. the US Cabotage Act. Pantojas-García (1990) adds one more point by referring to the 500 Acres Act, which limits the area under the control of companies.

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<sup>21</sup> Under the Spanish rule, the people of PR were represented by a similar institution.

<sup>22</sup> During that period the US Congress approved, at least, three different laws nominated Jones Act, the one related to Cabotage is the one written by Wesley Jones, as an amendment of the Maritime Marchant Act, 1930.

As mentioned above, similar to the situation during the decades as a Spanish colony, an 'easy pass to trade system' between PR and US would be implemented. The US Customs would guarantee pillars two and four besides free interstate commerce between PR and all the US states. Nevertheless, unlike the concessions of the Carta Autonómica, PR would be represented internationally by the US Federal Government only. In addition, all trade between PR and the US would be transported by US-flag vessels. Arguably, the Jones Act 'pillars' do not seem to be dramatically different from those under the Spanish rule. However, the scenarios would change over the years.

In 1922 the US Supreme Court jurisprudence<sup>23</sup> established the non-incorporated territory theory. It determined that not all the rights in the US Constitution are applicable to PR because it is not part of the US, as the other federal members are, but a US possession. Therefore, 'Puerto Rico belongs to but is not part of' the United States, which means, according to Pantojas-García (2005), 'foreign in a domestic sense'. Thus, in accordance with the US Constitution, the right to vote to elect a 'proper' US Congress representative and/or the US President is only applicable to those authorised citizens who live in a member state of the US Federal Government (Rivera, 2007). In other words, according to González (2015, see Goodman, 2015), 'the Supreme Court said that the US Constitution only applied in PR those portions that Congress decided, deemed necessary to apply'. Therefore, major decisions about the territory should be made by the US Congress and not by the elected officials of PR (González, 2015). However, curiously, over the years PR's land<sup>24</sup> was increasingly controlled by the US Military Corps (later in the hands of the Pentagon) (Dennis, 2015).

Pantojas-García (1990) states that, during the Great Depression (1930s), the expansion of the US colonial apparatus in PR was designed to maintain control. The territory was represented in the US House of Representatives by a non-voting representative who was democratically elected by the Puerto Ricans every four years.

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<sup>23</sup> In the US Supreme Court decision in the case of *Balzac versus Porto Rico*, 258 US 298, it is argued that 'locality was what determined which constitutional rights were bestowed upon individuals, not their individual status as citizens'.

<sup>24</sup> Dennis (2015) reported that in 1930 around 13% of the whole land of PR was registered as the property of the US military forces. Eight US military bases had control over the island, which was particularly striking; one of them was a nuclear site or tracking station. Until 2000 PR was one of the most important strategic settlements in the world for the US Navy.

New political alliances gave way to different ideas and new parties,<sup>25</sup> the PPD (Democratic Popular Party) being the most prominent. PR's House of Representatives was well established and its projects generating some actions, but the Executive and Judicial government branches were still appointed by the US President.

Capitalism, as the main source of investment, reinforces the US domination. According to Pantojas-García (1990), the model systematically increased dependency on the metropolis, enlarging its control through industrialisation, planning and social distribution. He suggests that this process differed greatly from that in many Latin American countries. While PR's development model was for the benefit of and led by foreign investment, in Chile and Brazil, for instance, investment and industrialisation came mainly from the local bourgeoisie (p.25).

In the 1940s and the 1950s institutionalisation led to PR's development. The historical alliance between the new US governor in PR (Dr Rexford Tugwell) and the new majority elected under the PPD was a new beginning. Productive enterprises, public utilities, planning and statistical structures were created to govern and to provide social welfare (Catalá, 2013). At the end of the decade, the initial institutionalisation approach to transform the economy was slightly transformed into 'developmentalism'. PR's industrialisation after the US invasion was initiated in the late 1940s. The experimental model, with some association with the Marshall Plan, was formulated between the USA and the new PR Government in a post-world war context but extended until the Cold War period.<sup>26</sup> 'Operation Bootstrap'<sup>27</sup> (Operación Manos a la Obra), which was developed in this decade, turned PR into an export-processing zone (export promotion to lead industrialisation), and it is thought that it was the first nation in the capitalist periphery to adopt this kind of development strategy (Dietz, 1989). Following PR's experience, similar export-promotion strategies were adopted in Taiwan and Mexico (Pantojas-García, 1990).

Although Dietz (2003) divides the operation into three stages, the whole programme was based on some local and/or federal corporate tax exemptions to the benefit of

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<sup>25</sup> In 1938 by dissidents from the Puerto Rican Liberal Party and the Unionist Party, was formed the Democratic Popular Party (PPD in Spanish – Partido Popular Democrático) with a centre-left ideological view.

<sup>26</sup> According to some authors, this was extended until 2006 (Irizarry-Mora, 2011).

<sup>27</sup> It was PR's creation but based on section 931 of the US Federal Tax Code created during the Great Depression in favour of US corporations.

foreign direct investment, free access to the US market and other supportive arrangements<sup>28</sup> that were highly attractive to industrial companies. The target point of the industrial plan was the US market although it attracted foreign capital from across the globe (Vélez-Pizarro, 2011). To transform the territory's poor living conditions, this strategy was designed to make a rapid change based on manufacturing and high-tech industrialisation as a model for the whole of Latin America and the Caribbean (Bosworth & Collins, 2006). Indubitably, the 'Operation Bootstrap' industrialisation and modernisation plan diversified the economy and transformed the social framework of PR (Pantojas-García, 2014; Catalá, 2013; Irizarry-Mora, 2011). Since then the local governments have considered the native agrifood sector as a marginal and less productive segment of PR's economy.

'Operation Bootstrap' relied on confidence in the permanence of an external policy in the hands of the US Congress. Apparently, it was thought that the dynamic and hegemonic US economy would not be affected by the rest of the globe or, if it changed, the US would at least preserve the legislation benefiting Puerto Rican-US citizens. In addition to the risk of elaborating an economic strategy on the basis of an external policy that was not controlled locally, the initiative did not put much effort into transferring the knowledge of those multinational industrial skills to the local producers. Consequently, whilst the economic and social developments were nominally led by Puerto Ricans and for Puerto Ricans, in practice they were more for the benefit of foreign rather than locally owned businesses. The eventual crack in PR's strategy was due to two factors: the failure to encourage innovation and the limited knowledge transfer to the native firms to promote vertical and horizontal integration (Pantoja-García, 2014; Dietz, 2003). These two would catapult the native wealth, the local entrepreneurship empowerment and expose PR's native companies to global linkages.

### **2.1.3 The Commonwealth of Puerto Rico**

Supported by the last two US-appointed governors in PR, in 1947 the US agreed to pass Law 600 (P.L. 80-362) to authorise, among others, the Puerto Rican right to elect

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<sup>28</sup> The US-flagged shipping is considered to be one of them.

its Government<sup>29</sup> through general democratic elections and be ruled by its own Constitution (Rivera, 2007). In 1948 the first Puerto Rican Governor was elected democratically.

PR's Constitution was an advanced framework for its time and was massively approved by the people of PR in a general referendum. The US Congress unilaterally decided to eliminate various sections<sup>30</sup> and promulgate a new version in which a silent 'ceteris paribus' rules the political relationship between PR and the US. However, as a condition for the approval of the US Congress (Law 82-447), the Constitution would be under the Federal Relationship Act, which is tied to the Jones Act and the Foraker Act<sup>31</sup> (Ortega & D'Agati, 2012). Since 1952 the new constitution of the Commonwealth of PR (in Spanish: Estado Libre Asociado, which means Free Associated State) has ruled the structures of government and society. Commonwealth was the political name given to PR in a unique form of status.<sup>32</sup> For instance, technically Virginia, Massachusetts, Pennsylvania and Kentucky are commonwealths, but they have full membership of the Federal Government; thus, their state classification gives their US citizens the right to vote and have representatives in the US Congress. From a constitutional perspective, PR is still an unincorporated territory of the US; hence, its laws are submitted to the US Constitution. Therefore, it is reasonable to suggest that the current relationship between PR and the US is a 'suzerainty, determined by the US Congress' (Rivera, 2007:p.49).

With independence the free market would disappear. With the statehood the federal tax collector would appear. But the premise was that, aside from independence or statehood, there was only the indignity of colonialism. Would you choose to eat your bread in shame or proclaim your dignity in hunger? (J. Luis A. Muñoz-Marín, 1953-54)<sup>33</sup>

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<sup>29</sup> From early in the 1900s, all PR's parties demanded the right for Puerto Ricans to elect their own governor and rule their destiny democratically. The legislative history recognises Law 600 as reaffirmation by the US Congress of the right of self-government of the people of PR.

<sup>30</sup> In the original form approved in the referendum, the twentieth section of the Chapter of Puerto Rican Rights was eliminated by the US (González, 2011). However, it is said that the inclusion of Chapter VI, section 8, in which PR's Constitution says that 'the general-obligation bonds must be repaid even before government workers receive their salaries and/or public services', was originally proposed by the US through some of the Constitutional Assembly members.

<sup>31</sup> From the Constitution of the Commonwealth of Puerto Rico, Chapter 7, Section 3.

<sup>32</sup> The US Supreme Court recognised that PR is an autonomous political entity and sovereign over matters not ruled by the US Constitution. However, in 2005, a US President's Task Force on the PR's Status found that by law PR is a US territory. In 2016, the US Supreme Court declares that PR is subject to the US Congress' plenary powers under the territorial clause (Case PR vs. Sanchez Valle).

<sup>33</sup> Regarded as the 'Father of Modern Puerto Rico' and the 'Architect of the Commonwealth', in 1948 he was the first democratically elected Governor of PR. The quote was taken from Vélez-Rodríguez (2014:p. 154).

Interestingly, during the first 20 years of its creation, the Government of the Commonwealth of Puerto Rico conducted an international exterior policy. The team of PR, named by the US authorities 'our Latin American-Left-Democratic front', developed collaboration agreements<sup>34</sup> with more than 50 countries or territories, except for the USSR dominions (Vélez-Rodríguez, 2014). In the Caribbean between 1962 and 1967, PR's Government was instrumental in the eventual organisation of the 'little eight' (British Virgin Islands). In this period an intense decolonisation dialogue was unfolding between Britain and its far-flung Eastern Caribbean possessions at the height of the Cold War (Cox-Alomar, 2009). Similarly, technical assistance and cultural and university grants to study in PR were successfully promoted globally. Furthermore, a strategy to promote foreign direct investments by invitation was initiated. Besides, political asylum was offered to various academics, intellectuals and politicians from the Latin globe particularly, as well as other political interventions (Vélez-Rodríguez, 2014).

#### **2.1.4 Bipartisanship**

In 1968 a new political party cut off the hegemonic structure of the PPD. Founded a year afterwards, the New Progressive Party (in Spanish: Partido Nuevo Progresista, PNP) advocated that PR should become an incorporated state of the US. It promoted the belief that statehood (total integration) would represent better economic development for the territory. In the elections of 1968, due to an internal division in the PPD after 14 years of strong hegemonic administration, a PNP Government was elected and implemented pro-US developmentalism to activate the territory's economy (Dietz, 1989). Markets and the trade infrastructure were developed to trade primarily with the US, because the main target of development was to imitate it. Since then, the Pro-Statehood political party has been alternating governance with the PPD. Although differing in beliefs, forms and approaches, both parties promote the idea that the economic development of PR should be associated with the US. PR's parties are not clearly organised along liberal–conservative lines having mixed coalitions. Both are supporting government economic intervention and reducing transparency in public accountability (Di Salvo, 2015).

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<sup>34</sup> The US President Truman's Four Point Programme was basically instrumented from Puerto Rico with the hidden support of the US intelligence and the US Navy.

As an ideology, the Pro-Statehood party promotes the complete integration of PR with the US as a model of economic development rather than an organisational political form (Pierluisi, 2015). Several authors concur that that political strategy as a possibility for PR's economy is based on a perception of sharing wealth and development rather than analyses well supported by academic research (Otero-Figueroa, 2014). Arguably, applying the current US federal framework to PR could signify an increase in its economic inequality, particularly due to the federal tax laws and other restrictions to trade (Segarra-Alméstica et al, 2014). For instance, it is believed that LDCs cannot afford or sustain the developed states' inefficiencies if they want to achieve sustainable growth, a substantial capacity to change and flexibility to trade (Stiglitz, 2010). For others, though, the example of Hawaii is enough evidence to support the statehood's ideology for PR (Romero-Barceló, 2009; Badillo, 2005). Nevertheless, as a piece of a large federal government structure in which each of the states has to produce according to its resources but in the same framework designed for all, the particularities of PR's development would be more asymmetric than those in the majority of the states (Federal Reserve Bank of New York, 2012; Maingot, 2005).

### **2.1.5 US Congress's interventions**

The 'one-size-fits-all policy' applied by the US Congress to PR's economy has signified serious challenges, forcing the territory to copy its capitalist system (Bernabe, 2015). For instance, in the early 1970s, section 931 of the Federal Tax Reform was substituted by a new one, titled 'Possessions Corporation Section' and commonly known as section 936. It was a framework fitted to the benefit of US corporations in which PR had for mile square the highest concentration in all the US territories (Rivera, 2007). The new section amends the US Internal Revenue Tax Code to allow domestic offshore companies to operate tax free (by rebate) in the US territories, which in the case of firms in PR would mean a triple tax exemption: national (PR), base state (state of origin of the company) and federal. This 'safety net' for the US petrodollar crisis was approved by the US Congress as a 'symbiotic' benefit for the US offshore corporations. The strategy promoted production and growth of PR's economy through tax exemption and credits for investments, increasing the average

salaries, infrastructure investments and businesses' diversification (Vega-Rosado, 2011; Bosworth & Collins, 2006).

Annually, companies under section 936 reported high exports and thousands of millions of dollars in profits and tax credits. As a result of the increase in the containerisation rate provoked by trading, PR's ports were rented and modernised for handling finished goods. Dry-bulk material became less important. Certainly, the Jones Act (cabotage) and the concentration of US firms in PR were enough reasons to hire only US firms. However the evidence confirms that at that time, due to the lack of service providers in the hemisphere, the options available for managing containers were US maritime companies (Guerrero & Rodrigue, 2012).

Whilst PR's external policy was diminishing, in the late 1980s, the governments of PR and Japan initiated negotiations. The Japanese Government's plan was to convert PR into a hub centre for car parts and technical specialised support for the hemisphere. Nevertheless, the unfortunate public disapproval of staff of the US State Department in Washington provoked the Japanese to withdraw and the negotiations were cancelled.

In the last decades, perhaps the most notorious example of the US's particular intervention in PR's economy occurred in 1996, when the Congress amended the federal tax breaks for domestic manufacturing firms. Section 936, the vertebral column of the Commonwealth's economy that in the 1970s substituted section 931, would be eliminated. Its effects on PR's industrial policy would be dramatic for the manufacturing sector (47%) of its economy (Dietz, 2003). Supported by important members of the PNP,<sup>35</sup> who theorised that section 936 was an impediment to statehood, the US Congress, without considering PR's scenario, finally decided in the federal interest (Rivera, 2007). Although the US Congress conceded a 10-year transition period, its effects began before the middle of the phasing-out term of the 936 Act. For instance, prior to the changes – only – \$38 billion /year (2004) for chemical exports and \$19 billion /year for imports were reported. After the

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<sup>35</sup> In a letter of 15 December 1995, the Governor of PR and president of the PNP, Dr Pedro Roselló, says to the President of the Internal Revenue and Taxation Committee of the House of Representative at the US Congress: 'With this respect to this entire subject, however, I wish to emphasize that we do not advocate the retention of Section 936 as such. Instead (in a modification of the plan that I submitted to you in September), we strongly urge that the wage-credit incentive be preserved through the creation of a new section 45(c) of the Internal Revenue Code' (Jiménez-Juarbe, 2015).



amendment, over 40 months, the sector incomes were reduced by 9% (\$3.6 billion for exports). At that time, more than 250,000<sup>36</sup> Puerto Ricans were considered to be redundant by the multinational industries (Bosworth & Collins, 2006).

The response of the PR Government to mitigate the impact of this action was to promote development – as a big-city island – through the private sector. The private construction sector was actively promoted, the national planning-zone frameworks relaxed and urban sprawl increased. A total of 14% of PR's economy was supported by the construction sector and the agricultural sector was decimated (González & Gregory, 2014). Eventually, this would create a structural gap in the government budget (García-Pelatti, 2014c).

In 2006 the governments' efforts to mitigate the effects of the 936 phase out were insufficient. After the amendment the US companies in PR would be treated for corporation tax purposes as if they were in a foreign jurisdiction. PR was no longer the corporate paradise in the US jurisdiction; as a result, a corporate migration abroad began (Pantojas-García, 2014). During that turmoil a divided government was democratically elected. The Executive was ruled by the PPD party and the Legislative and the US Commissioner were led by the PNP. Consequently, the public sector was practically inoperative.

Although NAFTA began in 1994 and since 2006 more trade agreements have been signed between the US and other countries across the hemisphere, the participation of PR in those events has been limited. As an inactive spectator, PR's economy has been negatively affected by the US FTA (Segarra-Alméstica et al, 2014). It was established by the Jones Act that the US represents PR at the international level. For decades this political framework has been unchanged whilst the world has been changing rapidly, and PR's preferential access to the US markets is now shared with sovereign countries with flexible regulations and lower production costs. To mitigate the decrease in PR's competitiveness, the Government opened commercial offices in some strategic places in South America. However, PR may engage in cultural exchanges with Peru, for instance, but it cannot negotiate with it as if it were an

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<sup>36</sup> It is estimated that around 20% of them had a postgraduate degree.

independent nation. In a memo to the Belize Government, the US State Secretary – Mr Collin Powell (2003) – reported that:

The Department is aware that Puerto Rican government officials have approached a number of countries seeking treatment normally only accorded to a sovereign state. The department reiterates that the US federal government is responsible for Puerto Rico's foreign affairs.

The US's great housing bubble hit PR's market before a recovery from the effects of 936's phase out (Baily & Elliott, 2009). Due to the closing of multinationals, thousands of people migrated to US and an excess of housing offers reduced the cash available at banks and thus the bank consolidation began. Once the Great Recession squeezed global credit after the Lehman Brothers' collapse, the PR market received another blow. As a result, the Government of PR ruled by the PNP decided to implement an austerity strategy to reduce the deficit. Between 2009 and 2010,<sup>37</sup> 13,000 public servants were laid off, the property tax was raised and the prices for utilities (such as water and electricity) increased. The high price for oil raised the cost of all its derivatives, especially the cost of energy in a public system that was highly dependent on petroleum.

To compensate for the lack of federal interest, the Government of PR borrowed heavily (Pierluisi, 2015). Between 2000 and 2013, PR's public debt grew at a compound annual rate of 7.6%, while the GNP grew at a nominal rate of 3.5% (Marxuach, 2013). A situation in which the national debt (\$70 billion) was around 97% of GNP, the government's budget deficit was around \$900 million and a structural deficit was estimated to be \$3 billion demanded multiple actions to restore PR's competitiveness (Krueger et al, 2015). However, for others, the entire problem was provoked by the bipartisanship (national and federal) polarisation in which the parties are opposed one against the other rather than just a structural issue (Gutiérrez, 2015; Hohmann & Viebeck, 2015).

Late in 2012 the large deficit in the public budget caused PR's 'general obligation bonds' to be downgraded. In March 2013, after three months of the new government,

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<sup>37</sup> In around 14 months.

those bonds were downgraded again. The facts were complex: an actuarial deficit in the three biggest national pension systems was estimated at almost \$35 billion, the aging and reduction in the population plus the national public debt are the last factors that added to PR's crisis (Marxuach, 2013). In a slightly similar way to the PNP strategy, the new PPD Government implemented its formula to deal with the problem. It raised taxes on sales and services, made cuts in public pensions and health benefits, raised the retirement age, consolidated public agencies, froze public employment and closed schools. However, less than 24 months after the plan's implementation, three grading rate companies downgraded PR's credit rate dramatically, affecting its capacity for loan payments (García-Pelatti, 2014c).

It seems that the neoliberal recipe for PR's depressed economy created the perfect storm (Bernabe, 2015). PR's current scenario could be summarised as follows: a reduction in public investment in a contracting economy, a reduction in public investment, employment and employees, more taxes for all sectors, a petro-crisis, limited capacity for international agreements, no right to bankruptcy or aid from the IMF, a high level of national debt, limited foreign direct investment, a high mobility – brain drain<sup>38</sup> – and a lack of interest from the US Congress in helping to find the solution. Besides a weak business environment for the native producers, there is a lack of competitiveness, in which the majority of non-agribusiness productive sectors are in foreign investors' hands (Cátala, 2015). Furthermore, it is reported that, in the last years, more than 400 businesses have filed for bankruptcy annually and there has been a reduction of 17% in commercial industrial loans and a decrease of 6% in personal loans (Villamil, 2013).

### **Other interventions**

Several referendums were held from 1967 to 2012. Although Puerto Ricans regularly rejected both political options – independence and statehood – historically the interest in the latter has been raised. Blanco-Peck (2009) suggests the existence of a correlation between US transfers to PR and Pro-Statehood's popularity. In the last referendum, 54% of voters expressed disagreement with the actual political status,

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<sup>38</sup> In the last 9 years, approximately 400,000 Puerto Ricans have migrated, the vast majority to the US and many to Central Florida (Dennis, 2015), and around 14,000 businesses have closed.

but this does not mean an interest in cutting the relationship with the US or a claim for assimilation (The Economist, 2013). Decades of political dependency perception – highly supported by the US and PR's two major political parties – have created psychologically pro-US and conservative voters (Blanco-Peck, 2009). Gradually, Puerto Ricans have adopted the materialistic consumer patterns of the US, and socialmedia through technology seems to be helping the new form of assimilation, which is much faster than in prior decades.

Although different US presidents have voiced their personal opinions about the status of PR, the standard stance is 'let the Puerto Ricans decide'. Besides, to counter accusations of colonialism presented at the international level, the US has stated that PR is a domestic subject and has fared well economically compared with its Latin neighbours (Clar, 2013). As a result, some argue that, to reach a consensus on a solution among Puerto Ricans, a unilateral action should be imposed by the US to force a decision (Colón De Armas, 2015). Others argue that PR is a victim of seemingly uncontrollable global economics; hence, the country is in the wrong place at the wrong time (Krugman, 2015). For others still it is the result of years of imperialist neo-liberal policies that did not fit the territory (Stiglitz & Medish, 2015). Consequently, the issue seems to be more about politics than about debt (Paul, 2015). Krueger et al (2015:p.1) assert that the territory is 'now virtually shut off from normal [credit] market access'. Meanwhile, PR has begun a new phase, defaulting on its bond payments for the first time since it became associated with the US 117 years ago. In addition, it is believed that more studies should be conducted to analyse the relationship between leadership styles, entrepreneurial orientation and innovation and their impact on native businesses' competitiveness and performance in PR.

### **2.2.0 Puerto Rico's economic dimension and its competitiveness**

In 1976 the Nobel laureate economist James Tobin, who was commissioned by the Government of PR to study its fiscal policy, concluded that, although economically beneficial for both sides, the restrictiveness of the political relations between PR and the US should be recognised (Estudios Técnicos, Inc., 2014). Three decades later, the United Nations Economic Commission for Latin America and the Caribbean (Comisión

Económica para América Latina y el Caribe (CEPAL), 2004) pointed out that the economic and social policies imposed by the US on PR's economy had three negative impacts: 1) an indirect impact from the effects on imports and migration; 2) a direct impact through the frameworks required to receive US grants; and 3) a mixed impact from failure of the US monetary, fiscal and exterior policies to consider PR's scenario. Therefore, the level of integration between PR and the US could be considered to be the root of the problem.

As a nation, PR has autonomous taxation and control over its internal regulatory system, except when it intervenes in US interstate commerce or international trade (Table 2). Although PR is not a member of the US federal union, the Commonwealth has been 'represented' by it since 1900 in all international trade issues (Irizarry-Mora, 2011). Accordingly, the majority of the Federal Laws are applicable there. For instance, maritime laws, military service, national security, customs and border policies, nationality, currency and some other topics are controlled by the US Federal Government. While not in disagreement with Porter (1990), who states that the 'competitive advantage of a country is not inherited but is created', both could be applied in this case. Therefore, US trade policies to develop the market are designed for natural conditions that are considerably different from those of *Borinquen*<sup>39</sup> and thus may affect its competitiveness and efficiency in trade.

The World Economic Forum (2012, 2013b and 2014) shows that PR's competitiveness ranking allows it to be the only Hispanic territory in the list of the top 30, the only Latin American nation in that group and the fourth in the top five SIDSs; these data are debatable by specific indicators. As a result, in the literature some argue that these methodologies are not appropriate for comparing SIDSs' economies with big economies (Castro-González et al, 2013). According to Lara (2014), the methodology used for this international organisation is based more on entrepreneurs' perception than on empirical facts. Indeed, economic growth and competitiveness should be considered not synonymous but complementary.

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<sup>39</sup> Puerto Rico's native (original) name, before the Spanish colonisation in 1492.

Table 2: Basic facts about PR's economy

Year	Area km <sup>2</sup>	Population	GDP <sup>(USD)</sup>	GDP <sub>pc</sub> <sup>(USD)</sup>	GINI <sub>coef</sub>	Life Ex.	HDI	Inflation	Unemployment	Growth Rate	Major Exp.	Major Imp.
2012	9,104	3.67 M	101.5 B	27,450	0.56	79.5 yrs	0.91	2.47%	14.7%	0.90%	90.7% to US	60% from US
% GDP by Sectors	Manufacturing	Finance & Insurance	Services	Government	Trade	Transportation	Construction & Mining	Agriculture	National Debt		GNP	
	46.4	19.6	12.5	8.5	8	2.7	1.7	0.6	89%	-30%		

M=millions; B=billions; pc=per Capita. Extracted from: Instituto de Estadísticas de PR (2013); Junta de Planificación de PR (2013); Irizarry-Mora (2011). Relation of National Debt vs PR's GNP. % GNP vs GDP.

Pantojas-García (2014) suggests that the original competitive advantages<sup>40</sup> of the Commonwealth lose their value when the hidden economic strategy is based on exemptions rather than competitiveness in a global era. For some, the strategy should be focused on increasing PR's competitiveness through productivity and reducing the socio-economic disparity, but for others attention to education and a more globalised view on business are necessary (Balmaceda, 2013). However, the following issues are frequently highlighted by Puerto Rican interviewees in WEF publications (2012—2014): the high cost of energy, high bureaucracy and requirements for business, government favouritism towards certain groups and the cost of transportation in PR. Nothing is said about PR's dependency on food imports, its food supply chain capacity or the linkage between native agrifood entrepreneurship and internal markets' vulnerabilities or sustainability. These probably occur due to the fact that the concept of competitiveness is usually associated with exportation rather than other internal activities. Alternatively, at the academic level, it has been said that, whilst the agribusinesses may have potential, data available are among the most critical issues for its developing. Nevertheless, the lack of accurate economic data and their availability are issues that the territory has to solve (Krueger et al, 2015).

### 2.2.1 Productivity

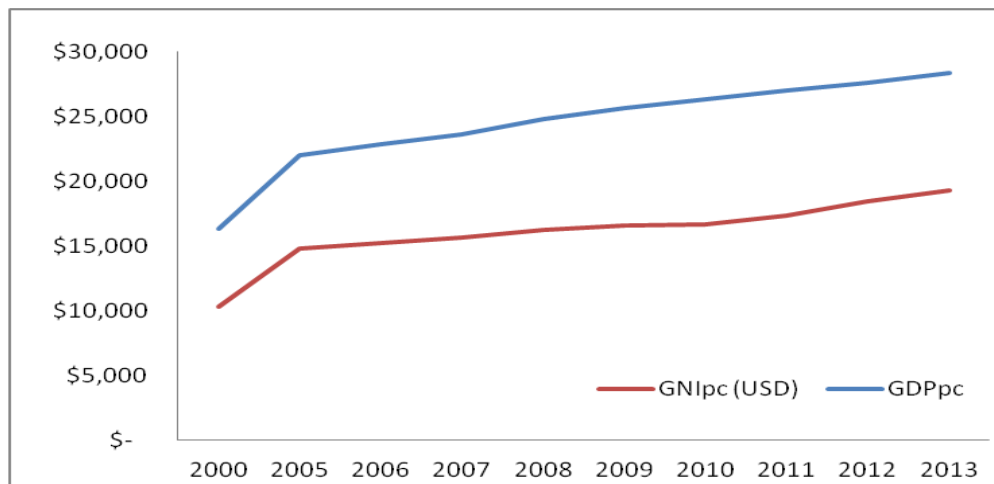
Much of the private non-agribusiness sector relies on external capital (manufacturing and pharmaceutical industries) run by US companies and a tourism sector geared towards US citizens (Clar, 2013). The main macroeconomic indicators (Fig. 3) of PR's economy are integrated with or highly related to the US economy, such as exports (%),

<sup>40</sup> The literature on PR frequently identifies five competitive advantages resulting from its relationship with the US: a common currency, common defence, a common policy framework, the US federal tax exception and the PR's bilingually trained society.

direct investment, transfer payments, the interest rate, the minimum wage and work visas (Aponte, 2005).

The public inefficiency and the bureaucratic regulatory structures demand re-engineering. It is said that they are not flexible enough to adapt to a pluralistic, politically polarised, highly critical and well informed society in a post-industrial economy (Pantojas-García, 2014; Santana-Rabell, 1994). For some the current crisis is a result of the lack of public or private investments and the simultaneous reduction in public expenses (Colón De Armas, 2015). For others the Commonwealth's economy lacks the internal power to grow due to a combination of structural elements, internal factors and external shocks (Lawrence & Lara, 2006). Currently, PR's economy has faced a sustained recession and is ranked 213 out of 216 in the real GDP growth rate (Indexmundi, 2015). According to the Government Development Bank for Puerto Rico (2015), the inflation rate was recorded in July as minus 0.30% and on average —data from 2006 to 2015— as 2.58% (Estudios Técnicos, Inc., 2014), but the cumulative inflation rate was 15% (WG-FEGP, 2015).

Figure 3: PR's real GNI per capita vs. its GDP per capita since 2000



Source: World Bank (2014).

Whilst PR could be considered as a very open economy, the regular government strategy to attract investments is focused on the US market (Pantoja-García, 2014). Besides, the nation seems lack the funds to run its own Government and to invest in

native development; thus, it is continuously dependent on FDI<sup>41</sup> (Irizarry-Mora, 2011). The trade between PR and the US amounts to over \$60 billion dollars annually, but approximately \$15 billion are received from the US in grants and transfers.<sup>42</sup> Consequently, PR's market could be categorised as an inward US-oriented economy, in which the government policy attempts to achieve development by stimulating the domestic (US) oriented industry but sacrificing the native import substitution industries.

The Commonwealth framework for trade is designed to accomplish the US parameters; hence, over 70% of PR's external trade is with the US market (Puerto Rico Institute of Statistics, 2014). PR's production, although in a positive trade balance of between \$12 and \$19.8 billion (2012 and 2014, respectively), is in the hands of the foreign sector. A substantial percentage of its exports are pharmaceutical products, medicinal drugs and medical devices, the majority of which are produced by foreign companies in PR (Fig. 4). Arguably, as a result of the capital flight, a substantial portion of this wealth is not reinvested locally to promote private employment or to expand PR's economy. According to Catalá (2015), PR's foreign capital performance (profits, interest rates, etc.) is estimated to be \$36,052.2 million (FY, 2014), of which around 83% is profit outflows by direct investment. For instance, the drugstore sector is dominated by two US companies Walgreens and CVS, which literally control PR's market, diminishing the native community's drugstore system (Herrero, 2014).

As in PR with 'Operation Bootstrap', US pharmaceutical firms have invested since the mid-1990s in two large offshore centres, also considered as small economies: Ireland and Singapore. These two countries – well known for their efficient maritime transportation – offer intellectual property rights protection, an adequate infrastructure, highly qualified (and English-speaking) workers and favourable corporate tax policies (Boring, 2012).

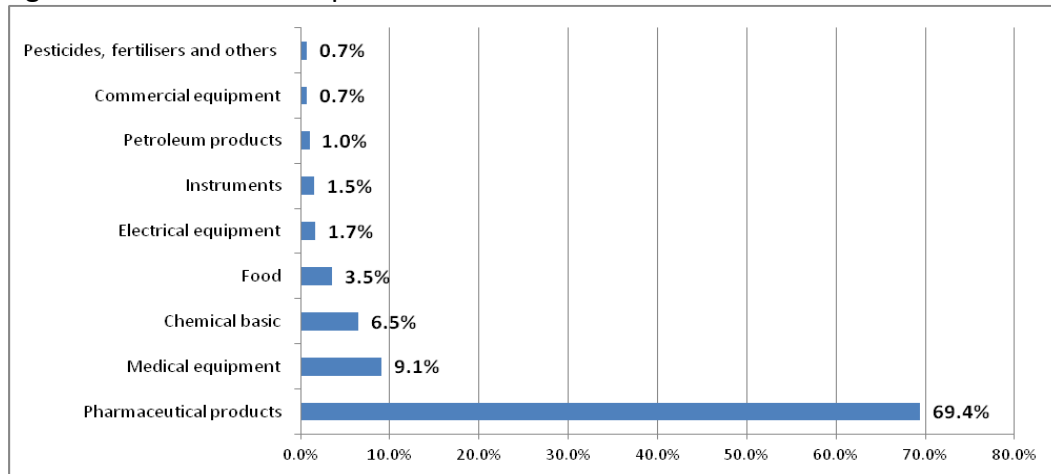
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<sup>41</sup> The estimation (in USD) of the FDI in PR's economy has not been undertaken by the PR Planning Board or any other governmental agency since 1984.

<sup>42</sup> More than 70% of the US transfers to PR's economy are for salaries and marginal benefits, such as social security, veterans, medi-care and unemployment insurance, and rebates by the PR's rum and coffee taxes in the US (Irizarry-Mora, 2011). Since 1917 the taxes on PR's rum exported to the US have been rebated to PR. This measure benefited the rum production in US territories. Due to the fact that PR was the biggest rum producer (particularly Bacardí, Serrallés, Captain Morgan (now in USVI) and other distilleries), the rebate became an important percentage of its income. For instance, in 2010 the rebate was \$434.1 MM (USD). However, in 2007 the law was amended and the USVI initiated a strategy to attract rum producers to its territories. These actions affected PR's income, reducing the US rum rebate by \$130 MM (USD) per year (Banco Interamericano de Desarrollo, 2013). In 2012 the US rum rebate to PR was \$224 (USD). Further US federal transfers, although they may vary, are estimated to make up 14% of PR's public annual budget. Principally, these funds are used for specific activities, such as infrastructure and municipalities. In the last decade, the average of US grants to the Commonwealth of PR was \$3.4 BB (USD) per year (Government Development Bank for Puerto Rico, 2015).



Figure 4: Puerto Rico's exports



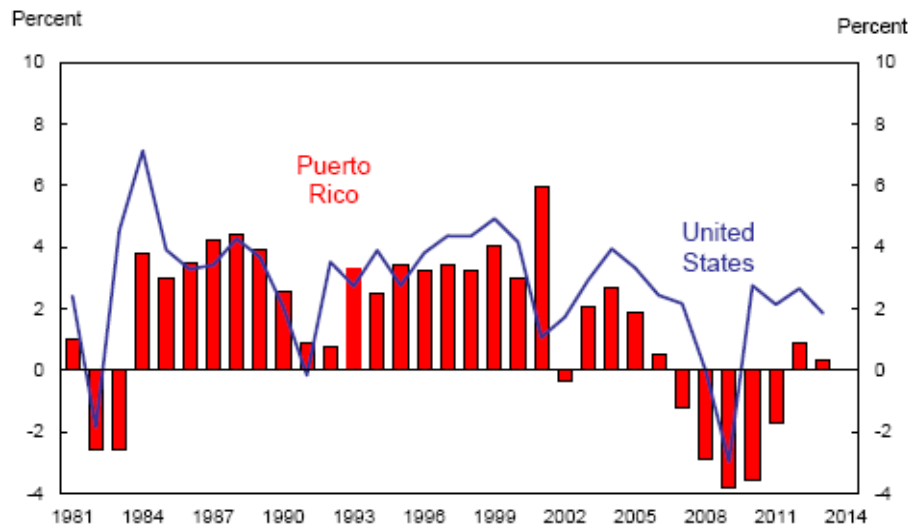
Source: Puerto Rico Institute of Statistics, data of 2014.

PR's competitiveness between the 1960s and the 1980s showed high levels of productivity and employment, boosting its GDP with the transformation of its economy from agriculture-based production to manufacturing (Dietz, 2003). Since the mid-1970s, its economy has developed more in parallel with the US economy, but it was in 2006 that PR's downturn started and it has been much steeper and prolonged than that in the US (Fig. 5). From a historical view of PR's average annual growth rate, in comparison with some LDCs, it is notable that, since the oil price recession in the 1970s, the average percentage of the annual (in decades) growth rate has been falling (Table 3). However, in an income per capita analysis (in PPP), PR shows twice the income of some contrasting countries, but this is not the case if it is compared with states of the US. Thus, PR's economy as a case study could be evaluated as a US territory, as a graduated LDC, as a high-income LDC or as a developed country but in all these cases as an SIDS that is highly influenced by an external large economy (Federal Reserve Bank of New York, 2014).

PR's public sector is commonly perceived as huge and paternalistic, but, according to Catalá (2015), the real problem is that the native entrepreneurs are feeble and highly dependent on the Government; thus, there is a limited level of self-innovation mixed with a very conservative vision to avoid risks. However, it is believed that, in addition to the capacities to trade and the national entrepreneurs' ability to promote local

business, it is necessary to consider secondary factors that affect the level of new businesses' activities or at least their capacity to produce sustainably.

Figure 5: Real GNP growth in PR and the US



Source: Federal Reserve Bank of New York (2014:p. 5).

Table 3: Comparison of the average annual (%) growth rate of real GDP<sub>pc</sub> and income (PPP<sub>pc</sub> in USD) between 1955 and 2009

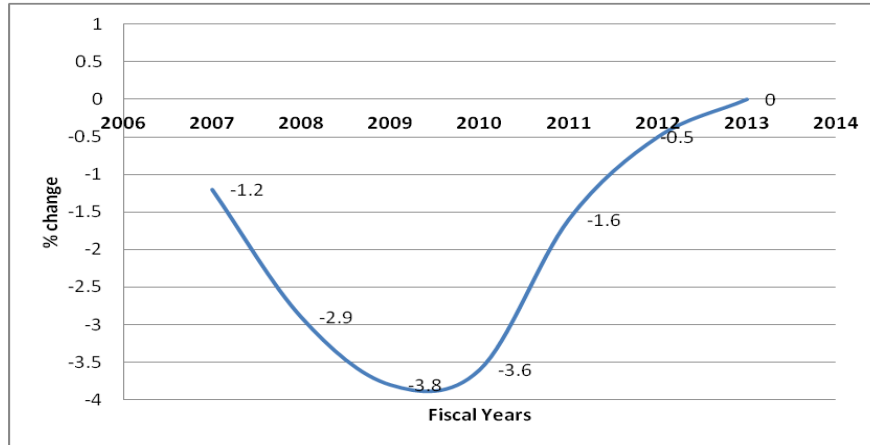
FY	Puerto Rico		South Korea		Mexico		Brazil	
1955—1959	8.7	\$ 677	2.5	\$ 232	4.6	\$ 718	6.0	\$ 455
1960—1969	10.1	\$ 2,145	9.8	\$ 629	6.4	\$ 1,481	5.8	\$ 915
1970—1979	8.9	\$ 5,026	14.1	\$ 2,358	12.4	\$ 4,757	13.8	\$ 3,332
1980—1989	7.7	\$ 9,833	13.3	\$ 7,239	3.1	\$ 6,281	4.0	\$ 4,870
1990—1999	2.6	\$ 13,747	5.7	\$ 12,519	1.7	\$ 7,826	0.3	\$ 7,449
2000—2009	0.8	\$ 20,850	4.7	\$ 23,658	1.8	\$ 11,869	3.4	\$ 10,388

Note: In the 1980s and 90s Arkansas (\$7,586, \$16,817) and Mississippi (\$7,076, \$16,497) were the states of the US with the lowest PPP<sub>pc</sub>. Source: Dietz (2003:pp.18 & 20) and World Bank (2014). In 2009 Puerto Ricans had a median household income estimated to be \$18,314 (Hernández et al, 2014) and in Mississippi it was \$36,646.

PR's economy has been in contraction since 2006, and this is verifiable by the reductions in the country's population, employees, house construction and hence gross national product (Fig. 6). According to Villamil (in García-Pelatti, 2014a), due to the new global reality, in which the US is losing its capacity of influence over the global economy, PR's politically limited scenario for trade may increase its domestic inequalities. Efforts towards the integration of regional economies may be the way forward. However, to accomplish this, a more complex and selective supply chain

system at the global level will be required. Therefore, in a global economy, PR should enhance innovation, a high level of national competitiveness and entrepreneurship.

Figure 6: PR's gross national product – real percentage change (2007–2013)



Extracted from: Junta de Planificación de PR (2013).

‘Socio-cultural and political constraints’ may confine entrepreneurship and hence a country’s capacity to grow the national economy (Leibenstein, 1968). For example, the lack of global exposure of the native SMEs is an inconvenience because it limits the development of their competitiveness skills. Additionally, it is believed that, in the most dynamic economies in the global market, the national entrepreneurs’ innovations play a vital role (CITA). Nevertheless, in the case of PR, the whole system of the market, public policies, TV programmes and the educational curriculum seems to be aligned with the US structure and regularly focuses on the US framework for business. Consequently, a proper Puerto Rican entrepreneurial and innovative society is not yet well developed (De Hoyos-Ruperto & Figueroa-Medina, 2011). Pantoja-García (2014) argues that, whilst Puerto Ricans are debating the political status and lobbying against themselves in the US Congress corridors, the rest of the less developed countries are taking the lead to produce efficiently and to facilitate trade. Indeed, the national pattern – Government and/or entrepreneurs<sup>43</sup> – is to prefer the *status quo* rather than to incorporate different approaches or innovate (Catalá, 2015).

Academic research related to PR’s economy, business environment, national competitiveness and market openness is scarce in the literature, in contrast to other

<sup>43</sup> For instance, Pérez (2015) reports the recent issues with Uber’s Company pilot plan in PR and the local taxi’s drivers’ union.

SIDSs, such as Malta, Bahrain, and Singapore and two other small open economies such Ireland and Hong Kong. Curiously, at the international level, academic publications on PR are related more to highly technical discoveries in sciences than to its capacity to conduct business or attract businesses (Krueger et al, 2015). Although the PR Planning Board provides timely releases of the nation's economic statistics, the methodologies used have not been updated following international guidelines, such as the System of National Accounts (SNA) (Bureau of Economic Analysis, 2011). This has resulted in measures that are difficult to compare with the estimates for the rest of the globe. For example, the World Bank and the World Economic Forum are practically the only global economic institutions that include some data on PR, but for some indicators the available data are insufficient or not provided. This means that, at the local level, PR is limited to collecting, producing and analysing information to be included in those global institutions' statistics or there is a lack of interest in publishing it. However, it is possible that the level of interventions of the US institutions in PR may indirectly reduce the access to information of the local government.

### **2.2.2. Population and socioeconomic disparity**

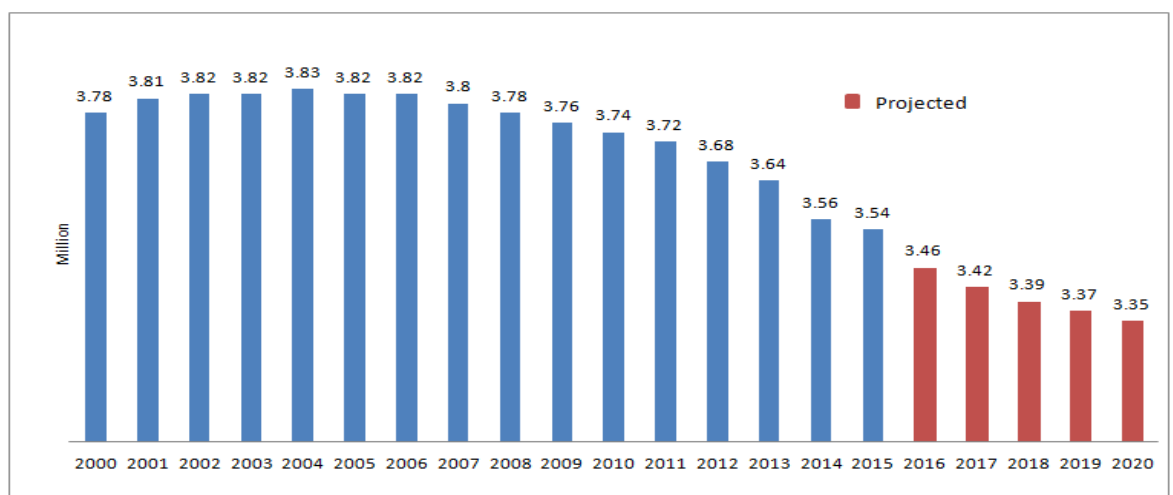
Various economic factors contributed to the trend for Puerto Ricans to leave the agricultural sector between the 1950s and the 1980s. For instance, in the urban areas, they had better access to public services, higher wages and more diverse job opportunities. Besides, the lower minimum salaries in farming and the ineligibility to receive transfer payments for food assistance and housing subsidies for workers making an income may have discouraged the availability of labourers in native agribusiness. Other factors, such as the perception and image of agriculture as undeveloped work, the tough conditions of the fieldwork and discouraging traditional (public and private) messages about working on farms, may have played a negative role too (González & Gregory, 2014).

The Director of the Puerto Rico Statistics Institute, Dr Mario Marazzi, states that it is estimated that the cost of living in PR is around 13% higher than the average cost of living in the US. According to Marazzi, the cost of groceries in PR is around 23% higher than the average of these goods in the US. The average monthly cost for utilities in PR is \$234.81, which is considerably higher than the overall US average of \$159.21

(NUMBEO, 2015). On the other hand, despite similar conditions and regulations, the costs of medical services in PR are 45% lower than those in the US but much higher than in Canada, UK and Japan (Nuevo Día, 2014). During 2012 and 2013, the health sector accounted for around 12% of the GNP, which represents approximately \$3,300 per capita per year (Departamento de Salud, 2014).

The Commonwealth’s population has fallen more in the last three years than in the whole first decade of the 2000s (Fig. 7). Projections suggest that the population will continue to fall by 1% a year, which is 10 times faster than in Japan (WEF, 2013b). The net population growth in 2013 was 7,000 people (Velázquez-Estrada, 2014). The level of international migration to PR is lower as a result of the application of the US immigration laws (Clar, 2013). Currently, it is estimated that there are more Puerto Ricans living on the US mainland than in the Commonwealth: around 5 million Puerto Ricans live on the US mainland and 3.6 million in the territory (Austin, 2015). In the last year,<sup>44</sup> the net estimation<sup>45</sup> of outmigration from PR to the US was 74,000 people. This amount is approximately 2% of the territory’s population. The profile of these outmigrants is estimated to have a mean age of 28.5 years and 35% are single and never married, 52% unemployed and 51% with post-secondary studies (Velázquez-Estrada, 2014).

Figure 7: PR’s population since 2000 in millions



Source: Government Development Bank for Puerto Rico (2015).

<sup>44</sup> In this case the data period of the study was fiscal year (FY) 1 July to 30 June.

<sup>45</sup> The estimated data are between 5,800 and 6,300 Puerto Ricans per month.

The Department of Labour and Human Resources of PR (2013) estimates that around 930,000 people that work in non-agricultural jobs, 76,000 of them in manufacturing. The rate of labour participation is around 40%, which is considerably lower than that in the US (68%). Ruiz (2014:p.106) argues that this rate, although related to public welfare aid, is more a problem of demand than a problem of supply, because in PR the employment generated by the private sector is limited and very specific. However, others suggest that high salaries<sup>46</sup> and local labour regulations to the benefit of the employees are the core of the problem (Krueger et al, 2015).

According to PR's Department of Labour and Human Resources (2014), around 169,000 people are unemployed, which is 6% less than for the same period in the previous year. The US Department of Commerce (2015) reports that 46.1% (1.3 million) of the population of PR is living below the level of relative poverty (US parameters), a reduction of 3% in comparison with 2000 (Bishaw & Fontenot, 2014). This percentage is 30% more than the US federal average (Santiago, 2015). The vast majority of Puerto Ricans below the relative poverty level are receiving some public aid or are eligible to receive it (from the US, PR or both). It is estimated that in 2014 38% of the whole population was receiving some public aid. Of the PAN<sup>47</sup> participants, 58% were female, 31.6% were less than 18 years old, 20% were (college or university) students, 9% were people with disabilities and 0.3% were homeless. Besides, it is estimated that 64% of those who live in relative poverty in PR have not completed secondary school (Fernández-Pabellón, 2014). Approximately 33% of PR's population under the US parameter for relative poverty live in metropolitan cities, and the others are distributed between suburban towns and rural areas in the countryside.

As an example of the relationship between education and salaries in PR, López-Alicea (2015) estimates that the average cumulative salary in 35 years of working was around \$250,000 for a secondary-school diploma employee. In the case of an associate degree employee (a college titled, 2-year diploma), the average cumulative salary is estimated to be \$540,000; for a non-high-technical bachelor degree (4-year university diploma) it would be around \$800,000 and for a high-technical bachelor

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<sup>46</sup> Opposing this point, Dube and Zipperer (2015) suggest that the current minimum wage in PR is also less consequential than during the 1980s, because at that time around 44% of PR's workers were affected by the minimum wage, but by 2010 this share had fallen to around a third.

<sup>47</sup> In Spanish this is 'Programa de Asistencia Nutricional', which in translation means Nutritional Assistance Programme.

degree (4–5-year diploma) the average estimated is \$1,100,000. The average for master’s degrees and doctorates is \$2,250,000 (López-Alicea, 2015).

### **2.2.3 Education**

According to the World Bank (2014),<sup>48</sup> the literacy rate in PR is 92%. However, Disdier et al (2012)<sup>49</sup> posit that on average the rate is higher than 95% among participants between 18 and 54 years old. Apparently, big gaps exist between academia and the needs of ‘productive sectors of the industry’; thus, it is thought that more integration of both sectors could be beneficial for PR’s competitiveness (Ruiz, 2014; Federal Reserve Bank of New York, 2012). At the university level, PR has 85 campuses distributed across the main island. The public sector includes 18 institutions and the private sector consists of 67 academic centres or campuses. In 2012 around 85% of the students at the university level received some public grants or aid to study (no loans).

Business administration programmes are regularly provided in the majority of the universities in PR. Nevertheless, only one campus of the University of Puerto Rico (public) has a (small) programme<sup>50</sup> specialising in agribusiness (bachelors and masters). In the year 2000, the Inter-American University (a private university) founded the first and only Competitiveness Institute in PR. In 2008 the Pontifical Catholic University of PR (private) founded the first and only bachelor degree programme in business with a major in maritime logistics. Currently, other programmes to study logistics or supply chains in business are not offered. Since 2001 the local policy makers in the agricultural sector, have shown some concerns about the lack of a strong basis in administration and entrepreneurship among farmers.

### **2.2.4 Infrastructure**

PR’s media include a free press, some of which are independent and others politically aligned. Newspapers (local, national and from the US mainland) are easily accessible, some in both official languages.<sup>51</sup> Radio (over 80 stations) and television (over 20 free

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<sup>48</sup> At the international level, this is the last rate available.

<sup>49</sup> The literacy rate is highly correlated with age. Disdier et al (2012) conduct research in PR with more than 6,000 participants. The group over 55 years old shows the lowest level of literacy (87%).

<sup>50</sup> Annually fewer than 20 students are admitted to this programme.

<sup>51</sup> Spanish and English

channels) are easy to obtain. The system is regulated by the FCC (US Federal Communication Commission). Around 20 Internet service providers on the main island keep costs competitive, using diverse systems<sup>52</sup> either wireless or landline. It is estimated that in 2014 86% of Puerto Ricans aged over 12 had at least one mobile phone, 62% of which are reported to be smartphones or iPhones, and 86% of users state that they access the Internet through their phone. Furthermore, it is estimated that 58% of the population access the Internet by a personal device at least once a day. Of the population with annual salaries over \$30,000, 100% are frequent Internet users versus 44% of the population with annual salaries under \$14,999 (Estudios Técnicos, 2014).

The nation has 11 airports, 3 of which are international (San Juan, Ponce and Aguadilla), but only San Juan handles over 5,000 flights per month and 8 million people (in transit) per year. The national transportation network can guarantee that all points in PR are no more than 3 hours from an airport or seaport (PRIDCO, 2015).

PR has 11 maritime ports but currently 9 are active. The main one is located in the capital, San Juan, and is the only port in the north of the territory. The port of San Juan is ranked in the top 20 for container movement in the US. In the south the major seaport is located in Ponce and is the most recently designed with the deepest draught (15.2 m or 50 ft) of all (Puerto Rico Port Authority (PRPA), 2015). In Chapter 6 more detailed data of these facilities is presented and contrasted.

Power and water are widely available on the island, with even isolated rural villages receiving electricity and running water. In the case of the water supply, the AAA (the Spanish acronym for the Aqueduct and Sewer Authority), which is a public corporation, follows the US standards (AAA, 2015). Over 97% of the population is connected to the main water system (Rivera-Arguinzoni, 2015). Regarding electricity, PR produces more power than needed and thus is self-sufficient in power production consuming almost 6 megawatts produced by 4 power centres (PRIDCO, 2015). A total of 70% of the electric power is from imported oil. The rest is generated by liquefied natural gas (LNG), coal, hydroelectric, wind power and solar cells. So far PREPA (the

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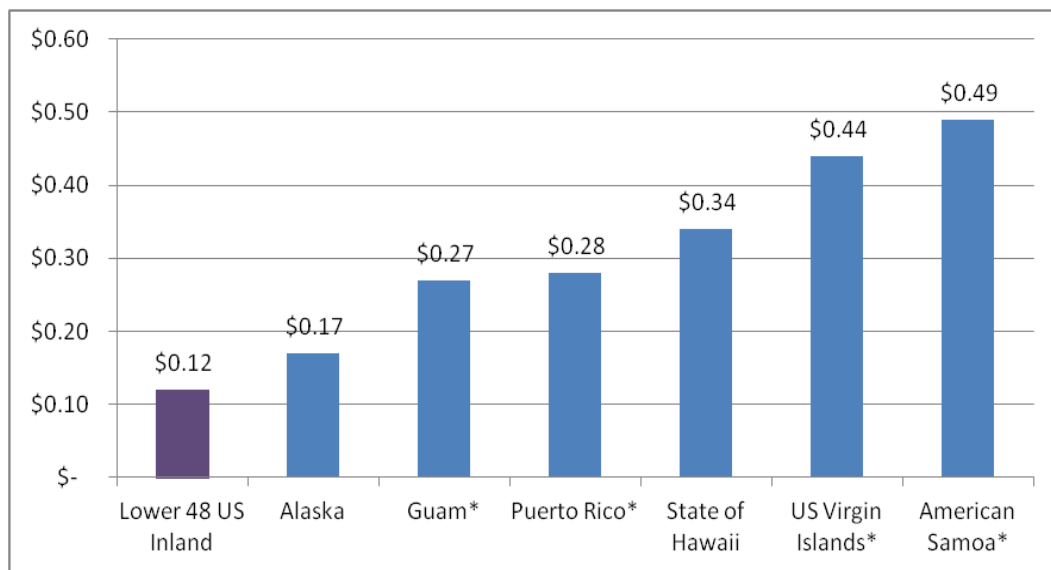
<sup>52</sup> It could be by satellite, under-sea and broadband or fibre optics.



Puerto Rico Electric Power Authority) has been the only distributor of power on the island and is the largest public corporation.

In the list of the top five US territories for higher utility costs, Alaska and Hawaii take the first two places followed by PR (Morales, 2015). However, the reasons for this overpricing are not explained in the publication. Previous analyses of this issue for PR are not available, but some believe that it can be attributed to the cost of transport and the lack of maintenance and updating of the national infrastructure (Imbert, 2015). Since 2012 PREPA has faced serious liquidity challenges, but in August 2014 the corporation entered a restructuring agreement with major creditors (Austin, 2015). Due to the new US environmental regulations, PREPA needs \$2.3 billion to modernise its operations and stabilise its finances. Currently, the average cost per kW/hr is around \$0.25, which is high in comparison with that in the US mainland jurisdictions (Fig. 8).

Figure 8: Cost of energy (kW/h) in US jurisdictions (2012)



Extracted from: US Energy Information Administration (2015); Instituto de Estadísticas de PR (2013). Residential electricity prices in fraction of US dollar per kilowatt hour. \*2011 data.

### **2.3.0 Outlining Puerto Rico's agrifood industry**

According to the list of prevalence of trade barriers published by the World Economic Forum (2013b:p.478), PR is classified as 23/148 and the US 53/148, so the former is in a position that is less restrictive to trade (4.8 and 4.5, respectively). It is believed that the vast majority of non-tariff measures (NTMs) applied in PR are also external or imposed by the US rather than endogenous or established by PR's Government. Unfortunately, data of distortive regulations for PR's agriculture or analysis of the effect of producers' incentives measured as the nominal rate assistance (NRA) to farm output conferred by domestic price support, are not available.

Due to the lack of funds for public investment, its internal devaluation and the urgency of creating jobs in the rural areas to respond to the high levels of unemployment<sup>53</sup> and emigration, the Government of PR and some economists currently view agriculture as a potential sector to activate the rural economy (Lara, in García-Pelatti, 2014b). Enhancing rural entrepreneurship, increasing local production and promoting fresh produce in an import substitution policy may help the national internal economy (Vélez-Pizarro, 2011).

Vega-Rosado (2006) states that the two most competitive industrial sectors in PR are health care and food. She highlights that for an industry it is easier to move one production line to another country than to move the complete value chain to manufacture a product. However, after the FTAs between the US and various Caribbean countries (CAFTA-DR) were signed in 2006, the conditions for native agribusiness producers have changed. The 'advantage relationships' for trade between PR and the US have diminished and hence also PR's competitiveness, allegedly, as a result of the maritime regulatory framework (MIDA, 2015; Senate of Puerto Rico, 2015).

It is said that shipping goods to and from PR costs considerably more than shipping to and from the other Caribbean islands, and this imposes an important cost on Puerto Rican businesses, dampening the economy's competitiveness (Federal Reserve Bank

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<sup>53</sup> Between 2011 and 2014 the unemployment national rate was between 13.4 and 16.2 (Estudios Técnicos, Inc., 2014). However, although they depend on the municipalities and regions, at the rural level the unemployment rates could be higher than 23%.

of New York, 2012:p.23). The limited publications that analyse this issue in PR's shipping are focused on contrasting the container costs but not by sectors. Villamil and Pagán (2014) state that imports of a large proportion of goods from the mainland could be affected more by the Cabotage Act than goods with less volume. Nevertheless, empirical evidence to support these arguments has not been provided so far. The US General Accountability Office (USGAO) report (2013) is the most recent federal study about the Cabotage Act's effects on PR's economy and the topic of agriculture is not considered. The USDA (2003:p.1) reports that:

Beyond the challenge created by restricted choices in transportation modes, the opportunity for farmers and ranchers in such geographically isolated States and Territories to access transportation services is further reduced by infrequent or inconsistent service availability from existing carriers, especially in terms of air transportation.

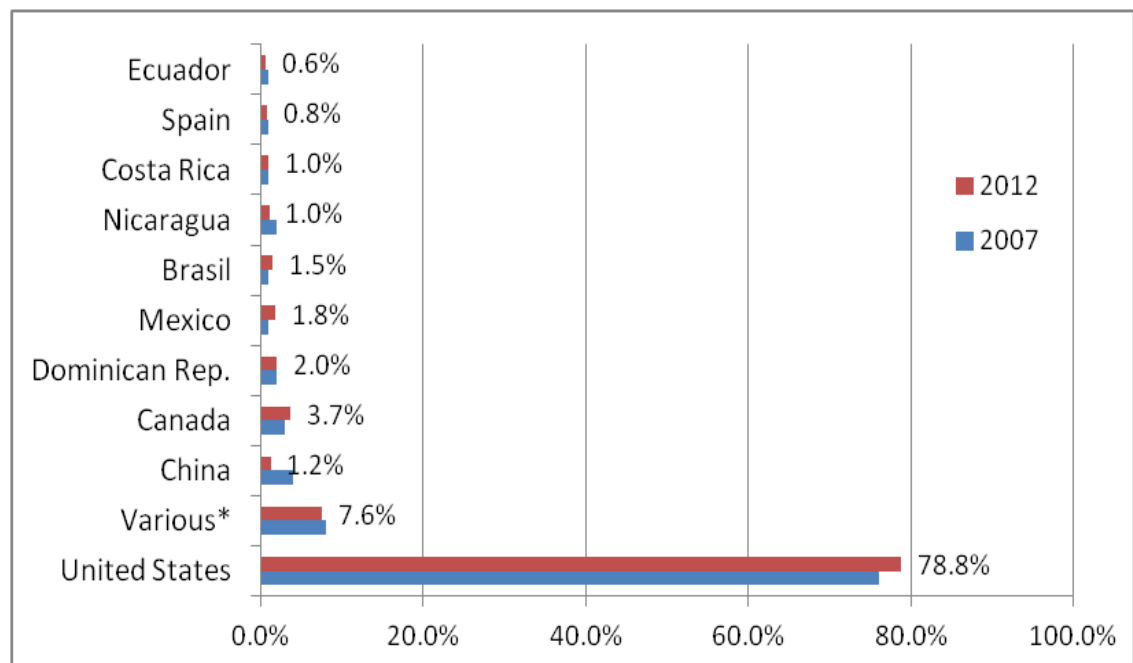
Puerto Rico stands out as an exception to this general rule, because it has successfully managed to transform itself into a major distribution centre for merchandise moving to and from other islands within the Caribbean Basin, and has been able to attract a sufficient volume of trans-shipment cargo to sustain competitive interest from transportation carriers.

Publications using empirical or retesting methods to validate procedures are limited in the literature. Partisan discussions rather than academic peer reviewed studies have affected the analysis of cabotage. Over a dozen well-known proposals to develop PR's agriculture have been written since the 1950s, highlighting the technical aspects of the production processes to the farms and the farmers (González & Gregory, 2014). None of these proposals, particularly those written between 1993 and 2012, explore cabotage's influence on the native food supply chain or on the agribusinesses.

Among agricultural scientists it is said that formal strategic planning of PR's agriculture (mid-term or long-term) does not exist; hence, the agricultural policy is a reactive one, lacking goals, vision and recommendations for sustainable development. In a similar way, publications or academic research about the food supply chain's competitiveness are rare in PR. Consequently, an agricultural sector with the potential to drive and contribute to the growth and development of PR's economy seems to be limited by day-to-day management with a narrow, insular view.

SIDSs and transitional economies, in proportion, import large amounts of raw materials (Jung & Kim, 2012), and these apply on PR. The official figures from 2006 show that an estimated 83% of all food groups in fresh and frozen forms (except fresh milk, bananas and plantains) consumed by Puerto Ricans were imported. It is estimated that three years later the Commonwealth food imports had increased to 85% (Comas, 2009), a similar percentage to Hong Kong or Singapore, where the level of food imports is around 90%. More than 90% of PR's exports and more than 60% of its imports are traded with the US (Fig. 9).

Figure 9: Percentage of PR's food imports by country



Sources: PRPB (2015) and Comas (2009).

Given that only four maritime companies (Table 4) have control of transfers between PR and the US, the cost of transportation appears to be challenging for the native agriculture and food sector. Due to political relations, the topic has an ideological perspective; hence, no consensus exists about the Act (Santiago, 2012).

Table 4: Maritime routes between PR and the US

Companies	Routes	Journey (days)	Miles	Trips
Crowley	Pensauken (NJ)-SJU	8	1400	weekly
	Jacksonville (Florida)-SJU	6	1119	weekly
	Miami-Jacksonville-SJU	7	1434	weekly
Trailer Bridge	Jacksonville-SJU	6	1119	Twk
Sea Star	Elizabeth (NJ)-SJU	4d 4h	1400	weekly
	Houston (Tx)-SJU	5d 5h	1745	FtN
	Jacksonville-SJU	3d 4h	1119	Twk
	Everglades (Florida)-SJU	3d 4h	N/A	N/A
	Jacksonville-SJU	4	1414	weekly
Horizon*	Elizabeth (NJ)-SJU	4	1400	weekly
	Jacksonville-SJU	4	1119	Twk
	Everglades-SJU	3d 4h	1073	weekly
	Houston-Tampa-SJU	7	1849	FtN

Legend: Miles=nautical miles, Twk=twice a week; FtN=fortnight, N/A=not available; \*during this research the firm shut down its operations (2015). Source: Comas (2009).

The agricultural sector in PR has lacked attention since the mid-1970s. Today PR's agriculture contributes 0.79% of the GDP or around \$700 million per year, of which 55% is from animal production (Table 5). In comparison with similar small economies – such as Singapore (0.09%), Ireland (1.6%) and Hong Kong (0.1%) – the percentage of PR's agriculture contribution seems to be relatively high. On the contrary, PR shows a lower performance considering factors such as restrictions to trade, inequality levels (GINI<sub>c</sub>) and the cost of agricultural policies to access food.

Table 5: PR's GDP and agricultural GDP between 1990 and 2012

	Years						
	1990	1995	2000	2005	2010	2011	2012
<b>Gross Domestic Product (BB)</b>	30.6	42.6	61.7	82.8	96.3	100.2	102.0
<b>Agricultural GDP (MM)</b>	434.1	318.4	407.3	499.3	553.2	795.6	813.0
<b>Agricultural GDP/GDP (%)</b>	1.4	0.7	0.7	0.6	0.6	0.8	0.8

Source: González and Gregory (2014:p.5). Data from Gross Farm Income, PR Department of Agriculture, Agricultural Statistics Office, Junta de Planificación de PR – '*Informe Económico al Gobernador*' – and Puerto Rico Institute of Statistics.

PR's geographical location is, at least, no different from other SIDSs in the region, totally dependent on maritime transportation showing also large imbalance in agricultural goods trade (FAO, 2006). Setrini (2012) suggests that the Commonwealth's producers find themselves squeezed between the low cost of industrial producers in the US and that of low-wage producers in the Caribbean and Latin American countries. For instance, the agricultural minimum wage in the US, as in

PR, is \$2.75 (per hour) more than it is in Costa Rica. In comparison with the Dominican Republic, that amount is the equivalent to 10 hours of work.<sup>54</sup> Furthermore, its regulatory framework for the environment and for workers – protection, security and rights – may elevate producers' relative costs in comparison with competitors (Setrini, 2012).

Whilst subsidies may support PR's agriculture in dealing with its differences in the market, Setrini (2012) argues that native producers and the system are promoters of 'junkies to subsidies' rather than promoters of innovation or transforming processes. Other forms of competitiveness should be identified to potentiate production, because competitiveness by 'price only' is not the only method. However, PR's agriculture has some characteristics of a competitive market. Firstly, its openness is high as is the rivalry between international products and native producers (WEF, 2013b). Secondly, the local infrastructure permits native distributors to make 'just-in-time' purchases, thus giving fresh products more days on the shelf (Setrini, 2012). Thirdly, the number of producers (around 11,500) and buyers is relatively large in contrast to the internal market. For instance, in 2012 the Puerto Rican food consumption expenditures were estimated to be \$8.93 billion, making up 14.64% of the total consumption expenditures (\$2,400) per capita/year in food) (González & Gregory, 2014).

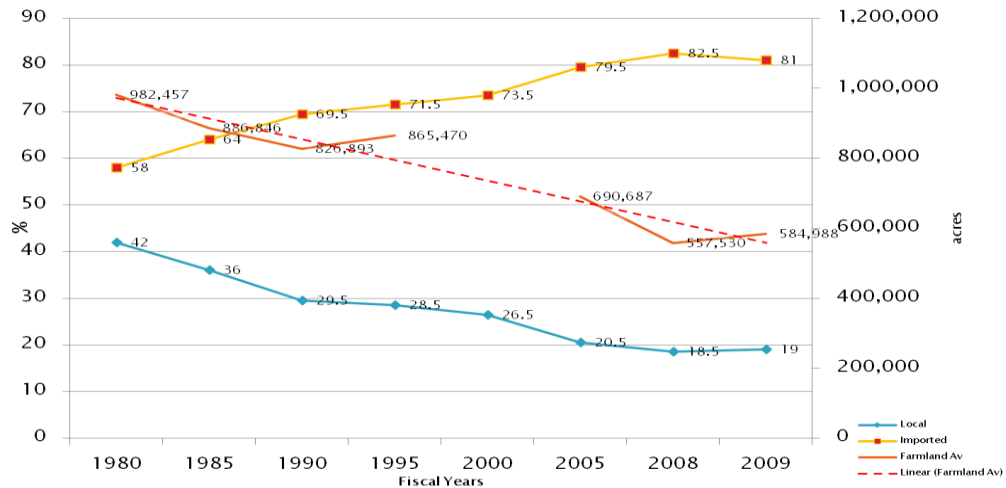
PR's agrifood data are regularly presented by total sales rather than volumes of production. Consequently, it is reasonable to assume that, if the production is decreasing but without changes in gross farm income, the available public data show the effects of a price increase rather than a real sustainable development (Fig. 10).

Currently, the farm size area and the sales values on average are small. The average size of PR farms has increased by 26% (from 34.3 to 43.2 acres), but between 2007 and 2012 their number decreased by 16%. In addition, although around 72.4% of farm business tenure is individually owned by locals and 89% is legally organised, individual business corporate farming accounts for less than 4% (González & Gregory, 2014).

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<sup>54</sup> Resolución No. 2/2013 Ministerio de Trabajo de la República Dominicana, June 2013.

Figure 10: PR's food consumption (imported vs. local) (%) and farmland availability



Sources: Junta de Planificación de Puerto Rico (2015), Departamento de Agricultura (2012), USDA-NASS (2015) and Comas (2009).

The factor of aging is an important one when PR's agribusinesses are described. The average age of PR's farmers is 60, and 70% of them are over 56 years old. The substitution rate, with a new generation of producers who are more technologically knowledgeable, seems to be limited.<sup>55</sup> Additionally, it is estimated that 75% of PR's farmers are in the group of annual sales of \$10,000 or less (González & Gregory, 2014).

The Commonwealth's agriculture is highly susceptible to external shocks<sup>56</sup> and highly regulated by the same sanitary and phytosanitary (SPS) measures as the US. Besides, it is highly exposed to natural conditions (hurricanes, overflows, etc.) and a low level of added value in native production. These factors, according to González and Gregory (2014), have been detrimental to PR's production over the last twenty years, particularly for crops –vegetables and root produce. For instance, in comparison with the 1990 production, in 2012 the production of plantains and bananas decreased by 55.4 and 208.4 million units, respectively. Using a representative group of vegetable crops as a parameter, González and Gregory (2014) estimate that in 2012 the area in use decreased by around 770 acres when compared with 1992. Nevertheless, these data may not be a good indicator due to the fact that improved technology – hydroponic, aeroponic, aquaponic and so on – may reduce the area of production

<sup>55</sup> It is believed that although young farmers have more scientific and technological knowledge, they have very low entrepreneurship backgrounds, a lack of resources (land available to produce, credit for loan or money savings) and a poor young farmers' public programme (González & Gregory, 2014).

<sup>56</sup> The US Interstate Commerce Act restricts Puerto Rico's capacity to impose restrictions on the US produce.

without having significant effects on the amount produced. However, the production and particularly its pricing in PR are highly influenced by the US prices and greatly affected by the climate seasons.

In the case of coffee, once the most famous Puerto Rican commercial product in Europe, its production seems to be more traditional than commercial. Different factors have decimated the production and the scenario seems to be extremely threatened by the recent US regulations. Currently, the Federal Court of District in PR is considering a case that requires farmers to pay workers a fixed minimum salary per hour rather than a higher payment but based on the weight picked by the workers (Cobián, 2014).

The number of farms dedicated to fruit crops has been declining for the last two decades to almost half of the 1992 level (Departamento of Agricultura, 2012). For example, pineapple production in 1990 was around 50,000 tonnes, but in 2011 the production was only 2,500 tonnes. In 2011 the production of oranges and avocados together was 121 million units (per fruit) less than in 1990. Nevertheless, a reduction in farms is not necessarily a reduction in acres of production, which is particularly the case of papayas and mangos. Although the area (acres) of production of oranges seems to be relatively stable, the area dedicated to producing papayas and mangos increased by around 40% in the period between 1998 and 2011. However, the gross farm income (GFI) for mangos in 2011 shows a reduction of 69%.

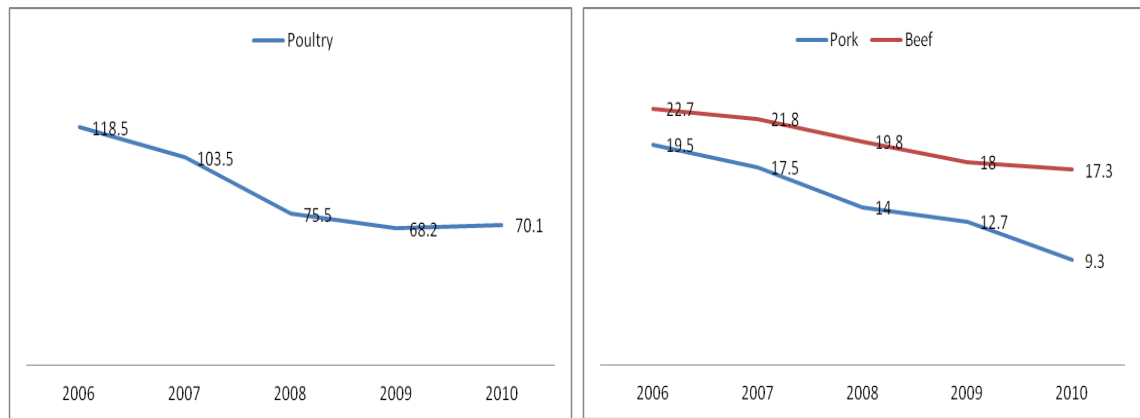
Comparing PR with Hawaii, the Hawaii archipelago's area is 7,500 km<sup>2</sup> bigger with a third of PR's population. However, in cropland, PR shows 150,000 acres more (USDA-NASS, 2015). Nevertheless, from 1997 to 2012, both US territories lost almost 300,000 acres of farmland (González & Gregory, 2014). The majority of PR's agrifood exporting products have not been produced by its native agriculture as in Singapore. Regularly, PR's production is achieved by mixing raw materials from foreign countries and then exported principally to the US.

Since CAFTA-DR, although the imports of raw materials into PR have increased, domestic production levels have decreased, particularly in the livestock industry (Fig.



11 and Fig. 12). A more disaggregated assessment facilitates better understanding of the situation.

Figure 11: Livestock local production in million pounds of meat (2006–2010)

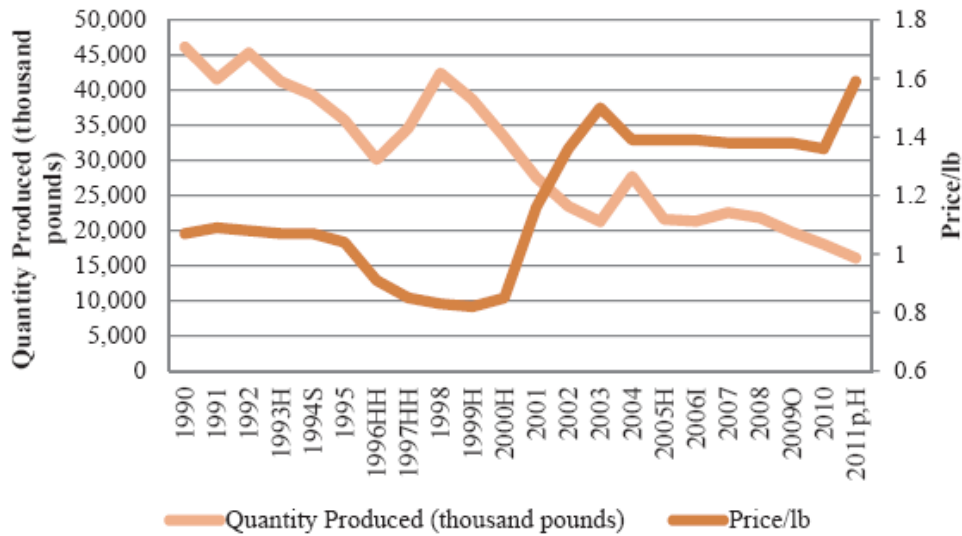


Source: Departamento de Agricultura (2012).

Animal production, as a subsector, exhibits the highest gross farm income (GFI), contributing a total of \$423.3 million in 2011 (González, 2014). However, in the last decade, the number of dairy farms has decreased by 14% and production has decreased by 4%. Nevertheless, the milk sector has the highest GFI with \$237.1 million and a share of 30.0% of the total available PR agricultural GDP (González & Gregory, 2014).

Broiler production, on the other hand, has suffered a dramatic impact in the last decade: 66% of the factories have closed and with them many producer have disappeared. As a result, the 2011 data show total production of 41.3 million (kg) of poultry, which is 9.9 million (kg) less than in 1990. In 2011 the local production accounted for only 25% of PR's per capita consumption of poultry which is approximately 46.7 kilograms a year, it. Since 2008 the only poultry-processing plant operating in PR has been Pilgrims' Pride, a US-based corporation that was recently acquired by the Brazilian JBS S.A. A similar pattern is apparent in the egg sector, for which the market is estimated to be 50 million dozen per year. Production in 2011 was 11.7 million dozens in contrast to the 27 million dozens produced in 1998. In the last 2 years with data available (2010 and 2011) the sector income decreased by 5.07% and 3.01% per annum, respectively.

Figure 12: Relative production of meat (pounds) vs. price of beef (USD) in PR



Legend: p= preliminar, S= drought, l=flooding, O= tropical depression, H<sub>x</sub>=hurricane(s).  
 Source: González and Gregory (2014:p.19).

According to the USDA-NASS census (2008) in 2007 PR had 1,513 swine farms, but in September 2014 this number was dramatically reduced to an estimate of 160 farms. However, the per capita consumption of pork has been increasing, and although it has a seasonal pattern, the national average is around 55 pounds (22.73 kg/year). According to González and Gregory (2014), by contrasting the years 1990 and 2011, it can be estimated that in general the entire native meat production experienced a reduction of around 80 million pounds (36.36 million kg).

### 2.3.1 The native grain importing sector: Animal feed mill production in Puerto Rico

PR's grain-importing sector is broken down into animal feed manufacturing and flour milling and baking. Animal feed industries as a production system in PR consist of four basic activities: grain buyers' resale, grain transformation, product trading with wholesalers and retailers and the sale of secondary products to consumers. In general, these are the first basic echelons in the agrifood chain of animal production.

Some sectors of animal production for meat are more grain-dependent than others. Other factors, such as land and grass limitations, the type of production (extensive vs. intensive) and the climatic conditions (seasonality) may affect their level of grain dependency. Non-ruminant production, particularly poultry and swine operations, are

classically highly grain dependent. According to their digestive apparatus, both species are classified into the group of farm animals with a simple system.<sup>57</sup> The farm animals included in this group are commonly species that are less demanding of space to grow but have a low level of yield (food/meat rate) during growth in natural conditions (not man-made supplemented). Thus, in an intensive production system, their nutritional requirements demand a strict balance in diet to enhance the natural metabolism and increase their natural yield. Farm species in the group of complex digestive systems are less dependent on grain than those of the simple system. Farm animals in this classification are *equines* and *cuniculi* (rabbits). In the group of ruminants – beef and dairy cattle, goats and sheep – the level of grain dependency is lower than that of farm animals classified into the group of complex digestive systems. However, it depends on the production system and cropland available.

Animal production is the strongest agricultural sector in PR and the most dependent on grain imports. It is well known that between 50% and 70% of the production costs in this sector are for animal feed (Austin, 1981). In the last decade, the number of grain-importing companies in PR has been reduced by bankruptcy and consolidation. It is believed that it has been highly affected by the grains' volatile costs and by the impact of the costs of trade between the US and PR. Additionally, in the livestock industry, it is expected that, in the next years, more local companies importing grain for animal feed will disappear. Promoting efficiencies in the agricultural sector has not been a priority due to the fact that the agricultural sector nowadays accounts for less than 1% of PR's GDP and its capacity to export food is practically non-existent. As a result, the literature is silent regarding PR's agribusiness supply chain competitiveness.

Before the animal feed product is consumed, various processes are undertaken in the chain. They include grain producers at the farm level, grain elevators and sellers, transporters, surveyors and receivers, inspectors, regulators and other secondary activities associated with them (Morgan, 2000). For each of these processes, some buyers are searching for a combination of low prices and high quality. It is believed that price is the most traditional factor used in this business. Commonly, animal producers are not well informed about the technical–nutritional requirements of their

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<sup>57</sup> This refers to the digestive anatomic classification.

animals, but they are highly aware of the costs for their own business. Consequently, farmers searching for lower prices for animal feed may ignore the importance of quality to the detriment of their animals' yield. Similarly, feed mill agribusinesses are focused on low-cost materials rather than improving efficiency through innovation and technology (Chavarría et al, 2002).

During this research the dairy and swine farmers' sectors through the PR Farm Association, denounced the low quality and higher costs of the animal feed produced in PR. They demanded a revision of the regulatory frameworks for the quality of animal feed by PR's Department of Agriculture. They recruited an independent international expert to evaluate the quality of the products (CyberNews, 2015).

The agrifood sector regularly needs to restructure its value chain and update its production processes to meet changing consumer preferences and the requirements for efficiency in processing and retailing products. Due to its natural limitations and internal and external particularities, every country has to develop systems to optimise its resources and minimise its costs. As a SIDS, PR faces challenges in trading efficiently and in securing access to food at competitive prices (FAO, 2011). As a result, a study of the agrifood supply chain system could identify inefficiencies in the various activities involved to modify or develop more sustainable production processes. There is no single, common, generic rule for achieving competitiveness. Every nation is different and its environment is the result of a combination of circumstances, on which policies and human effort have their impacts (Garelli, 2014). As a consequence, any public economic measures adopted in relation to trade or to improve competitiveness should consider the goal of sustainability (Ballarin, 2005). However, what if the domestic trade of a SIDS is subjected to policies whereby its own economic sustainability is affected by another economy that limits productivity? What if an anti-monopolistic policy falls into an oligopolistic collusion, limiting firms' efficiency?

### **2.3.2 The native fresh produce importers' sector in Puerto Rico**

Similarly to some of the smallest Caribbean nations but unlike Jamaica, the Dominican Republic and Cuba, PR imports around 85% of its food needs. Its food imports depend on volatile export markets, which are susceptible to periodic market access

disruptions and external regulations. Around 70% of this amount is imported from the US markets, and almost 92% of it from the Port of Jacksonville in Florida (Comas, 2009). PR's market dependence on imported food may entail several dangers, beginning with the fact that in a national emergency the population would not be able to feed itself. Climate change, with more frequent and severe events, can seriously affect the supply of food available on the global market. Additionally, the natural geographical limitations and the alleged overpricing in transportation should be considered.

The majority of the fresh-produce importers in PR are native-family agribusinesses. Although few in number, they supply almost 75% of the imported produce to feed the total market. The remaining 25% is from transnational companies that focus on processed products rather than fresh goods. Unlike grain, the vast majority of the imports are transported in containers, refrigerated or controlled climate storage units. Academic publications about these topics in PR are uncommon; thus, a basic outline of their operational information is provided later in this thesis.

These agribusinesses are totally dependent on the maritime transportation companies and are limited by a plethora of regulations. Whilst these imply extra costs that may affect the supply chain, they may not necessarily be associated with cabotage. However, such a scenario may present opportunities to analyse the connection between them. By exploring the US Cabotage Act as an external NTM, we could identify inefficiencies in the supply chain, potentialities, robustness and vulnerabilities in the process of trading food in PR's market. The analysis may contribute to the discussions about how to encourage a more sustainable and socially just agriculture industry.

#### **2.4.0 Conclusion**

Resource efficiency is one of the important challenges that SIDS and other trade regions should be facing. In a context of high price volatility for agricultural commodities, promoting competitive and sustainable agriculture has become a real challenge for the agrifood sector. It is not a secret that European and some US agro-industries are under huge pressure from emerging countries on the global market

(Courlex & Dedieu, 2013). The rise of emerging economies and the upgrading of their industries have increased competition for natural resources globally and resulted in export restrictions on raw materials in the production value chain. Restrictions on exports have led to scarcity of raw materials (ECORYS, 2011:p.5). Some small economies and SIDSs have been more affected by the higher costs on food imports. Particularly for the CARICOM members, over the period 1991–2006, generally the US import market for fresh (non-processed) crops has not been competitive (Lowe & Davis, 2007).

PR's economy is highly influenced by the US economy. Although its infrastructure, political stability, dollarised economy, free access to the US markets and absence of direct US taxes may be considered as strengths, PR's economy is in recession and submerged in debt. Various social problems have arisen in addition to its small sector of native entrepreneurs; hence, in the short term, the scenario for PR looks precarious. PR's agrifood system could be described as an unsustainable one (Weisskoff, 1985). Nevertheless, it appears that PR's agricultural sector has growth potential, and some believe that import substitution based on the principle of food security is a feasible option to generate jobs in the rural regions, increase the GNP and promote rural entrepreneurship by endogenous development.

In the literature, the US Cabotage Act has not yet been directly assessed as a NTM. Whilst its effects are on domestic trade only, this legislation may act as an external NTM limiting PR's interest in developing its agribusiness into sustainable production. Neither aspect is considered in the literature studied. Exploring the Cabotage Act's impact on the native agrifood sector may help to identify some factors that could affect the food availability or the native agribusinesses' stability and areas of opportunity under the local (firms' or government) control. In the next chapter the activities associated to cabotage will be discussed and contrasted.

## CHAPTER III

### LITERATURE REVIEW

#### **3.0.0 Introduction**

Having contextualised the PR's socioeconomic scenario, the following chapter discusses other factors that may affect local agribusinesses' operations. Maritime cargo is the basis of the trading system to move high volume of raw material and containers, but the high level of volatility in maritime costs has been detrimental to food importers, particularly in SIDSs, small economies and low-income countries (Korinek & Sourdin, 2009b). This chapter discusses concepts of maritime economy, shipbuilding and management, elements of sea trade, and associated issues on the maritime transportation that justifies this research. Scenarios of sea cabotage policies at the international (Hong Kong and Singapore), domestic (US – Hawaii, Alaska, Guam) and local (PR) levels are presented. Additionally, due to the fact that the maritime liberalisation of New Zealand<sup>58</sup> is a well documented case, it is contrasted with PR's experience.

#### **3.1.0 Maritime economy and policies**

Depending on location, transport costs vary between 8% and 13% of import values (Márquez-Ramos et al, 2007). Few studies focus on sea transport costs for the supply chain process from the origin. Subsidies, shipbuilding restrictions, foreign direct investment restrictions and other types of elements may act as barriers limiting foreign trade and investments (Lewis, 2013). For instance, cabotage policy can be implemented through measures that exclude foreign shipping or crews from the country's coastal trade (Liu, 2009). In the form of protectionist measures, many activities associated to the sector such as shipbuilding, technological advances or fleet renovations might be affected and eventually the freight rates.

Since the World Trade Organization (WTO)<sup>59</sup> was created, multilateral rules have been set to support international trade and arbitrate in disputes among member nations

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<sup>58</sup> Currently is the only small developed economy archipelago that in the last decades has implemented a complete maritime liberalisation process.

<sup>59</sup> Since 1995, it is the intergovernmental organisation which regulates international trades, replacing the General Agreement on Tariff and Trades (GATT) initiated in 1948.

acting as an international trade forum court (ECORYS, 2009). However, finding appropriate formulas to negotiate maritime transportation liberalisation is not easy when many countries reserve this kind of transportation for national-flag ships (WTO, 1996). Moreover, the existence of 'grandfather clauses' for the original contracting parties of GATT/WTO, freight agreements and the level of confidentiality between transporters and importers, adds challenges to this topic (Liu, 2009). Arbitrage mechanisms created by and for the member nations of the WTO were developed to facilitate foreign trade. However, when domestic trade is affected by domestic rules, those mechanisms are useless.

### **3.1.1 Tariff reduction is not enough**

The reduction or abolition of tariffs not only enhances countries' trade but also has an impact on trade directions and hence fleet development (Meersman, 2009). Between 2008 and 2011, trade patterns were extended and the world fleet grew by 37%, but between 2011 and 2012, shipping companies claimed that freight rates were often unprofitable (UNCTAD, 2012:p.xiv). Operators attempted to make savings through greater economies of scale by investing in large-capacity ships in the tanker and dry-bulk market segments. To benefit, countries need major investments in port infrastructure and multi-modal operational systems. The exponential growth in throughput is the consequence of globalised seaborne trade, but the fall in transport costs over time plays a key role and ports require greater efficiency (Denktas-Sakar & Karatas-Cetin, 2012; Musso, 2009).

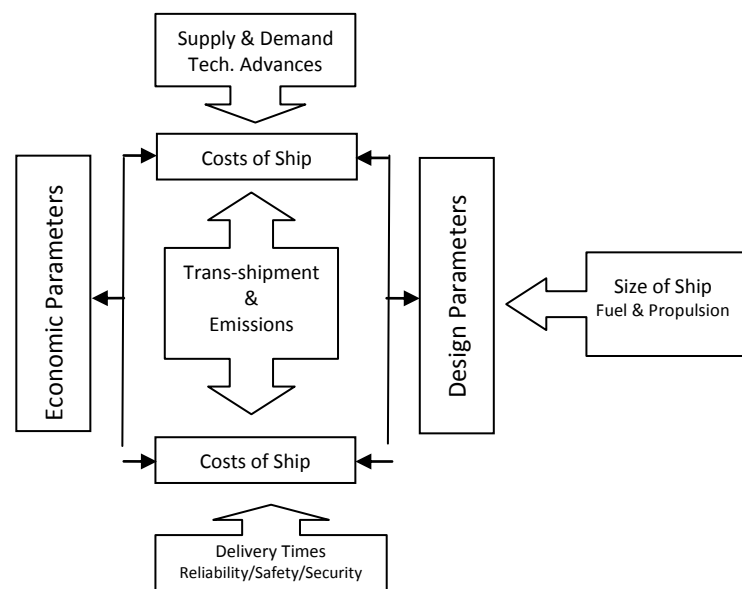
Although tariff measures have fallen considerably over the past decades, maritime transport costs have risen slightly overall in ad valorem terms. Using data between 1991 and 2007, Korinek and Sourdin (2009b) posit that maritime transport volatility contributed substantially to the sharp rise in the prices of agricultural products. Volume and remoteness factors are also important variables. However, the costs of a profitable business in the shipping sector are heavily dependent on the balance between the supply and demand for shipbuilding capacity. Therefore, to achieve efficiency and cost reduction, the optimisation of space for transporting products should be considered.



In the last decade, the level of containerisation has increased substantially with the influence of the Asian market trade. Not only does the growth of merchandise trade have an impact on container trade but also the existing trade imbalances are mirrored by the maritime container flows (Meersman, 2009). In fact, the World Bank and the United Nations measure countries' economic activity by the number of metric tonnes or containers in twenty-foot equivalent units (TEUs) imported and exported. For the transportation of raw material (e.g. grains), containerisation is much less frequent than the utilisation of dry-bulk vessels for high volumes of goods. Nevertheless, both systems are tied to a regulatory framework, which is usually more sophisticated for agricultural goods. Although containerisation in agriculture has increased dramatically since the mid-1980s, an estimation of the costs of trade should consider the differences in management by products and their particularities.

Hopman and Nienhuis (2009), state that cargo prices will remain under pressure since shipbuilding continues to be seen by some governments as an attractive employment sector. They also argue that changes in design and efficiency and larger capacities to transport are of more interest for the Asian markets. They estimate that in 2025 the consolidation of industries related to maritime transportation for competitiveness will be imminent (Fig. 13).

Figure 13: Main parameters for the future of ports and shipping



Source: Hopman and Nienhuis (2009:p.28).

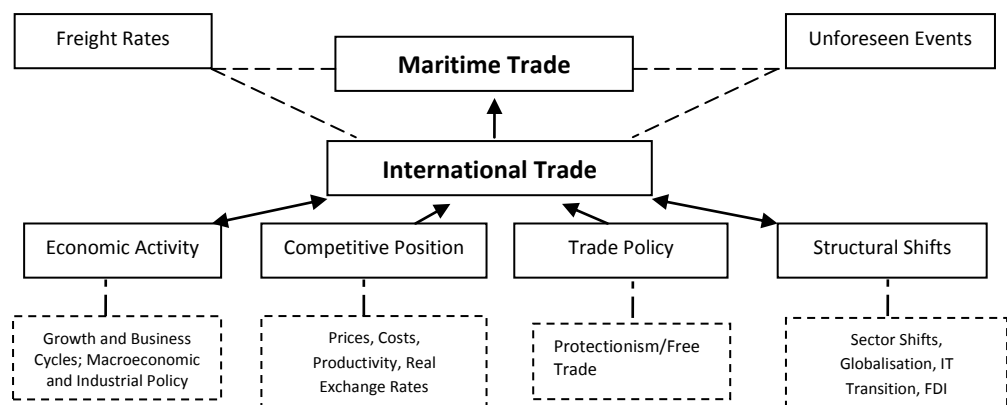
For instance, in terms of freight shipping, Maersk Co. led the way in 2012, with sales of over 60 billion USD. In March 2014 they owned 248 ships and held about 15% of the global cellular fleet (Statista, 2015).

How could this possibility be negative for the economy of small islands and/or SIDSs? Could the port stakeholders' supporters (e.g. employers and operators), infrastructure and regulations affect the SIDSs' vulnerability? How can SIDSs avoid oligopolistic structures in a scenario of shipping company consolidation? To answer these questions, study efficiency in the value chain and business collaboration is required.

### 3.1.2 Factors that may affect trade by maritime transportation

The analysis and reduction of transport costs is quite a complex issue. Meersman (2009:p.1) posits that plenty of factors influence maritime trade costs and could have an impact on countries' trade pattern (Fig. 14). As an example, short-sea shipping is different from deep-sea traffic; thus, container traffic and liner shipping are totally different industries from bulk traffic.

Figure 14: Factors affecting maritime trade



Source: Meersman (2009:p.3).

### Shipbuilding factors

Productivity is highly affected by regulatory systems, and in the case of shipbuilding the labour intensity operation is important. Hopman and Nienhuis (2009:p.32) argue that, although design and other economic parameters are interdependent affecting eventually the freight rates, the most important factor in the equation of costs

(presented below) is the total price of the shipbuilding highly influenced by the unit labour cost per hour of construction. Today, low-wage countries such as the Philippines seem to favour this kind of production. Vietnam and Ukraine are looking for a space too. However, China and South Korea have the dominion (Tables 6 and 7).

$$P = [(M * R + I + F + C) * (1 + r) - S] * E$$

P=price;

M=man hours spent by the main contractor;

R=hourly rate of the average worker;

I=costs of the subcontractor;

F= financing and insurance costs;

C=capital costs;

r=profit margin;

E=exchange rate.

S=subsidy (ies)

Table 6: Deliveries of new major shipbuilding and countries where ships are built (2011 data)

Vessels	China	Rep. of Korea	Japan	Philippines	Rest of World	World Total
Tankers	7,613	11,370	4,764	-	617	24,365
Bulk carriers	26,719	11,678	11,656	1,658	1,290	53,001
Container and other passenger	4,291	11,794	2,921	3	2,418	21,427
Offshore and other work vessels	986	1,008	26	-	1,032	3,052
<b>Total</b>	<b>39,609</b>	<b>35,850</b>	<b>19,367</b>	<b>1,661</b>	<b>5,357</b>	<b>101,845</b>

Extracted from: UNCTAD (2012:p.49).

Table 7: Countries' fleet and its tonnes (dwt)

Country	No. of ships	dwt	Foreign flag as % of total dwt
Cyprus	355	12,716	52%
Hong Kong	610	26,603	30%
Ireland	79	773	67%
Malta	33	585	24%
Marshall Islands	34	614	26%
Mauritius	7	101	8%
New Zealand	20	222	66%
Singapore	2,120	74,064	45%
Trinidad and Tobago	5	7	14%
USA	1,927	57,356	85%

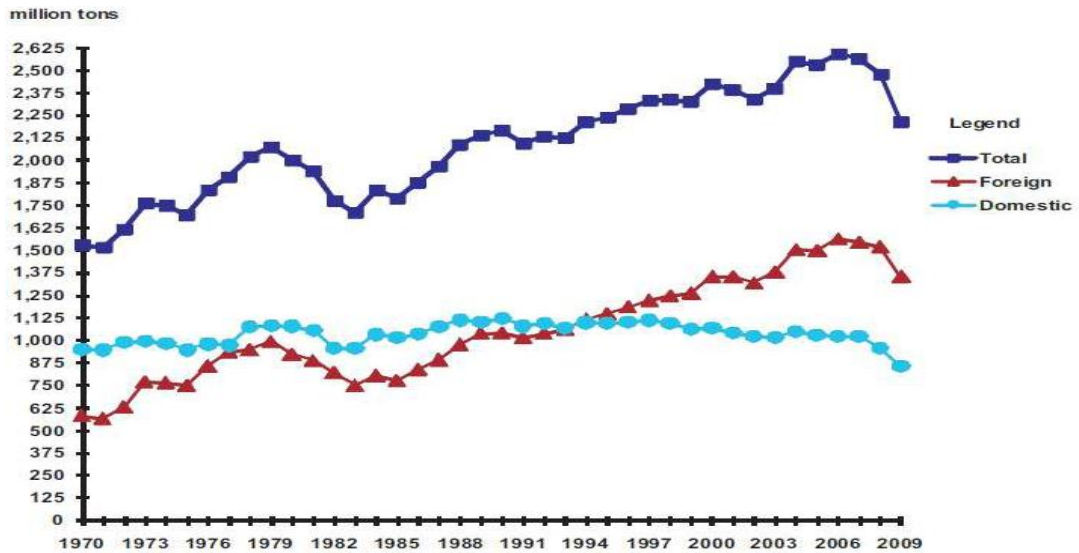
Extracted from: UNCTAD (2014:p.34ss).

A century ago shipbuilding was dominated by Europe, with a world market share of 80% dominated by the United Kingdom and the Netherlands. For various reasons,

including the decrease of the European shipping fleet, lack of investment, poor labour relations and an inability to increase productivity levels, their dominance was gradually eroded and partially replaced by continental Europe and Scandinavia (UNCTAD, 2013b). In the early 1970s Japan and Europe dominated the world market with a combined share of some 90%, but at the same time South Korea entered the stage. Korea offered lower wages than Japan or Europe and chose to position shipbuilding as a strategic industry (Donga, 2015). Just as Japan did before, a carefully planned industrial programme was successfully initiated, leading to a world market share of 25% by the mid-1990s and a world first position as of 2005. Then China entered, rising rapidly to over 20% of global ship deliveries (ECORYS, 2009).

It is believed that the US's domestic ocean-going fleet shrank between 1950 and 1975, and various writers argue that this was a result of the Jones Act but more notably after NAFTA (Fig. 15). The costs associated with operating restrictions have risen and widened the gap between foreign and domestic rates. In 1979 the US built roughly a tenth of the world's commercial vessels, but today it accounts for less than 1% of the market (SEA Europe, 2013). In 2011, according to UNCTAD (2013d), around 39% of the gross tonnage delivered was built in China, followed by shipyards from South Korea (35%), Japan (19%) and the Philippines (1.6%). The rest of the world, mostly Vietnam, Brazil and India, accounted for only 5.3% of the gross tonnage. More than half of dry-bulk carriers were built by China, while South Korea had a 55% share of container and other dry-cargo ships (p.7). It is believed that in 2012 the top 20 leading maritime operators accounted for approximately 70% of the total container capacity deployed. The 3 largest companies are based in Europe, while 6 of the remaining top 10 are based in Asia (UNCTAD, 2013c). As a result, shipping businesses are no longer the exclusive domain of rich countries. Maritime transportation companies are more globalised than before. Their ships are built in country W, manned by the nationals of country X, flagged in countries Y and Z, repaired in country J and make deliveries to countries D and H. This new reality has benefited the LDCs that participate in liberalized markets, finding niches in which they can be part of the supply chain of maritime transport service provision.

Figure 15: Total waterborne commerce in the US, 1970—2009 (million short tonnes)



Source: US Army Corps of Engineers (2009) Waterborne commerce of the United States (part 5), national summaries. In: Alameda & Valentin (2012: p.31).

Smith (2004) states that in 1984 US crew costs in domestic maritime transport were typically 2.5 times more than those of European crews and over 6 times those of the LDCs. The costs to build a ship in the US were estimated to be 3 times those of building comparable vessels in a Japanese shipyard. In the US the operational cost is another factor to be analysed. For domestic US operators, these costs could be twice those of foreign operators (Table 8). Indeed, if we look at Hopman and Nienhuis’s (2009) analysis, the man hours spent in the US versus foreign countries could be an important factor to be considered in their cost analysis for services.

Table 8: Operational daily expenses (USD) differential: US vs. foreign containerships

Exp. Category	US flagged	Foreign flagged	Difference
Crew	12,705	2,940	9,765
Fuel	4,410	3,045	1,365
Maint. & repair	2,310	1,470	840
Insurances	13,335	13,335	-
Other	1,500	1,400	100
<b>Total</b>	<b>\$ 34,260</b>	<b>\$ 22,190</b>	<b>\$ 12,070</b>

Extracted from: USITC (2007:p.98). Data were collected by USDoT-MarAd in 2005. A qualitative analysis is presented in USDoT-MarAd (2011). Costs may varied by type and size of vessel.

Since the Maritime Labour Convention (MLC) in 2006, minimum requirements have been established for almost all aspects of working conditions for seafarers, including

conditions of employment, hours of work and rest, accommodation, recreational facilities, food and catering, health protection, medical care, welfare and social security protection. It is believed that around 50% of the global 1.2 million seafarers were covered by the MLC agreements (UNCTAD, 2013c).

Other aspects that have an impact on services are the fuel costs, which represent between 20% and 60% of the operational cost, insurance and environmental regulations (UNCTAD, 2012). While shipping costs vary significantly across countries and commodity types, an UNCTAD (2010b) study shows that an increase in oil prices raises the transport cost for all types of cargo and containerised goods but it would be related to regions. They estimated elasticity range between 0.19 and 0.36, thus a 10% of increase on the Brent crude oil price would increase container freight rates from 1.9 % to 3.6 %.

Fuel consumption management may involve a range of strategies, such as speed management through slow steaming, routing optimisation or selection of the most economical options, and technology-based solutions (Vivideconomics, 2010). Consequently, in a globalised system, new designs and competition for the market may promote new options for green-efficient technologies. Hopman and Nienhuis (2009) report that, in the Dutch shipping market, the introduction of alternative propulsion systems using low-emission technology seems to be profitable and companies might have strong economic motivation to operate ships efficiently. However, if transformation investments change the cost benefit relationship with the operators it could limit its execution.

Stochniol (2011) shows how the application of market-based measures to greenhouse gas emissions (GHG) from international maritime transport provoked an increase in the costs of shipping food. He posits that the environmental policy proposed, estimated to be less than \$3.00 for every \$1,000 value of imported food (approximately 0.3%), seems to be a relatively low cost to potentiate positive changes in ships' GHG emissions as well as being profitable for the shipowner. However, his study demonstrates that the application of this measure would have major effects on

vulnerable countries, particularly those that import a significant proportion of their food supply.

The cost of transport is the price of a service, and it is determined by supply and demand (Sánchez et al, 2003). However, the cost of shipping is also affected by various other factors that may influence the market. Studies, conducted by Márquez-Ramos et al (2011), Djankov et al (2010), Korinek and Sourdin (2009a, 2009b), Martínez-Zarzoso et al (2004), Sánchez et al (2003), Micco and Pérez (2002), Clark et al (2001) and Hummels (2001), aim to identify the determinants of trading costs, especially transportation. Since the introduction of FTAs, external trade between countries can depend on a wide range of variables based on reciprocity and maritime transportation available between them is an element to consider (OECD, 2014; Márquez-Ramos et al, 2007). The two countries' GDP, their psychological attachments (such as sociological, cultural and language), the regulatory framework, common agreements, security (war), the volume of trade, accessibility (shipping distance) and the factor of time affect the cost of shipping (Burns, 2015; Korinek & Sourdin, 2009a; Martínez-Zarzoso & Wilmsmeier, 2008). These variables may affect transport conditions (i.e. refrigerated transport, sizes and weights of containers) and the number of maritime lines available to access a specific market, therefore affecting natural competitiveness (Clark et al, 2001).

### **Psychological attachments**

Corporations are poorly equipped to deal with dilemmas that are fundamentally cultural, social and moral rather than technical or operational. While cultural differences between some markets may seem not to be significant, ignoring them may present a high to trade. Aspects such as the colour of packaging, the products' ingredients, cultural values and beliefs demand particular attention in manufacturing but transport may involve other evaluations. Cultural proximity and a shared history may provide a perception of closeness other than geographical proximity (Márquez-Ramos et al, 2007). For instance, regionalism in the language or slang may represent a big challenge to business; as a result, countries with the same language have more probabilities of negotiating than countries with different communication codes.

Another aspect to consider is the value of time and a country's business norms, particularly when marketing across borders. Some markets in the Middle East, Africa and Latin America do not have the same conception of time and accuracy as other regions (Boundless, 2015). Similarly, the perception of other qualitative aspects, such as beauty, hygiene, responsibility and service, may vary widely among cultures. These may represent serious inconvenience for those without a contingency plan.

For example, the use of international metrics to trade commodities might be challenging in markets that preserve regional (antique) measures rather than adopting standard international systems. It is believed that, currently, more than 40 countries have no official standardisation systems to measure; thus, this basic element may represent a risk for those who trade with them (ISO, 2015). The importance of basic requirements, specifications, guidelines or characteristics to be used consistently for ensuring that materials, processes and services are fit for their purpose are issues not only of human security but also of business and profits. Whilst standardisation of products may affect some aspects of countries' diversity, basic frameworks have to be agreed by those conducting business.

### **Regulatory framework**

Business norms also vary from one country to the next and may present challenges to trade, particularly for foreigners who are not familiar with the frameworks of the host country. As the proportion of foreign to domestic trade increases, so does the frequency of business negotiations between people from different countries and cultures and thus the level of confidence among them (Adler & Graham, 1989). Financial instability, a lack of security, piracy, corruption and smuggling affect the business environment and hence trade. However, policies associated with control, besides those for environmental and workers' protection and SPS restrictions, although possibly limiting trade flexibility, may also guarantee some levels of reciprocity between traders and consumers (Beghin, 2013).

### **Volume to trade**

This factor is particularly complex in evaluating the cost of maritime transportation. For instance, the size of vessels on a route is greatly associated not only with their



volume capacity but also with their cost of maintenance. Often, the bigger the vessel is, the lower its operational costs are. As an example, Mázquez-Ramos et al (2007) report that the operational cost of a 2,500 TEU vessel is 50% less than that of a vessel with a capacity of 800 TEU. However, this applies only if the ships are carrying at full capacity or conducting a more or less complete round trip in accordance with the expected frequencies.

Korinek and Sourdin (2011) suggest that in maritime transportation the relationship between time and volume tends to be inversely proportional. In fact, greater volumes in cargoes are not easy to manage, because they require enormous ships to transport and so far their velocity rank (at super-slow steaming) is between 8 and 16 knots, which is much lower than the standard average of 23 knots. With the combination of recession and climate change emissions, maritime companies are moving to adopt 'slow steaming' to save fuel. Allegedly, this 'super-slow transit' reduces fuel consumption and GHG emissions by 30% and saves money for the companies. For instance, in 2010 Maersk's fuel savings were estimated to be more than \$100 million since it began its 'go-slow' (Vidal, 2010). However, this implies logistic considerations on the side of the importers, who have to deal with the perishability of products as well as maintaining safe levels of inventory for their business.

The value-to-volume ratio, particularly in raw materials and agrifood produce, means that larger amounts reduce the transport costs per unit. Precisely due to their low value to weight, larger amounts of raw materials and agrifood produce lead to a reduction in the cost per unit, but they are voluminous and relatively expensive to transport (Korinek & Sourdin, 2009b). However, in the case of grain and container ships, freight rates are relative insensitivity<sup>60</sup> of fuel cost (bunker C) (Vivideconomics, 2010). Consequently, it does not allow significant reductions in the import cost. Nevertheless, in dependent markets with limited alternative of suppliers, consumers will recurrently absorb the differences in the price per unit of the product.

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<sup>60</sup> According to Vivideconomics's 2010 estimation, the elasticity of the grain freight rates to the fuel price is around 0.20, and in the case of container ships it is around 0.10. This estimation applies to Panamax ships. Lower dwt vessels show higher sensibility to – effects on – their freight rates.

Márquez-Ramos et al (2007) posit that, when the trade balance is negative, the pattern shows high freight rates for shipments transported on the leg of the trip with a larger amount of traffic. Considering the round trip as the total amount charged, this leg must compensate for the relatively reduced income to be raised on the return trip, when part of the capacity of the vessel will inevitably be used for repositioning empty containers (p.8). In the case of PR, this particular aspect, documented by Frankel (2002), could be misunderstood if it is analysed by traffic only without considering the volume of trade. The rates of the southbound routes (from the US to PR), with less traffic but overcapacity, are twice those of the northbound routes (from PR to the US).

### **Time and accessibility**

Shorter distances entail lower costs and more trade (Sánchez et al, 2003). Limão and Venables (2001) estimate that additional distance over the original route base, the transportation cost may increase by \$380 per each 1,000 km. To balance costs, each additional day in transit may reduce the volume of trade. Uncertainty in shipping time reduces confidence in clients but may also provoke dramatic effects on the supply chain, particularly in the weaker echelons. Hummels (2001) argues that a lengthy shipping time – particularly due to distance, logistics, inspection protocols and/or infrastructure – means that goods depreciate before arriving at the market. Shipments of fresh produce and livestock are highly sensitive to time because of their perishability and product life. Some authors believe that an increase in the time of transit reduces bilateral trade by more than 5% and leads to a reduction in trade values (OECD, 2014). Therefore, delays in transit, handling goods and port management may represent a logistic problem to traders that may increase costs (Korinek & Sourdin, 2009b). Inefficiency in goods management seems to be common in countries with higher shipping costs (Burns, 2015). Delays provoked by obsolete or inadequate infrastructure, inefficiency of labour or systemic factors (controlled by the firm) may represent extra costs for importing firms and eventually an increase in consumers' costs.

Although the geographical location of countries cannot be modified, the effect of distance can be lessened by improving the infrastructure, transit and destination countries' efficiency (Martínez-Zarzoso et al, 2004). Accessibility is also an important

component of trade competitiveness. Countries' interconnectivity in terms of transport, communications and deliveries, can be measured through the supply capacity put at the disposal of given markets by regular shipping services (UNCTAD, 2013c).

### Port logistics and infrastructures

The logistics services in ports and their infrastructures play a very important role in which the previous factors interact. Novianti and colleagues (2015:p.58) identify six indicators of logistics performance: the 'clearance' process (customs); the transportation and infrastructure; the ease of obtaining competitive shipping prices and shipping scheduling; logistics competence and service quality – including warehousing; the tracking and tracing facility; and timeliness. In a more complete form, the World Economic Forum (2013c) recognises nine indicators distributed among four categories (Fig. 16).

Figure 16: Supply chain barriers to trade

Market Access	Border Administration	Telecom and Transport Infrastructure	Business Environment
1. Domestic and foreign market access	2. Efficiency of customs administration	5. Availability and quality of transport infrastructure	8. Regulatory environment
* Quotas Non-tariff import fees * Local content requirements * Rules of origin * NTM (technical, S&P measures, other requirements)	* 3. Efficiency of import-export procedures (e.g. coordination between border agencies; administration burden of complying with standards)	6. Availability and quality of transport services	* Investment policy * Hiring foreign workers * Other regulatory environment issues (including trade finance)
* Import-export licenses	4. Transparency of border administration (e.g. facilitation payments)	7. Availability and use of information and communication technologies (e.g. tracking, electronic tolls, communications)	9. Physical security

Note: The Global Enabling Trade Report identifies nine pillars; this is an extended list including several sub-pillars as tested in a separate survey, but in this table they are gathered into four major sections identified by colours. Source: World Economic Forum (2013c).

For instance, a significant component of logistics services is a well-developed and accessible information system. The level of intercommunication technology, its quality, its coverage and secure capacity to store and process data electronically promote efficiency and are vital for the security of the maritime transportation services (Wilmsmeier & Pérez, 2005). High-quality logistics services improve the competitiveness of a country's exports by reducing the costs of transporting goods –

especially for countries that are disadvantaged by distance from major markets (Korinek & Sourdin, 2011:p.5). In addition, countries generally trade more with those that have similarities in the quality of logistics services (Burns, 2015). On the other hand, customs procedures, tracking and tracing services and inspection (before, during and after docking) all add more challenges to this process.

Korinek and Sourdin (2011) estimate that the time required to complete both importing and exporting procedures affects trades. Every extra day needed to prepare goods for exporting and importing reduces trade by around 4%. They state that an extra day that goods spend at the border has a greater negative impact on trade flows than an extra day spent at sea delivering a container of goods. The costs of logistics procedures might be affected by technical aspects, such as the need for a harbour pilot, SPS inspections, red-tape (custom brokers) protocols and port congestion (OECD, 2014; Sánchez et al, 2003).

Burns (2015) asserts that inefficiency in port logistics or in the supply chain and obsolete or inappropriate infrastructure may represent serious disadvantages and higher costs. The lack of secondary maritime services to complement maritime transportation structures, such as ship maintenance and repair technicians, docking and mooring maintenance, pier security, container management, also affect the processes. Various authors suggest that investments in logistics services and infrastructure, such as the number of cranes, the maximum draught and storage areas for origin and destination ports, can enhance trade and further investments, both local and foreign too (Burns, 2015; Márquez-Ramos et al, 2007). In general, the impact of the port infrastructure and efficiency in ports, whilst differing by industry, reduces the cost of trade (OECD, 2014).

Generally, certification requirements, particularly the verification of products' conformity with technical regulations, are a major concern for the surveyed exporters, regardless of the destination for their product (Mimouni et al, 2009). At the same time, obstacles to trade in relation to traceability requirements, tolerance limits for residues and contaminants and inspections of restricted substances tend to increase delays. Commodities requiring special conditions for their transport, such as

refrigerated cargo, bear an increased price not only for transportation but also for inspection protocols (Márquez-Ramos et al, 2007). For instance, fumigation procedures could be requested before cross-border transactions of goods to control pests and to prevent the transfer of exotic organisms. Branch and Robarts (2014) state that in the case of the carriage of grains the documentation required on cargo ships should be in accordance with the regulations of the International Code for the Safe Carriage of Grain in Bulk.

Many other protocols and inspections might be established by countries including: recognition of arrivals, x-ray inspections, procedures for crew identification, cleaning holds before and after carriage and health protocols. All of these may add delays to processes and increase costs. Whilst not all of them are directly associated with cabotage restrictions, many of the procedures or policies developed were created indirectly to implement the countries' preferences through cabotage.

### **3.2.0 National preferences through cabotage policies**

Historically, nations have invoked their sovereign rights and trade preferences. Countries tend to discriminate or restrict the movement of passengers, services, providers, crew, technicians and/or goods within their borders. Although the historical justification for these restrictions has been national security, the clear intent of many cabotage regulations, particularly those affecting the transportation of goods by water, is to protect local industries and labour interests (WEF, 2013a:p.48).

As previously mentioned (Chapter 1), cabotage is associated with sailing between capes or along the coast. It has roots in the British and Dutch Empires (Santos-Santos, 1997) to protect their shipping between their colonies. Currently, every country with a coastline has regulatory frameworks to restrict sea trade (Table 9). Therefore, the Cabotage Act might be considered as a NTM on sea transportation.

Table 9: Summary of national flag preferences in domestic trade

Country	Cabotage	Fleet Subsidies	Crewing Requirement	Ownership Restriction	Domestic Construction Provisions	Reflagging Restrictions
United States	Y	P	Y	Y	Y	Y
Argentina	Y	P	Y	Y	-	P
Australia	Y	P	Y	-	-	-
<b>Bahamas</b>	Y	Y	Y	Y	-	INP
Brazil	Y	Y	Y	Y	Y	Y
Canada	Y	-	Y	P	-	P
Chile	Y	P	Y	Y	-	Y
China	Y	P	Y	Y	-	Y
Honduras	Y	-	Y	Y	-	INP
India	Y	-	Y	Y	-	INP
Israel	-	-	-	-	-	INP
Japan	Y	Y	Y	Y	-	P
Kenya	-	-	-	-	-	INP
Mexico	Y	Y	Y	Y	-	INP
Panama	P	-	-	-	-	-
Russia	Y	Y	Y	Y	INP	INP
Saudi Arabia	Y	-	-	Y	-	INP
<b>Singapore</b>	-	-	-	-	-	INP
South Africa	-	-	-	-	-	INP
Uruguay	Y	-	Y	-	-	INP
<b>EU Members</b>	P	P	P	P	-	Y
Belgium	-	Y	Y	-	-	-
<b>Cyprus</b>	-	-	-	-	-	INP
Denmark	P	P	Y	Y	-	P
Finland	Y	-	Y	Y	-	INP
<b>Ireland</b>	P	P	P	-	-	-
Netherlands	P	Y	P	Y	-	INP
<b>Malta</b>	P	-	P	-	-	P
United Kingdom	P	P	Y	-	-	-

Y=Yes; —=No; **INP**=Information Not Provided; **P**=Partial; **SIDS** in **Bold**

Extracted from: USDOT (2001:p.4).

Parameswaran (2004:p.60) states that ‘cabotage restrictions effectively exclude foreigners from entering the [domestic] market and represent discriminatory protectionist practices based on grounds of nationality that treat foreign maritime service providers less favourably than domestic ones’. Others argue that cabotage laws are designed to guarantee the participation of the country’s citizens in its own domestic trade (Okoroji & Ukpere, 2011). This may include employment, national defence, and other socioeconomic purposes (USDoT-MarAd, 2001:p.2). Although trade globalisation is directly linked to the globalisation of transport itself (OECD, 2003b), market intensification and integration will require a more complex, liberalised way to manage competitiveness in the supply chain. Therefore, ‘cabotage policies

could be the most restricted form to trade' (Parameswaran, 2004:p.348) in maritime transportation by reducing market openness and limiting goods' mobility to domestic services.

In the European Union (EC Regulation 3577/92), cabotage laws on trade have been partially relaxed by requiring member countries to liberalise their prevailing policies among themselves. For the EU the topic is not exclusive to maritime transportation, because it includes all cargo-carrying trade within these countries. Therefore, since the regulation was approved, their markets have been open (fully open since 1998) to vessels owned by companies based in fellow EU member nations, but not for six member countries. Those countries (Belgium, Denmark, the Republic of Ireland, Luxemburg, the Netherlands and the United Kingdom) had no cabotage restrictions before the EC Regulation; thus, they preserve their previous status (OECD, 2003a).

At the international level, despite the best efforts of some countries, the maritime service negotiations in the Doha Round have not progressed any further than previous attempts in the period of the built-in agenda (Brooks, 2009). More than 50 members issued a Joint Statement on the Negotiations on Maritime Transport (van Grastek, 2013:p.346). Following the meeting in Qatar in 2001 and subsequent meetings in Mexico (2003), Hong Kong (2005), France (2005), Germany (2007) and Switzerland (2008), the Doha negotiations remain uncertain in 2014. Cargo reservation schemes and investment limitations are other forms of NTMs that are highly related to this topic (OECD, 2003b) but are especially preserved and supported by the US (Hearn, 1970). Nevertheless, in general, countries looking for competitiveness have adopted new strategies to deal with those policies, but in SIDSs only a few could be highlighted (Cyprus, Malta and Singapore).

Cabotage policies are recognised as being important for many countries and thus politically sensitive restrictions are applicable to the movement of goods within their borders. Whilst the restrictions are based on national security concerns, their domestic supply chain could be preserving inefficiencies, affecting their competitiveness (WEF, 2013a). It is believed that cabotage liberalisation may reduce the cost of production. Therefore, its relaxation might mean savings on imported

goods and on intermediate inputs, which would be beneficial for the whole supply chain (Novianti et al, 2015).

UNCTAD (2013d) reports that in 2012 the nationality of the owners of more than 70% of the world's gross tonnage was different from the nationality of the flag state, which means that the ship is 'flagged out'. As more and more registries are competing for business, the traditional distinction between 'national' and 'open' flags of registration has become less common due to the mode of 'sharing flags', which is much more common than a decade ago. However, in some important jurisdictions, this mode is limited, which may affect trade costs due to restrictions on fleet availability.

Economists in the US argue that the costs of regulations, especially from cabotage protection, are substantial (Stiglitz, 2012 in Hansen, 2012a; Smith, 2004; Hufbauer & Elliott, 1994). Different approaches to calculating welfare costs by relaxing cabotage restrictions in the US diverge and are estimated to be between \$200 million and \$9.8 billion. Largely mirroring those of the US relaxing estimations, China's cabotage regulations could reduce costs by some \$500 to \$700 million and \$1 billion in inventory by trans-shipping instead of rerouting (van Grastek, 2013). Nevertheless, there is a debate concerning which items should be considered cabotage costs, because it is believed that the data traditionally collected may include shipping costs: the cost of loading and unloading at ports, insurance premiums, port fees, the cost of labour and fuel, the service tariff, towboat services and various other charges that may vary among countries and/or traded commodities (Novianti et al, 2015). Therefore, due to the differences in the data collected by countries, the estimates of the shipping costs attributed to cabotage, might be associated to but not exclusive of it.

Since 2000 several nations have further considered the relaxation of their international relay regulations, particularly growth markets in which an efficient infrastructure is the key to future developments. In Brazil, for example, foreign-flagged vessels only operate in cabotage, but port support and maritime support navigation are allowed when chartered by a Brazilian shipping company provided that



there are no Brazilian-flagged vessels available, if it is a matter of public interest or if the foreign vessel is being chartered as a substitute for a vessel owned by the Brazilian shipping company under construction at a Brazilian shipyard (Bello-Olowookere, 2011). Although some authors posit that the Brazilian institutional framework in place has acted as a causal factor in strengthening the bureaucratic roles of maritime transportation and logistics, its cabotage protocols are less restrictive than those of the US (Ng et al, 2013). For example, while the adoption of an electronic freight system is positive, it fails both to reduce red tape and to invest in the necessary supporting information and communication technology infrastructure. As a result, various global agribusinesses experience multiple delays each week when government servers' crash, allegedly affecting companies annual efficiency of its truck fleet by 4%. (WEF, 2013c).

A different example in Asia is the case of South Korea. Its Government abolished trans-shipment fees and relaxed the cabotage rules in 2003 to make its ports more attractive as a regional northern hub for containers. A month after the liberalisation, various foreign shipping lines had entered the market, providing competition and reducing rates for shippers (Bello-Olowookere, 2011). Similarly, India allows a foreign cruise vessel calling at more than one Indian port to sail without obtaining a license (Hackston et al, 2005). In 2005 it modified the Merchant Shipping Act to allow foreign vessels to move containers between Jawaharlal Nehru and Mumbai. In 2011, inaugurating the port of Vallarpadam as a free-trade zone, India initiated the use of a high-scale trans-shipped system. Around 70% of the exports and imports of India are trans-shipped abroad, many through the ports of Sri Lanka, Singapore and Dubai. As a consequence, India is now not only focusing on relaxing its cabotage policies but also seeking efficiency in its domestic supply chain (Krishnakumar, 2012). A more recent analysis particularly for the Association of Southeast Asian Nations (ASEAN) indicates that the transport service sector's openness may reduce the transport costs of imports (Novianti et al, 2015).

Four of the five small economies highlighted in the list above have full or partial liberalised maritime policies for trade. The Bahamas is the exception (Table 20 above). It is believed that their level of maritime liberalisation is related to their level of

competitiveness. However, the literature does not mention much about the topic in SIDSs or small islands economies in comparison with others.

Some supporters of cabotage policies sustain their arguments in relation to the importance of controlling maritime emissions and other potential environmental effects. New specifications for new vessels could be enforced by the intervention of public agencies. High specifications, such as having a high intake of refrigerated containers, double-hull fuel tanks and the ability for the main engine to be run on LNG as well as normal bunker fuel, are part of the projected designs (Container Team, 2013). However, this may also explain some of the price differentials, especially if the costs of raw materials and labour are not in a competitive market. The US regulations for crude tankers also require cross-agency interventions, for instance the Maritime Security Programme and the Environmental Protection Agency, which may imply some mechanisms or requirements for fleet renovation or security controls.

The effectiveness of cabotage in preserving employment and national fleets has been questioned. Cabotage regulations have been relaxed within the European Union (EU) and elsewhere without obvious downside costs. Therefore, in view of the benefits that followed domestic liberalisation in other economic sectors, it is suggested that those countries that have cabotage restrictions should consider removing those provisions. Even if it is not politically feasible to achieve full liberalisation immediately, serious consideration should be given to setting a time frame for such liberalisation, with access initially given to OECD member countries (OECD, 2003a). Although Greece,<sup>61</sup> Italy and Spain initially rejected any proposals for full liberalisation, the EU is following a programme for eventual full liberalisation (Parameswaran, 2004). For decades, the European shipowners' associations have been supportive of the inclusion of movements and repositioning of equipment as regular business as well as labourers between the Western European countries. However, in America, specifically in the US, the situation is very different from that in the EU.

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<sup>61</sup> In regard to this topic in Greece, please refer to Giannopoulos and Aifandopoulou-Klimis (2004).

### **3.3.0 International experiences in maritime cabotage**

Before the Confederation in 1867, Canada had some form of protection to reserve its domestic activity first for British Commonwealth and eventually to Canadian-flag ships. Until the 1950s only registered Canadian ships with all applicable duties paid had unrestricted access to engage in coastal trade activities. Eventually, the contraction in importance of the Commonwealth, the emergence of the OECD and the extension of sovereign rights to the outer edge of the continental shelf provoked the transformation of policies on related activities in waters under Canadian jurisdiction (Hodgson, 2007). The last legislation is based on the 1992 version but after NAFTA and other international cases of relaxation in maritime regulations. In 2004 the Canadian registered fleet constituted only 6.5% of the size of the US-flag fleet, while the Mexican fleet was 2.8% the size of the US fleet (UNCTAD, 2005). However, the pressures of the US Cabotage Act dictate a unique situation that seems to limit Canadian trade; moreover, those interventions seem to be inappropriate when the US is seeking unilateral relaxation of the rules by Canada (Hodgson, 2007). The researcher concludes that 'the present cabotage regime has effectively constructed a barrier between domestic and international operations, to the point where ships positioned and qualified to operate in one regime are unable to participate in the other' (p.30). Clearly, the policy regime is large and stable enough to sustain healthy commercial operations but not for vulnerable economies. However, if Canada unilaterally opens its market to foreign-flag participation due to its geographical position, it would be likely to result in significant US-flag carriage invasion controlling the Canadian domestic market without reciprocity to its own carriers (Hackston et al, 2005).

#### **3.3.1 Hong Kong**

Hong Kong's archipelago consists of more than 200 islands, a total area of 1,104 km<sup>2</sup> and around 7 million citizens. Easily<sup>62</sup> connected to mainland China, the port contributes around 1.3% to its GDP and provides around 88,000 jobs (Yi, 2014). The maritime framework of its container terminal is currently established by China under a policy of 'one country two systems' of cabotage regulations. It has benefited from the port framework which ensures that it remains a key player in the market. As Hong Kong is a special administrative region of China, carrying cargo between mainland

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<sup>62</sup> The shortest distance between Hong Kong and mainland China is approximately 20 nm by sea (less than 2 hours), and by land it is no less than 18 miles.

ports and the city is not subject to cabotage and the port has long been preferred by foreign carriers as a trans-shipment hub for cargo to or from mainland China (Knowler, 2015a). The Chinese cabotage laws prohibit foreign-flagged vessels from moving cargoes from one mainland coastal port to another. However, Hong Kong is considered a foreign port for these purposes; hence, rather than being direct competition for China's ports, it has developed a complementary relationship among them (Wee, 2013). Besides, one of the top twenty biggest container operators in the world (OOCL) is based in Hong Kong (UNCTAD, 2014:p.40).

Some foreign maritime companies (particularly Maerks Lines) have appealed to China to liberalise its cabotage policy. Apparently, Hong Kong Port's high-sea traffic and volume cause serious delays for private companies affecting their competitiveness (Knowler, 2015a). In 2013 Beijing announced that it would permit Chinese carriers to ship, using international cargoes, but only between Shanghai and some other national ports. The vessels could be flagged abroad but registered with the Chinese transport ministry. This would be a pilot programme to boost trans-shipment in the Shanghai free-trade zone to promote its port as the busiest in the world but also as an international shipping centre. Nevertheless, it is believed that cabotage relaxation in other ports, while attracting a large amount of trans-shipment from other ports in China and abroad, might compromise other ports' competitiveness as trans-shipment centres, particularly those in Hong Kong and Shanghai (Shen, 2015).

The Chinese strategy in progress seems to allow those cargoes previously registered as Hong Kong flagged, while those registered in other Chinese destinations should apply to be considered eventually. Although currently foreign cargoes are practically excluded from China's domestic coastal trade, in a hypothetical case of total relaxation of China's cabotage its fleet<sup>63</sup> number and strength would be the logical way to supply goods to themselves (Shen, 2015). However, recent developments suggest that the cabotage rule might be gradually relaxed; thus, the Hong Kong Government is apparently considering enhancing the handling capacity of the existing container terminals and related infrastructural facilities (Yi, 2014).

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<sup>63</sup> It is estimated that, of China's owned vessels, around 12% (200 tdw) and 63% are flagged overseas (Shen, 2015).

### **3.3.2 Singapore**

Galbraith (2014) states that, in the late 1990s the Port of Singapore was managed by a highly complacent and self-satisfied team. Certainly, it was in charge of the primary container-shipping hub in Asia and the vast majority of the cargo was transhipped to other destinations, so it was too successful to worry about particularities besides being highly profitable. Despite this scenario, Galbraith suggests that, new price scales were imposed, increasing the costs of the shipowners and the port management in Singapore, apparently without a proper analysis. Years later the biggest Maersk Line developed a rival port at Tanjung Pelepas in cooperation with the Malaysian Government. Evergreen Line acted similarly in Taiwan. Within a very short time, a portion of Singapore's container throughput disappeared to the Malaysian territory. Currently, around 8 million containers are shipped through Tanjung Pelapas and other amounts by Evergreen in Taiwan. Nevertheless, in 2014 Singapore still remained the headquarters of two (APL and PIL) of the top twenty biggest container operators in the world (UNCTAD, 2014:p.40).

Singapore's hegemony in the region is continually being undermined by challenges from rival ports. The new Government in Indonesia has signalled that one of its primary tasks will be to develop the port of Djakarta as a regional container hub. Besides, India and Sri Lanka seem to have similar interests. Consequently, it is clear that maritime transportation and ports are very powerful and shipping is a dynamic sector on which trade depends. Countries' economic development requires a high level of flexibility in their business frameworks and a continued reinvention capacity.

### **3.3.3 New Zealand**

According to Hackston and colleagues (2005:p.15), New Zealand is an instructive case in which cabotage restrictions were substantially liberalised in 1994. An archipelago with a relatively small economy, a population of only 4 million people and a relatively limited number of maritime vessels (21 ships operated by 9 companies), it decided to allow foreign entry into its coastal trade as part of much broader initiatives to improve the competitiveness of its national economy (Brooks, 2009). It is believed that the objective of the New Zealand Government's dramatic action of cabotage relaxation was carefully designed to promote competition but without a substantive reduction in

its domestic fleet. Reports of the time show that the use of foreign vessels for domestic movements was minimal if not non-existent. A reduction in the transportation rates occurred after the entry of foreign maritime transportation companies. For instance, the freight rates for coastal containers fell quickly after liberalisation. The southbound rates in dry-container movements dropped by up to 30% (from NZ\$1200–\$1500 to \$950–\$1000, respectively), but the reduction in the northbound rates was much smaller (Liu, 2009). Furthermore, it is reported that the freight rates for grain produced in the south and consumed in the north fell from NZ\$90 to NZ\$40 per tonne, which is certainly beneficial for the annual return on grain for southern (domestic) farmers. Apparently, this pattern of reductions was not the case for refrigerated containers<sup>64</sup> (Liu, 2009). However, the reason or theories for it are not presented in the literature reviewed.

Unfortunately, along with the wide-ranging deregulation introduced by the Government, it appears that the previous good practice of gathering statistical data on domestic marine transportation was abandoned (Hackston et al, 2005:p.16). Consequently, the most important publications found related to qualitative considerations based on stakeholder input and limited quantitative information. It is thought that data gathering was conducted during a very short period after the cabotage liberalisation (3 months). Consequently, Hackston and colleagues (2005) suggest that this short time was not sufficient to explore New Zealand's changes.

A few important points to consider in the evaluation of liberalised maritime services are the impact on the freight rate of changes in fuel prices and currency fluctuations. The literature is clear about the sensitivity of maritime transport services to the world prices of fuel. In the case of currency fluctuations, the domestic industry must pay for fuel and charter fixed costs<sup>65</sup> that could be higher than those for foreign firms because of their more flexible scenarios for trade (Hackston et al, 2005). Similarly, taxation and compliance costs may differ dramatically between domestic and foreign maritime firms, which might affect the Government's revenues.

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<sup>64</sup> Also named reefer, which is an intermodal (shipping) container that is refrigerated for the transportation.

<sup>65</sup> The data presented by Hackston et al (2005) are 9% in fuel and 19% in charter fixed costs as regular cost bases for New Zealand's domestic maritime firms.

Liu (2009) reports that those opposed to the relaxation argued that its costs would be high, exerting an impact on employment opportunities and equity in employment conditions and negatively affecting New Zealand's GDP, balance of payments, regional development, environment and national defence. Besides, it is argued that the tax environment faced by the domestic shipowners gives an unfair advantage to foreign vessels. In addition, foreign seafarers are not subject to New Zealand's laws and thus are free of taxes. According to the sectors opposed to the cabotage liberalisation, all these aspects together would make the NZ domestic maritime firms uncompetitive, resulting in insolvent companies and eventually reducing the number of dedicated coastal operators. Similar arguments have been presented in the US by domestic maritime organisations to justify the maintenance of the Cabotage Act that has ruled since the 1920s.

#### **3.4.0 The US Cabotage Act**

The US has protected its transport sector since the late eighteenth century. The Naval Act of 1794 was passed by the US Congress on 27 March 1794 and signed by George Washington, establishing a permanent standing naval force of the United States of North America, which eventually became the present-day US Navy (Allen, 1909). After the colonies' independence, the participation of foreign ships was practically forbidden in the domestic market (USITC, 1991). The US discouraged the use of foreign sea transportation imposing tariff and weight taxes in widely discriminated forms. The current cabotage prohibition of foreign vessels is covered in section no. 27 of the Merchant Marine Act of 1920 (46 USC 883), also commonly referred to as the 'Jones Act', named after its author, the US Senator Wesley Jones. The Act was also initially related to the offshore US territories<sup>66</sup>.

Traditionally, due to its nature, maritime transport has been relatively open to competition. Unlike the majority of countries, the US cabotage policies led to a combination of laws to protect domestic trade. The law requires all domestic maritime cargoes transported by water between two domestic ports to be carried by US citizens. This applies to owners, operators, builders, repairers and the vessel crew

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<sup>66</sup> From the east coast via the Caribbean: Panama Canal, Puerto Rico and Virgin Islands. Besides, from the west coast: Alaska, Hawaii, Guam, the Philippines, American Samoa, Northern Mariana Island and the Marshall Islands.

(Parameswaran, 2004). For instance, all officers and no fewer than 75% of the crews of vessels engaged in cabotage must be US citizens, with the remainder being lawfully admitted foreigners (Goure, 2011).

Very few exceptions to the Cabotage Act have been identified through history: for instance, during the First World War and other catastrophic events (Bloomberg Views, 2013); after the independence of the Philippines; an exception was made for the Virgin Islands, American Samoa and the Northern Mariana Islands; a partial exclusion was made for Guam and Alaska; and in 1981 the last partial exclusion was made for Puerto Rico's cruises only in the tourism sector. The Act also provides mechanisms for other very particular exclusions, such as the ones applicable to empty vessels at sea,<sup>67</sup> the US rescue<sup>68</sup> or seizure<sup>69</sup> of foreign-flagged vessels constructed outside the US during a war, by bilateral transfer<sup>70</sup> and other much more specific<sup>71</sup> scenarios (e.g. environmental issues<sup>72, 73</sup>), which are included in the Merchant Marine Act (Alameda & Valentín, 2014). In addition, there are several federal regulations that are associated with domestic marine activities linked to the Cabotage Act. For instance, the Dredging Act (46 USC 55109), Towing Act (46 USC 55111) and Salvage Act (46 USC 80304) cover specific activities, as their names indicate. The Nicholson Act of 1950 (46 USC App. 251(a)) regulates the use of fishing vessels. Section 446 of the Tariff Act of 1930 (also known as the Smoot Hawley Tariff) (19 USC 1466) imposes a 50% ad valorem duty on repairs to US-flag ships performed in a foreign place. Clearly, the main objective is the complete regulation of maritime transportation in all the US (mainland and territories) ports.

In 1991, the US International Trade Commission (USITC) estimated the output and employment effects for downstream sectors. In agriculture, forestry and fisheries production, the output reduction is estimated to be \$141.2 million, while employment was reduced by 1,065 full-time jobs. In the mining and oil sector combined, the reduction was estimated to be \$329.8 million and 1,014 full-time jobs. They further estimated that an annual direct subsidy of \$619 million was required to sustain the

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<sup>67</sup> Title 46 U.S.C. §55107. Available from: <http://www.law.cornell.edu/uscode/text/46/55107>

<sup>68</sup> Title 46 U.S.C. §12107. Available from: <http://www.law.cornell.edu/uscode/text/46/12107>

<sup>69</sup> Title 46 U.S.C. §12112. Available from: <http://www.law.cornell.edu/uscode/text/46/12112>

<sup>70</sup> Title 46 U.S.C. §55106. Available from: <http://www.law.cornell.edu/uscode/text/46/55106>

<sup>71</sup> Title 46 U.S.C. §55108. Available from: <http://www.law.cornell.edu/uscode/text/46/55108>

<sup>72</sup> Title 46 U.S.C. §55105(b). Available from: <http://www.law.cornell.edu/uscode/text/46/55105>

<sup>73</sup> Title 46 U.S.C. §55113. Available from: <http://www.law.cornell.edu/uscode/text/46/55113>



domestic Jones Act shipping services. In addition, using indirect calculation methods, the protection costs of the Cabotage Act for the US economy are estimated to be \$5.9 billion (USITC, 1991:pp.1–2–11).

Hufbauer and Elliott (1994) estimate that the net cost of the Cabotage Act for the whole US economy was \$1.1 billion. The USITC, in its reports of 1991 and 1995, states that the annual impact was around \$9.8 billion and \$2.9 billion, respectively (USGAO, 1998). UNCTAD recognising the difficulty of calculating the value of maritime transportation in its 1995 report estimated that freight accounted for approximately 5% of the total value of imports. Two years later, the US Department of Commerce Census Bureau (USDoC Census Bureau, 1997) reported that the value of US federal subventions to the shipbuilding industry (only) attributed to supporting the Jones Act costs for freight was \$479 million annually.

Using data from 1996, the USITC estimated that the economic cost of the Jones Act was as much as \$1.3 billion in that year and its removal would result in a 22% reduction in the price of shipping (Smith, 2004). In 2002, using the data of ocean-borne cargoes the USITC estimated that liberalisation of the Cabotage Act, could cause around \$700 million dollars in welfare change for the US economy (USITC, 2011; Smith, 2004). However, van Grastek (2013) reports that the WTO's estimation of cost to the US economy was just \$200 million, although it is not clear whether these data consider inland shipping or ocean-borne cargoes only.

Although economic studies are more opposed to rather than in favour of the US Cabotage Act, both sides offer estimations using different approaches. For instance, the Transportation Institute (2013), an organisation supported by the US maritime sector, published a comparable table using data from 2011 (Table 10), arguing that the Act supports around 80,000 employees and provides \$2.6 billion dollars of annual income for the US Government.

Table 10: Total operational and capital investment impact of the Jones Act in the shipping industry on the US economy in 2011.

	<b>Direct Impacts</b>	<b>Indirect Operational Impacts</b>	<b>Indirect Capital Investment Impacts</b>	<b>Total Impacts</b>
Employment	82,040	382,850	13,550	478,440
Labour Income (\$MM)	7,213	\$20,970	\$768	\$28,952
Value Added (\$MM)	\$12,060	\$32,456	\$1,229	\$45,745
Output (\$MM)	\$34,261	\$55,647	\$2,632	\$92,540
Tax Impact (\$MM)	\$2,580	\$7,022	\$274	\$9,876

Direct contribution of the Jones Act to the shipping industry in 2011

	<b>Shipbuilding and Repairing</b>	<b>Water Transportation</b>	<b>Total Direct Contribution</b>
Employment	36,200	45,760	82,040
Labour Income (\$ BB)	\$2.40	\$4.80	\$7.20
Value Added (\$ BB)	\$3.00	\$9.10	\$12.10
Output (\$ BB)	\$7.40	\$26.90	\$34.30
Taxes (\$ BB)	N.A	N.A	\$2.60

Source: PricewaterhouseCoopers. In: Transportation Institute (2013).

In the literature the most common justification for the US Cabotage Act is based on national security. Those in favour argue that the Act guarantees sea transport supply and equipment to US troops during wars overseas (Jewell, 2013). The US Department of Commerce (2001:p.81) states in a public testimony: ‘the Act serves the interest of the US because it provides a fleet of sealift capable vessels, a workforce of experienced and knowledgeable people and a shipbuilding industrial base that can be used to protect American economic and military security’. Similarly, Goure (2011) posits that, without the Jones Act, ‘massive subsidies to the US maritime industry would be required to cover the exorbitant prices for naval vessels’. He also argues that repealing the Jones Act would cause the whole US economy and the transportation of critical military cargoes to be dependent on foreign-owned and/or foreign-flagged

vessels at great expense to US national security. Furthermore, he suggests that, by using inland waterborne transportation, shippers save around \$10 per tonne over the cost of shipping by alternative modes, resulting in \$7 billion annual savings nationwide. However, no data or calculations are provided to support these estimations.

The Military Sealift Command (2004) argues that half of the mariners used to crew government-owned vessels come from the commercial merchant marine. It also alleges that, in the absence of a robust and effective domestic maritime industry, they would be dependent on foreign shipyards and vessels to meet the nation's ongoing needs for military transportation (The West Coast Sailor, 2013). Goure (2011:p.17) asserts that 'via the inland waterways, a terrorist could reach America's heartland and many of its largest and most important urban centres'. In fact, it is said that is by preserving its current sea-power that the US influence has never been more important for its security (US Sea Service, 2007).

Supportive editorials in financial publications over the last five years, advocating maritime liberalisation in the US, are common (Box 1). For instance, Bloomberg Views (2013) argues that two sections of the Jones Act should be dismantled. Firstly, the requirement that ships used in domestic trade must be built in the US should be removed. Secondly, foreign shippers should be allowed to compete in the US. Similarly, in Forbes Magazine Pavlo (2012) claims that US maritime companies operating under the Jones Act represent a small, organised and close-knit group, to act in some cases in clear violation of the Sherman Antitrust Act. In the same way, it is reported that for North Carolina livestock farmers it is cheaper to import grain from Argentina and Canada rather than from their southeastern US state neighbours (Blom-Hill, 2013).

**Box 1: 40,000 tons of New Jersey salt, stuck in Maine**

Authors: Kilgannon, C. & Santora, M. (2014) *The New York Times*

FEBRUARY/ The road salt supply at the Marsh Street Salt Pile at the Port of Newark can be several stories high; at the moment, with intense demand, it is nearly empty. New Jersey officials are calling it a maddening winter's tale: how the raging forces of nature and a nearly century-old maritime law have clashed and managed to strand a 40,000-ton load of road salt in a waterfront depot in Searsport, Me.

The salt is sorely needed in New Jersey, where salt sheds are down to their final grains and a shortage has grown so acute that local officials have contemplated closing roadways and curtailing public bus routes. State officials had come up with a partial solution by arranging for a vessel that would not run afoul of the federal law to retrieve a portion of the marooned salt. But a winter storm in New England forced that vessel, a barge, to seek shelter in Providence, R.I., officials with the New Jersey Department of Transportation said.

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The New Jersey Transportation Department bought the salt earlier this month to replenish its stock, which has been consumed by a barrage of snowstorms. Even one of the state's largest depots, a site in Port Newark run by International Salt, has nearly run out. So when International's staff said they had a spare stockpile in Maine, state officials pounced.

State officials said they arranged on Feb. 7 to buy the salt and ship it immediately to Port Newark on a vessel that had just unloaded its cargo in Maine and would have delivered the entire load to New Jersey by last weekend. But then officials learned that the maritime law, which was passed in 1920....

Officials applied for the waiver on Thursday, but the Department of Homeland Security has not yet ruled. Such waivers are issued infrequently — limited ones were granted after Hurricane Katrina and Hurricane Sandy to expedite fuel shipments — but New Jersey officials argued that the state was facing a dire situation. Some municipalities, officials said, were being forced to seek alternatives, including mixing sand into rock salt and using a briny mixture similar to pickle juice as supplements.

The Jones Act was pushed through Congress after World War I by Senator Wesley Jones of Washington....

**3.4.1 Administrative structure and data availability**

In the 1950s the US Maritime Administration (US MarAd, 2015) was created by the US Congress as part of the US Department of Transportation. Currently its annual budgets are dedicated to promoting US competitiveness (89%), environmental sustainability

(3%) and other organisational (7%) goals (USDoT, 2015). In fiscal year 2015, the agency requested \$406.8 million to fund activities supporting ships and shipping, port operations, vessel operations, national security and strategic mobility, ship disposal, the environment, safety and education. The US MarAd has registered<sup>74</sup> 164 vessels, 52% of them Jones Act eligible. The US Merchant Marine Academy and States Maritime Academies are under its control. Furthermore, the programme of Capital Assets Management related to water transportation, Maritime Environment and Technology Assistance and Ship Disposals are programmes under its management.

US MarAd is associated with Home Land Security,<sup>75</sup> US Customs and Border Protection (US-CBP), US Department of Defence and many other programmes, particularly Food Aid and the Maritime Guarantee Loan. It should be highlighted that the Maritime Security Program – administered by US MarAd – ensures the maintenance of a (private) commercial fleet capable of supporting a US presence in foreign commerce while also ensuring the military's ability to obtain assured access to these commercial vessels, intermodal facilities and mariners. Annually, around \$3.1 million are paid in public funds for each of the 60 (private) ships enrolled in the programme (US DoT, 2015). Arguably, the Jones Act subsidies to the benefit of the US domestic maritime firms are voluntary; however, the direct public payments granted per private vessel under the programme are very attractive. For instance, for the maritime firm Matson in Guam, that benefit is an important consideration. Guam is one of its principle ports of call in the Pacific but also remains a major US military base (Container Team, 2013).

US CBP has direct responsibility for enforcing the Jones Act and may grant waivers of the requirements only in the interest of national defence. Once US CBP has received a request for the use of a foreign vessel for a domestic trade, it must seek US MarAd's advice before making a decision by law (46 U.S.C. § 501). US MarAd's role in the waiver process is to canvass the domestic shipping market to locate suitable coastwise qualified vessels and then to inform US CBP of the results. If a US ship is located and available, no waiver is needed. The protective umbrella erected for US sea shipping is complex in nature and has been designed to be preserved (Gruendel, 1980). As a

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<sup>74</sup> The data were collected from the official Maritime Administration website, Flag Fleet Summary, published on 9 October 2015.

<sup>75</sup> Particularly two agencies: the US Coast Guard and the US Transportation Security Administration, both under the Home Land Security organisational umbrella.

result, even strong federal agencies, such as the US General Accountability Office (US GAO, 2013), admit that, due to the lack of data available, their recommendations are limited.

The data collection on cargoes in tonnes and their purchase value is generally a combined activity between US Coast Guard, US MarAd and US Department of Commerce. Additionally, state servants posted in every domestic port in US territory may collect data according to their internal regulations, particularly for the Department of Treasury. However, freight rates and the costs of trade are not under the control of any US agencies, because by law that decision is considered to be protected as the right of a business relationship between the importer and the service provider. Consequently, the data on costs associated with freight are not published, but they are under the control of the private maritime transportation service providers. In addition, industrial importers may consider the negotiation of rates as part of their competitive advantage; thus, the information is considered to be sensitive or a corporate privilege.

#### **3.4.2 Cabotage and agribusinesses**

Frankel (1982) posits that the application of the US Cabotage Act to the colonies (early in the twentieth century) was initially requested by the US colonial landlords ('Hacendados') to maintain a captive market under their control. Another view of the interest in preserving the antique Spanish form of cabotage was to ensure participation of the native shipping companies in coastal shipping and to protect them from foreign competition. However, during the US colonial period, the historical data available show only one local (PR) shipowner, whom we suspect was not robust enough to survive the US tariff imposition early in 1900.

Frankel (1982) also argues that a group of farmers in the southwest of the US was the first group claiming cabotage exclusion in recent years. In 1996 a unified group of strong associations in the US agricultural sector demanded changes to the Act. As a result, many agribusiness owners argued that the Cabotage Act undermines their ability to compete with foreign producers (Piggott & Goodwin, 2002).

As a result, a study about the effects of the Jones Act on US agriculture was published in 2002 by Piggott and Goodwin. Using a spatial model, they focus their research on the impact of the cost of soybeans (only) in North Carolina (NC) as an importer state to satisfy local demand. They performed simulations for the NC soybean producers, estimating their welfare loss to be \$1.7 million dollars. Furthermore, they reveal that the costs to NC soybean producers are outweighed by other benefits received by the soybean producers who export into NC. The study concludes that the reduction in cost could stimulate trade and have some positive implications for producers' welfare.

In 2003 a coalition of southeastern farmers' associations – the American Farm Bureau Federation, American Soybean Association, National Corn Growers and United Soybean Board – commissioned a study from Promar International. It concludes that an exemption from the Jones Act, for bulk feed ingredients, would be helpful but would not fundamentally alter the situation due to the inland combination of transport required for trade (Promar International, 2003).

The Dairy Farmers of Canada in 2011 also demanded changes to the transpacific partnership agreement between the US and Canada, specifically the US cabotage restrictions (Doyle, 2011). The American Farm Bureau (2014:p.20), in a recent publication, reports the approval by majority vote of a resolution for repealing the Jones Act, advocating no restrictions regarding the quantities or vessels on which a commodity is shipped between US ports. However, Piggott and Goodwin (2002) and the USDA (2003) are, so far, the only publications after NAFTA showing procedures or data to sustain their views, but no publications on this topic exist after CAFTA-DR.

### **3.4.3 Cabotage and climate change**

#### **Risk of delays (distance, sinking)**

Lorenzo (1999) states that the continued operation of old and ageing vessels is the most commonly cited issue in countries without a liberalised cabotage policy, particularly those that have benefited from domestic shipping services. According to him, this is highly associated with cargo service standards as well as inefficient operations. The risk of maritime accidents is higher in outdated ships, resulting in the loss of lives, property damage and dramatic environmental hazards (Box 2).

**Box 2: It's extremely rare for large ships like 'El Faro' to disappear. The Coast Guard believes the missing cargo ship sank in the Atlantic Ocean with 33 people aboard.**

By: Graham, D. A. (2015) *The Atlantic News*.

October// El Faro—a 790-foot cargo ship whose name means “lighthouse”—has apparently sunk in the Atlantic Ocean, the U.S. Coast Guard believes.

Rescuers have been searching for the container ship, which was in the path of Hurricane Joaquin, since the crew last made contact Thursday morning, saying El Faro was listing but the situation was manageable. The vessel was carrying 33 people—28 Americans and five Poles—and while searchers have found debris they believe came from the ship, they haven't found the vessel itself or any survivors. One body has been found.

While nautical disasters remain a fact of life—everything from missing sailboats to deadly catastrophes like the Costa Concordia's sinking or recent ferry disasters in Asia—it is exceptionally rare for a large ship like El Faro to disappear.

How rare? An analysis of vessels greater than 100 gross tons by the insurance giant Allianz found that in the past 10 years, from 2005 to 2014, only six ships were reported as “missing/overdue” — or, in other words, lost. Three were in 2005. There were none reported in 2011, 2012, 2013, or 2014.

This isn't to say that ships don't sink. In 2014, 49 ships “foundered,” which includes sinking or submerging—the largest category of ship losses. But often those are cases where ships sink with some warning, and most or all of the crew can be rescued. The second-largest category is ships that ran aground. (An excellent 2008 wired story goes inside the world of ship-salvage crews that try to right these vessels.) It's not an illusion that shipping seems safer these days. The number of total losses has decreased over the last decade.

And no ship lost in 2014 in any method—foundered, wrecked, or otherwise—was as large as El Faro, which was built in 1975 and was 790 feet long with a gross tonnage of 31,515. The biggest cargo ship lost last year was 12,630 gross tons, and while eight of 20 crew members died, that was in a collision—not a disappearance. The Caribbean, where El Faro is missing, also sees comparatively few losses versus the South China Sea, the Mediterranean, or the British Isles.

It's far too early to know what went wrong with El Faro. It's not uncommon for cargo ships to lose containers in heavy seas, but sinking is. Allianz lists several risk factors for ships: overreliance on electronic navigation; understaffed or undertrained crews; and structural weakness. El Faro was much older than the average container ship worldwide, which is just under 11 years old, but her owner told the AP the boat was in good condition and suited to rough weather....”

Commonly the complaints of shipowners/operators revolve around conditions or factors that allegedly inhibit them from delivering the kind of services demanded/expected by their clients (Lorenzo, 1999). Considering the capital-intensive



nature of their business, the absence of limited financial assistance and incentives as well as the lack of better port infrastructure and facilities might be additional constraints for them. Among these conditions is the country's level of bureaucracy and protocols. The lack of flexibility to respond immediately to business opportunities is due to restrictive government regulations and related bureaucracy.

...nearly all of the containerships and several of the barges used by these carriers [in the domestic market of PR] are operating beyond their average expected useful life, which is about 30 years for a containership and about 27 years for a barge. (USGAO, 2013:p.6)

In other different scenarios of climate change risk, Blom-Hill (2013) reports a case in which the company Hancock Lumber in Maine (US) could not find a domestic ship to transport its product from Maine to PR. As a result, the company was forced to truck lumber to Florida (around 1,600 miles approximately, 23 hours by road) and barge it from there. Whilst absurd, it seems not to pose much of a problem for non-perishable goods. However, we discover that cases like this are much more common in PR's food supply chain than the single case presented by Blom-Hill. In the case of fruits and vegetables, this scenario may imply additional costs for product preservation (humidity and temperature, gas), less time to handle the produce, a reduction in the product's shelf life, greater perishability and thus less time for consumers' use. Therefore, consumers pay for a short-life product.

### **Ports and climate change**

Ports and coastal facilities are vulnerable to a range of manmade and natural threats, with grievous potential effects on the human and economic security of a nation. It is believed that, due to the climate change effects in the following decades, ports' infrastructure could be seriously affected by the rise of the sea level, extreme weather events and changes in precipitation. All these expected scenarios may increase countries' level of vulnerability, particularly for SIDSs'.

Given the increase in the sea level and the temperature projections, it is expected that the coastal assets of small islands (e.g., corals, mangroves and sea grasses) would be

at great risk (Mimura et al, 2007). Consequently, the increases in the risk insurance appraisal of maritime transportation could add more costs. Besides, port infrastructure in developing regions with low adaptive capacity would be affected (UNCTAD, 2013c). For instance, in 2012 Hurricane Sandy in the US East ports (NY and NJ) generated economic damage estimated between \$30 and \$50 billion (Craft, 2012). Therefore, ports are potentially vulnerable to extreme weather events, and SIDSs with limited maritime infrastructure would be at high risk; hence, ensuring the climate resilience of ports is critical for those nations. The strategic importance of ports for trade and the current interdependency of the global supply chain demand, in both developing and developed countries, are undeniable; accordingly, critical consideration of their infrastructure and a risk assessment of the potential effects of climate change are vital (UNCTAD, 2013c).

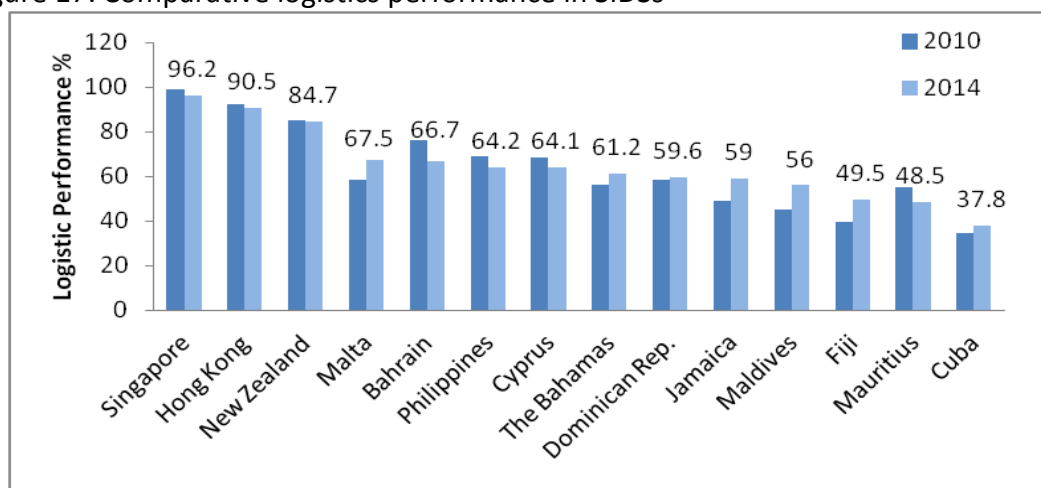
### **Food supply chain in SIDSs**

SIDSs exhibit highly divergent levels of development but face relatively similar challenges in terms of economics. Traditionally, they have depended on subsistence and cash crops for survival and economic development (Mimura et al, 2007). SIDSs are inherently economically vulnerable due to their remoteness and insularity, susceptibility to natural disasters, limited institutional capacity, limited ability to diversify, strong dependence on a narrow range of exports and high import content, particularly for strategic goods such as food and fuel, the prices of which have exhibited high volatility (Briguglio et al, 2006). Briguglio's economic vulnerability index (2010) catalogues SIDSs on the premise that a country's susceptibility to external shocks, its degrees of economic openness, export concentration and dependence on strategic imports but it not said much about access to food.

SIDSs food trade has depended on preferential access to major developed-country markets, which are slowly eroding (Mimura et al, 2007). Additionally, due to the climate change impacts, projecting more uncertainty in the environmental conditions, agriculture and food security would be negatively affected. However, the result of these disruptions also would affect the maritime transportation sector and with it multiple other dependent sectors and services.

The logistics performance (Fig.17) for the vast majority of SIDSs seems to be significantly worse than that in other countries with similar levels of development. Meanwhile, the trend towards urbanisation and increased dependency on food imports (Table 11), may affect those countries raising other issues associated to health such as the access to sufficient, safe and nutritious food (UN, 2010).

Figure 17: Comparative logistics performance in SIDSs



Source: World Bank Logistic Performance Index, 2010 and 2014.

As previously mentioned, an important portion of the cost of food is associated with the transportation cost. Additionally, the volume of goods is an important factor to reduce the cost per unit in maritime transportation. Nevertheless, internal logistics inefficiencies may affect the cost rates thus analyses to optimise transport and management are essential, particularly for temperature-controlled perishable goods. Markets that are highly dependent on perishables at any given time are easily affected by food price volatility and the extra costs for services using refrigerated containers. However, it seems that markets with high maritime transport competition show a reduction in the cost of trade as well as a reduction in the cost of containers (Castro-González et al, 2013).

Table 11: SIDSs and small economies' total agricultural imports in 2012 and their level of vulnerability

Country	Resilience Index	Vulnerability Index	Population	Total TEU	% Food Imported**	% Agriculture Material Imp.***	Estimation of TEU Agriculture+Food	Ratio Imports:Population
Singapore <sup>3</sup>	0.974	0.971	5,200,000	32,421,602	3.3	0.4	1,206,083.59	0.23
Hong Kong <sup>3</sup>	0.877	0.713	7,500,000	23,100,000	N/A	N/A	-	-
Jamaica <sup>1</sup>	0.42	0.922	2,700,000	2,079,585	18.1	1.2	401,359.91	0.15
Ireland <sup>2</sup>	0.845	0.371	4,500,000	1,918,317	13.6	0.9	278,155.97	0.06
Puerto Rico*	N/A	N/A	3,600,000	1,423,192	22.3	3.3	364,337.15	0.10
Bahamas	N/A	0.63	372,000	1,236,690	19.0	1.0	247,338.00	0.66
Mauritius <sup>3</sup>	0.509	0.632	1,300,000	417,467	21.6	2.4	100,192.08	0.08
Bahrain	N/A	N/A	1,400,000	318,743	14.9	0.8	50,042.62	0.04
Cyprus <sup>3</sup>	0.526	0.84	307,000	307,060	17.5	0.9	56,499.04	0.18

Extracted from: World Bank (2012) & USDoC Census Bureau (2015). Data at July 2012.

\*Puerto Rico's extracted from Departamento de Agricultura (2011); N/A=not available data; TEU=containers in scale of twenty-foot equivalent unit. Using Briguglio et al's (2010) schemas, 1= worse case, 2= best case, 3=self made. Ratio: relation % TEU in food and agriculture per capita. \*\*Percentage of the total TEUs classified as food for domestic use. \*\*\* Percentage of the total TEU classified agriculture raw material for domestic use.

In comparison with the other countries presented above, Bahrain (.04), Ireland (.06) and Mauritius (.08) show the lowest ratio in agricultural imports per capita (TEU); thus, their national production to sustain their population seems to be less vulnerable than that of Singapore (.23) and the Bahamas (.66). In the case of Singapore, its level of food imports (TEU) might not be exclusive of local consumption, hence affecting its ratio. Additionally, its economic design is called by Briguglio's (2010) 'paradoxical schema' because although it shows high economic vulnerability, the nation has 'nurtured' a high economic resilience through the adoption of policies, interconnectivity and logistic practices enabling them to mitigate its natural weakness. Hong Kong shows similar patterns but data on twenty-foot equivalent units (TEUs) by sector are not available so far. However, it is estimated that the vast majority (approx. 90%) of food imported by Hong Kong are from China's mainland (Kong, 2013). In this scenario any external policy imposed by China could provoke political and/or social tensions affecting Hong Kong's market and thus its food insecurity level.

Higher prices for refrigerated cargoes are not unique to this market or the global maritime shipping industry. They are probably a consequence of the lack of competition for food importers in this particular market segment. The low availability of efficient reefer containers may affect the cost of transporting fresh produce. Additionally, agricultural commodities produced in LDCs do not always satisfy the

expectations of consumers in more advanced markets with respect to the desired quality and thus have less access to more advanced containers (Verkerk et al, 2007).

According to the *Global Agricultural Productivity Report* (Global Harvest Initiative, 2015), the current rate of the agricultural productivity growth is only 1.72%, whereas a rate of 1.75% annually is needed to meet the demands of a growing population that will reach 9.7 billion in 2050 (p.8). However, the FAO estimates that one-third of food produced is lost or wasted along the pathway from production to human consumption. Therefore, multiple factors of inefficiency are affecting the food supply chain, increasing the cost of food and restricting the access to food, particularly in SIDSs.

One example of the effects of supply chain interruption is Hawaiian livestock farmers (Hawaii Cattlemen's Council, 2007). Beef and pork producers in Hawaii are highly dependent on US-flagged vessels to transport animal feed and genetics to the US. Allegedly, due to the lack of US-flagged vessels prepared for this, they are limited to trading live animals from their land to the West Coast of the US, affecting their business and local production. A report of the Hawaii Senate documents these allegations (Senate of Puerto Rico, 2015).

### **3.5.0 US Cabotage Act from the view of US offshore territories**

US offshore territories are a type of political division that is directly overseen by the Federal Government. By contrast, the states share sovereignty with the Federal Government and their representation in the Federal Congress is proportional to their population. Alaska, Hawaii, Puerto Rico, Guam, the Virgin Islands, the Northern Mariana Islands and American Samoa are US offshore territories. The first two are incorporated territories or states and the others unincorporated territories. All of them are considered as domestic markets for economic purposes. Only one has a natural land connection with the mainland (Alaska) and only two have a population of over 1 million people (Puerto Rico and Hawaii). Nevertheless, the last three were excluded from the Cabotage Act. According to a report of the Senate of Puerto Rico

(2015),<sup>76</sup> the cabotage exemption of the US Virgin Islands was legislated as part of the purchasing agreement with the Danish Government. In the case of American Samoa, apparently its exemption was the consequence of a partnership agreement between the US, Germany and the UK in 1899.

Since 1920 a few amendments in favour of the US offshore territories have been realised. Total exclusions of the Cabotage Act were applied only to the US Virgin Islands, American Samoa and the Northern Mariana Islands.

The loss of said (cabotage) exemption would have a devastatingly negative effect on the economy of the territory – we are totally opposed to such a concept. (John Harding, Director of Virgin Islands Port Authority; US Congress, 1989)

... the infamous Jones Act created a monopoly for Seattle shipping companies that served Alaska, keeping prices for imports and exports artificially high ... The Jones Act represented one expression of the problem that Alaska was in the control of absentee interests. (Ernest Gruening, Ex-Governor of Alaska; see Ascott, 2004)

Vessels constructed outside the US but flagged in the US are allowed to trade between Guam, Kingman Reef, Midway and other US ports.<sup>77</sup> However, this is not the scenario for Alaska, Hawaii and Puerto Rico, where all vessels travelling between their ports and the US mainland have to comply with the original regulations. Hansen (2012b) states that: ‘on these three domestic non-contiguous jurisdictions of the US their geography imposes an exclusive reliance on ocean shipping and federal maritime laws require vessels engaged in the non-contiguous trades be built in the US’. Furthermore, he argues that ‘the prohibitively high cost of new construction at the major shipbuilding yards on the US mainland nearly precludes all new ship orders’. Thus, an ageing fleet of ocean-going deep-draught ships makes ship replacement a critical economic issue. In addition, the US Cargo Preferences Act is required to transport food for welfare and other programmes.

During the past century, the special access that those US jurisdictions have had to the US market has brought new forms of prosperity. However, after NAFTA and the

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<sup>76</sup> The case of *American Maritime Association v. Blumenthal*, 590 F. 2d 1156, 1166–69 (D.C. Cir. 1978) may provide more data about these US possessions.

<sup>77</sup> Title 46 U.S.C. §12111. Available from: <http://www.law.cornell.edu/uscode/text/46/12111>

current multiplicity of US FTA, these advantages have become less competitive, and it is believed that the Cabotage Law is one of the reasons (Alameda & Valentín, 2012; Brackins, 2008; USGAO, 1988).

The Jones Act's influence on the price level has been part of the political discourse in Alaska (USDA, 1986). Its effects on the costs for industries dealing with speciality goods shipped to and from Alaska have been debated since 1921. The USGAO (1988) estimates that building vessels in the US increases the cost of transportation with Alaska by \$163 million per year. Indeed, before NAFTA it is believed that this was the area that was most heavily affected by the Jones Act for transporting goods produced in the contiguous US (Jackson & McKetta, 1986).

Studying the state of Hawaii, independent consultants estimate that Hawaiian residents pay an additional \$1 billion per year in higher prices because of the Jones Act. This amounts to approximately \$3,000 for every household in Hawaii (Ward, 1997); thus, it is believed that Hawaiian families require a budget 40% higher than their counterparts in a typical mainland US city (Box 3).

In 2015, congressmen of Hawaii, Alaska, Guam and PR presented together, in a common cause, a petition for a Cabotage Act exemption to the US Congress and President Obama. Nevertheless, arguably, the data to support their claims seem not to be totally compelling (Estudios Técnicos, 2013; USGAO, 2013; Caribbean Business, 2012; Boyd, n.d.).

In 2003 the USDA, in agreement with the University of Hawaii, studied the effects of the maritime transportation challenges in their agricultural sector. Hawaiian transportation service providers, agricultural producers and shippers were interviewed. The study concludes that: 'ranchers in non-contiguous US States and Territories, especially for Hawaiian agricultural producers, indicate that there are several transportation barriers' reducing their competitiveness. Later, the Hawaiian Cattleman Council published a manifesto in 2007 stating that the 'Jones Act' must be reformed at least to allow for a limited exemption for livestock. However, so far, after

NAFTA and CAFTA-DR, no publications with data to support those arguments have been found.

**Box 3: Claiming against the US cabotage**

Author: Zimmerman, M. (2012) *The Hawaii Reporter*.

DECEMBER/ Most Hawaii residents haven't heard of the Jones Act, but one Hawaii lawyer and several business owners say the 1920 federal shipping law has a major negative impact on virtually every resident and business in the state, and they are challenging the law in U.S. District Court. John Carroll, an attorney and former state lawmaker, has filed a class action suit against the federal government on behalf of his clients. They maintain the Jones Act violates the Commerce Clause by restricting shipping between states to American-owned and manned ships and thereby hurting businesses and residents by inflating the cost of goods. The issue is hotly debated among Hawaii's political elite, but largely ignored by the general public.

Carroll and his plaintiffs [...] hope to educate the public about the detriments of the Jones Act, which some experts argue increases the cost of living in the islands by as much as one third.

"The most important issue for me is [...]// Carroll maintains the class action lawsuit should be considered as Hawaii's "revolution"... "to obtain economic freedom from monopolistic domination of shippers who face no competitors."

Carroll said the impact of the Jones Act is so severe, that the state of Hawaii is denied access to about 90% of all available shipping in the world. He also blames the Jones Act for destroying Hawaii's agricultural economy. "Hawaii dairies, poultry farms, vegetable production, even banana plantations have declined or been eliminated because of the intolerable costs of farming and shipping in Hawaii," Carroll said. "The cost of agricultural production is prohibitive, not only because of the cost of fertilizers, herbicides, and farm implements, but also the cost of outbound shipping of locally grown fruits, livestock and ornamental plants to any destination other than the West Coast of the continental United States..."

**3.5.1 Puerto Rico and the US Cabotage Act**

The study of the effect of the US Cabotage Act on PR's economy is not new. In the literature available, the oldest publication on the matter is from 1953; however, Collazo (2012) discusses an earlier document from 1940 between the President of the PR Senate and his counterpart in the House of Commons:



Steam maritime companies – an effective monopoly under the US cabotage – block our economy based on fetching and carrying goods to PR or from PR. These companies are the equivalent, but in a most grievous way, to the Middle Ages taxes for the right of crossing a bridge, whose owner only allows those who pay to pass.<sup>78</sup> (Extracted from: Letter from Luis Muñoz Marín to Antonio Ramos Antonini, 1940)

Eastman and Marx (1953) evaluate the US tariff barriers to PR's offshore sugar cane shipping and the welfare cost to Puerto Ricans. They conclude that the fleet costs in PR are lower than those in the Virgin Islands. A later descriptive study conducted by the Commonwealth of PR (ELA, 1964:p.44) to evaluate the economic strength of PR's maritime industry concludes that the technical level and professionalism of the US maritime transportation gives security and stability to PR's market, ensuring efficiency. However, the study ends by supporting the cabotage exemption (p.45). Clover and Harris (1965)<sup>79</sup> explore some methods to alleviate Puerto Ricans' welfare costs but preserve the Cabotage Act, but, in their conclusion, the question of the impact of maritime service costs is not answered. In the same year, two more studies were published. Gaetán (1965), for example, presents a basic legal analysis of the trade relationship between PR and the US but without making specific recommendations. Pesquera (1965), on the other hand, posits that the freight costs of the maritime transportation companies in PR, due to their lack of routes, are designed to cover their operational inefficiencies rather than to promote trade.

In 1970 the first manifesto by PR's agricultural sector advocating amendments to the US Cabotage Act was documented (El Mundo, 1973). The only academic publication about the effects of the US Cabotage Act on some products in PR's food sector is that by Quiñones-Domínguez (1990). Although the research does not offer clear conclusions for the food sector, it establishes the limitations of access to information and the secrecy in the management of statistics by the maritime sector and the US agencies. According to Herrero and colleagues (2001), all of these studies between the 1950s and the mid-1990s, although demonstrative of the interest in the topic, are not widely discussed and do not consider FTA's scenarios.

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<sup>78</sup> Translated by the author.

<sup>79</sup> The only copy available does not include the Appendix section; thus, their methodology and data cannot be verified.

Other grass root initiatives by different professional associations asking for PR's exemption are available in the archives, but the majority lack data to support their arguments (Rochet-Santoro, 2014; Collazo, 2012). During the mid-1990s, considering Singapore's experience, the Government of PR launched an initiative to build the biggest port in the Caribbean in PR. Eventually, the proposal was also supported by the US Government. Although the construction started relatively quickly, the different political views on maintaining the Cabotage Act as a bond between the US and PR delayed the project. Afterwards the neighbouring countries of Jamaica, the Dominican Republic and Cuba announced plans to create mega-ports in their own regions, and PR stayed behind in its aspiration (Blom-Hill, 2013).

From 1995 to 2010, only four academic studies about the topic were published. Rosado-Dávila (2002) discusses the freight cost effects on PR's exports, and Alameda (2002) and Vélez-Loyselle (2002) focus on the impact of the US cabotage on PR's mega-port. In PR's Congress the topic has been presented for study in at least ten legislative projects.<sup>80</sup> These initiatives show an interest in the issue, but, due to the political debate that the topic generates between Puerto Rican parties, no actions have been taken. In 2012 the USGAO conducted research in PR about this topic. Although during the process the participation was substantial and some economists presented findings, the USGAO (2013) limited its publication to a qualitative bibliographic study and no significant recommendations were provided. The report, while lacking of recommendations, said that cabotage may obstruct PR's business formation and sourcing decisions (p.20). In reaction to this vague report, since late 2013 the Senate of PR has conducted hearings to collect complementary information and challenge the USGAO's findings. The report was published in late 2015 (Senate of Puerto Rico, 2015).

Using econometric data but different methodological approaches, only three items published in the last five years study the welfare cost impact of the US Cabotage Act

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<sup>80</sup> Legislative projects presented in Puerto Rico's Senate and/or House of Representatives: RKC-35, 1994; RC 2067, 1997; RC 0436, 2001; RC 1604, 2006; RC 5549, 2006; RC 0055 and RC 5549, 2009; PS 1688, 2010; RKS 0059, 2012 and RS 237, 2013.

on PR's economy (Alameda & Valentín, 2014; Estudios Técnicos, 2013; Herrero<sup>81</sup> et al, 2010). Although these publications are available for everyone on the Web, so far none of them have been published in formal academic journals or submitted to international scrutiny.

Arguably, the operational costs of vessels under the US flag in cabotage or foreign trade are significantly higher than those of foreign-flag vessels in similar trade (USDoT-MarArad 2011; Frankel, 2002). Overcapacity is an important issue in liner shipping, because capacity costs (storage factor) are determinant of liner shipping freight rates (Jansson & Shneerson, 1986). Industry overcapacity will thus restrict the carriers' ability to maintain sufficient revenues to cover the high fixed costs that prevail in this industry (Fusillo, 2002). Due to the level of food production, this scenario is not problematic for the US, but what does it mean for PR's reality?

Jewell (2013:p.1) states that 'modifying the Jones Act for PR could result in critical consequences for the US merchant marine, the American shipbuilders, the US national security and perhaps even the disappearance of US-flag vessels from the Puerto Rican trade'. He argues that this would create a 'negative impact on the US merchant marine and the shipyard industrial base that the Jones Act protects'. Similarly, the president of the Navy League,<sup>82</sup> Mr Marc Thornberry, expressed the institutional rejection of any changes in the cabotage regulations to favour PR's economy. He asserted that 'making flexible cabotage on PR may affect the US economic stability and its national security' programme (Delgado, 2015). However, the Federal Reserve Bank of New York (2012) reports that the impact of the Jones Act on PR is the basic element of the higher cost of shipping affecting business competitiveness. The report states (p.13), 'it costs an estimated \$3,063 to ship a twenty-foot container of household and commercial goods from the East Coast of the US to PR; the same shipment costs \$1,504 to nearby Santo Domingo (Dominican Republic) and \$1,687 to Kingston (Jamaica)—destinations that are not subject to Jones Act restrictions'.

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<sup>81</sup> An early version of this study was previously presented in 2001 to the Federal and International Affairs Commission of PR's House of Representatives (Herrero et al, 2001).

<sup>82</sup> The Navy League is an organisation associated with the US maritime transportation corporation, which represents 40,000 workers in this sector. One of its missions is to inform the US Congress of the need for strong sea services supporting the US Navy, Marine Corps, Coast Guard and US-flag Merchant Marine and volunteer its time and money to advocate the sea services.

Nevertheless, the report does not provide references, fieldwork or the methodology used to support the statement.

Alameda (2002) posits that the design of PR's economic development since the mid-1800s has been based on seeking foreign direct investment rather than diversified strategies. Consequently, although domestic production and native entrepreneurship have been historically weak, the cost of imports per capita from the US to PR is calculated as \$6,500/year. Using data from 2000, he estimates the cost of the Cabotage Act for the whole economy of Puerto Rico to be between \$300 and \$500 million. Besides, he argues that more than 60% of PR's imports are raw materials (\$25,400 million) and around 13% is food (\$1,800 million). However, his study does not provide the methodology used.

For some, the restriction on the use of maritime transportation in PR's trade seem to be a harmful intervention of the US on the economy, which is limited by its nature, resources and volume of trade (Clar, 2013). For the last five years, the well-being cost of the Cabotage Act for PR's economy has been estimated by some, but without any agreement or particularisation. Arguably, econometric models to estimate its effects are useless or inaccurate because the available data may have multiple variables, none of which are related to the phenomenon (Estudios Técnicos, 2014; Irizarry-Mora, 2011). As a result, the Federal Reserve Bank of New York (2014) suggests a temporary – five-year – exemption of PR from the Cabotage Act, as supported by other researchers (Ruiz, 2014).

Herrero and colleagues (2010) estimate the costs of the maritime transport in 2000 to be \$1,512 million or 88% of the total transport costs in PR's external trade (\$1,718 million). According to them, the excess price paid by Puerto Ricans due to the Cabotage Act is estimated to be \$426 million for that year. However, the estimations in the study by Herrero and colleagues are made using the cost data of one container size at the TEU scale. The problem is that in PR the container size for trade is wider than the international level (20', 40', 45' and 53'); thus, the costs may differ (Estudios Técnicos, 2013). Considering this, Alameda and Valentín (2014), using historical data from between 1971 and 2012 and a slightly different approach from Herrero et al

(2001), estimate the impact of the Jones Act on PR's economy to be between \$400 million and \$1.09 billion (Table 12).

Table 12: The Jones Act's impact on Puerto Rico's economy (fiscal years 1992–2012)

FY	Estimated Values		Differential	Relative US Value	Differential to US	Differential btw US and RW	Jones Act Impact
	M	PM					
	Equation 1	Equation 2	(1-2)	$X_{PR}+M_{PR}$ (3)	$3x(1-2)$	(4)	$4x(3x(1-2))$
1992	31,955.27	30,152.55	1,802.73	0.793	1,429.47	0.586	837.52
1993	31,823.59	29,891.10	1,932.49	0.785	1,516.30	0.569	863.19
1994	32,749.69	30,802.12	1,947.57	0.786	1,531.03	0.572	876.13
1995	34,356.46	32,307.42	2,049.04	0.780	1,598.98	0.561	896.57
1996	34,396.53	32,107.82	2,288.71	0.763	1,746.72	0.526	919.43
1997	35,626.43	33,094.29	2,532.14	0.761	1,927.28	0.522	1,006.53
1998	38,046.73	35,651.57	2,395.16	0.780	1,868.61	0.560	1,047.02
1999	41,594.47	38,826.18	2,768.29	0.759	2,100.14	0.517	1,086.37
2000	43,239.98	40,504.51	2,735.47	0.746	2,039.57	0.491	1,001.85
2001	46,222.67	43,774.68	2,447.98	0.749	1,833.27	0.498	912.57
2002	46,923.24	44,340.84	2,582.40	0.739	1,909.11	0.479	913.61
2003	49,509.82	46,860.23	2,649.59	0.721	1,911.41	0.443	846.37
2004	51,451.40	48,614.63	2,836.77	0.671	1,902.14	0.341	648.74
2005	51,271.55	48,494.28	2,777.27	0.690	1,915.65	0.380	727.04
2006	51,869.58	49,294.92	2,574.66	0.693	1,782.98	0.385	686.48
2007	53,271.21	50,131.64	3,139.57	0.655	2,057.32	0.311	638.95
2008	53,473.72	50,447.87	3,025.85	0.630	1,905.98	0.260	495.16
2009	53,353.14	50,075.64	3,277.50	0.617	2,022.66	0.234	473.85
2010	54,895.51	51,246.04	3,649.47	0.614	2,239.70	0.227	509.33
2011	56,122.68	52,405.38	3,717.30	0.607	2,254.94	0.213	480.79
2012	58,003.60	53,748.30	4,255.31	0.584	2,486.30	0.169	419.1

Legend: M=import of merchandise; PM=implicit price deflator for imports; (3) relative importance of US in PR trade commerce; (4) relative importance of rest of the world in PR trade commerce; Jones impact estimated in million USD. Extracted from: Alameda and Valentín (2014: p.39-40).

Estudios Técnicos (2013), a private firm commissioned by the Maritime Alliance to analyse the Jones Act's effects, states that, since not all the relevant factors are included in the cost–benefit calculation, quantifying the economic impact of the Cabotage Act on PR's economy is a speculative exercise. It argues that foreign maritime transport companies have a different level of technical sophistication, which is lower than that of the US maritime companies; thus, their standards are not comparable. Nevertheless, using a different approach and 2012 data, they estimate the total transportation costs to be \$1,017.5 million, and 69.2% of these are maritime costs. When including data from the Maritime Alliance, they estimate the Jones Act's cost for PR's economy to be \$155 million (p.8).

Cruz and associates (2014), in a basic analysis of transportation costs using data collected by the Puerto Rico Planning Board (PRPB), suggest that on average the costs are 1.75% of the annual total imports and exports. For them, the Cabotage Act is not a burden for the PR's economy but an advantage. They propose that the framework for trade ensures PR's access to the US market, which helps PR's security, resulting in competitive advantages. They also affirm that the majority of the publications available on this topic are based not on empirical studies but on purely economic and ideological interests. However, the analysis by Cruz and colleagues (2014) could be judged according to the same rule, because the authors do not consider differences in supply chains, infrastructure, management costs or social impacts.

Following a different approach, a legal view of this topic is presented by Collazo (2012), who argues that the Cabotage Act's impact on PR's economy could be considered a violation of Puerto Ricans' human rights by the US. He posits that, due to the high level of trade between PR and the US, the US violates international trade laws by imposing a protectionist measure diminishing the Puerto Ricans' human right to trade. Furthermore, he hypothesises that the Act was completely designed to benefit the US, and due to the lack of political representation of the people of PR in the US Congress, the application of the Act to PR's economy is based on 'generic consent' without any democratic participation of the citizens. Nevertheless, his analysis is not sustained by data.

### **3.5.2 Oligopolistic structure issues**

The trends, growing demand and supplies as well as the expansion of trade, infrastructure and connectivity are increasing container ship sizes, which will eventually reduce the number of carriers per country. These optimisation patterns could benefit shippers' costs and translate into lower freight to the benefit of trade. However, 'it could also squeeze out smaller players and result in an oligopolistic market structure' (UNCTAD, 2013c:p.1). Kujal and Ruiz (2009) suggest that a subsidy towards a domestic monopoly shifts its reaction function, increasing its profits rather than its efficiency. Other authors posit that imposing output subsidies is not a robust policy in this context (François & Manchin, 2007).

It is not uncommon for monopolies and oligopolies to provide key infrastructure services in both developed and developing economies. Particularly, SIDSs' markets are highly exposed to these kinds of structures, principally due to their market limitations. Krishna and Itoh (1986) suggest that, in oligopolistic protection schemes, it is clear that companies have different behaviour according to their market structure. For instance, in competitive markets restrictions can affect the equilibrium only by being restrictive, because in some senses they alter the demand and/or supply conditions.

Occasionally oligopolistic structures may emerge through the predatory behaviour of the firms themselves; their dominion is often established through some legislation, policies or public subsidies. The combination of monopoly power and public structures regularly produces a low-performance form of service, non-competitive rates, inadequate offers and a lack of innovation or investments. Consequently, the competitiveness of the market or country is undermined (ITC, 2012:p.10).

In the case of the US Cabotage Act, it may restrict some conditions of the domestic monopoly. For example, the building, assembling and part repairing of US-flagged Jones Act vessels or ships should be carried out in the US territory, which limits maritime transporters to a reduced number of service providers. Therefore, in the case of offshore US territories (incorporated or not), the restriction might be considered double. To trade between the US ports, only US-flagged vessels should be used, and in the case of damage, vessels should be repaired by those exclusive service providers. Although these restrictions are applied to the whole nation, only two of the 50 states and all of the US territories<sup>83</sup> are not directly land connected to the mainland; thus, the vast majority of their supplies are transported by sea or crossing foreign countries (the case of Alaska).

In January 2014 the Chamber of Commerce of Puerto Rico denounced the 4 maritime transportation companies in PR for not being supportive of the shipbuilding industry in the US due to the fact that the only 5 ships steadily used to trade between PR and the US have been in service for more than 30 years. In addition, in the case of the

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<sup>83</sup> So far, the only exception is Washington, DC.

barge-vessels, their age is between 14 and 42 years in service. This transport facility is clearly of limited use for defence and national security. In an ideal scenario in which the fleet serving PR's market is renovated, the cost of shipbuilding in the US could be triple the cost of similar transport in the international market. Whilst it is expected that a new fleet would bring new technology and hence more efficiency than the actual ships, the high cost of building in the US would certainly be included as part of the cost of trade. Consequently, the PR's market would be financing a private business to sustain US national needs (MIDA, 2015).

### **3.5.3 Racketeering in oligopolistic structures. Corporate corruption and maritime cartels**

Countries may carry out political and structural reforms to liberalise protocols or facilitate processes promoting competition in the domestic market to improve the business environment. Enhancing transparency can also facilitate the attainment of a collusive equilibrium among competitors or result in non-coordinated anti-competitive effects (OECD, 2010a). However, powerful multinational or strong firms in some critical services may fix or raise prices when the competition is small and/or a LDC or the market is not strong enough to stop their actions legally without negative effects on the country's citizens (Box 4).

A price-fixing overcharge occurs when income or wealth is transferred from buyers to the members of the cartel that occurs as a result of an overt collusive agreement (Connor, 2010). Maritime transporter oligopolies may develop cartel behaviour. In the form of cartels, some suppliers may create pseudo scarcity of goods and/or overcharge their clients (ITC, 2012). Connor (2010) estimates that at international levels cartels overcharge their customers on average by about 31% and are about 65% more effective in raising prices than domestic cartels. Similarly, Chen and colleagues (2013) posit that shipping dominance creates lack of competition on trade routes that lead to overcharging strategies. It may affect the most dependent firms or national economies negatively. Although the US Cabotage Act was not directly promoting it, the lack of international participants limit competition, where in scenarios of consolidation of maritime providers while perhaps more efficient; less in number and



in positions of dominancy. However, these patterns are not easy to validate and it is more when the data available is controlled by the maritime firms.

**Box 4: Sea Star exec convicted on price-fixing.**

Author: CB Online Staff. (2013) *The Caribbean Business*.

JANUARY/ Frank Peake, president and chief operating officer of Jacksonville-based Sea Star, was indicted in November 2011 in a conspiracy investigation targeting two shipping companies that had already netted five other shipping executives and has led to more than \$46 million in fines.

Sea Star agreed in November 2011 to a \$14.2 million fine and pleaded guilty to one felony count of conspiring between May 2002 and April 2008 to fix prices on cargo moving in and out of PR. The company issued a statement apologizing to its customers, and noted the agreement provides that the US Justice Department (USJOD) would not bring criminal charges against its parent companies, Saltchuk Resources Inc. and American Shipping Group Inc.

Peake was convicted of price fixing in violation of the Sherman Act, which carries a maximum penalty of 10 years in prison and a \$1 million fine for individuals. Peake is the sixth shipping company executive convicted in the sprawling case. Horizon Lines executives Gabriel Serra, R. Kevin Gill, Gregory Glova and Alex G. Chisholm, and Sea Star's Peter Baci previously pleaded guilty. Baci, a former Sea Star senior vice president was handed a four-year prison term for antitrust conspiracy, which is reportedly the longest prison sentence for a single antitrust charge.

"The coastal shipping price-fixing conspiracy affected the price of nearly every product that was shipped to and from PR during the conspiracy," said Bill Baer, assistant attorney general in charge of the USJOD's Antitrust Division. "[Peake's] successful prosecution shows that the division will hold accountable high-level executives who perpetuate these crimes."

In August, Jacksonville-based Crowley Liner Services Inc. pleaded guilty and was sentenced to pay a \$17 million criminal fine for its role in the conspiracy. Horizon Lines was sentenced to pay a \$15 million criminal fine in March 2011...

Kraft Foods, Kelloggs, Coca-Cola, Frito-Lay, Quaker Oats, Sears, ConAgra, Nestle, Frito-Lay, P&G and trucking companies are among the plaintiffs in two lawsuits filed against Sea Star and Crowley in federal court last April. The plaintiffs [...]

The maritime sector is associated with infrastructure. It is also characterised by highly fixed expenses and inefficiencies. Their business profitability is based on a very low income per unit transported and economies of scale. Consequently, they can develop strategies in their internal structures to control expenses. Pittman (2009) describes two trends that counteract structural measures to enhance competition. The first is firms' consolidation, in which large transnational firms absorb or reduce competition. He suggests that this may potentially harm SIDSs because the new conglomerate may replace the local operators, hence controlling prices, affecting the local business and basing its decisions on the parameters of profits associated with the developed markets. Consequently, producers (importers or exporters) might be forced to pay whatever the port's firm charges because of the absence of other options (US Department of Justice, 2014). In this case such alternatives might be other ports firms, but they might also be other types of customers.

The second trend identified by Pittman (2009) is more related to bulk traders, where the transportation lines have been vertically integrated or include the ownership and operation of container terminals, excluding other service providers from the use of their port terminal. However, due to the cost of the vessels' maintenance, profitability requires constant traffic; thus, smaller producers (importers or exporters) in the grain sector, for example, are limited. As a result, renting vessels for long-term contracts (3 years or more) at fixed prices is a common practice. In the case of reefer intermodal containers, the agreements are by volume (number of containers) per year. The last cases although not necessarily violating competition, in some senses are mechanisms that reduces the number or obstruct the entry of new service providers.

One way to create competition between maritime service providers is to break down relevant concessions and create multiple port terminal facilities with different operators for different terminals within the port (ITC, 2012). In this case competitors as well as business users can always notify authorities of any anti-competitive behaviour, because in the end they will also suffer the negative consequences resulting from it. However, as presented in the cases above, this is not easy for SME businesses to manage, particularly when the access to terminals is managed by transnational firms in which the priority is given to their own cargoes or discriminatory

terms are applied to the former. In addition, the experience of New Zealand suggests that the real competition in maritime sea service providers starts when more than four firms are freely disputing the same market (Burns, 2015).

#### **3.5.4 Are the unions part of the problem or the solution?**

Since maritime transportation has become more technical over the last few decades, port traffic has risen fast enough to offset the fact that each container requires fewer man-hours to unload. Similarly, fewer workers are needed on board, but there is a widely held perception that a crew in a ship is more like that on a cruise ship rather than a small team of hard workers engaging in risky activities moving a heavy cargo vessel through the open sea. Due to the risk and underestimation of the seafarers' job since the mid-nineteenth century, labour unions have been occupied by social dimension concerns, looking after working conditions, health and safety issues and sailors' professionalisation. Unions' fights, particularly in developed countries, have promoted, raised and standardised the level of working conditions and labourers' rights. The elimination of the worst forms of child labour and equal pay for equal work may be considered victories of the unions. Similar trends are developing in LDCs, but for a few, the implementation of more measures for transforming working conditions and the right of workers is necessary.

In the US, the magistrates have ratified that they expect unions to act reasonably for both sides in offering a balanced grievance and refusing to act on the plaintiffs' terms when its actions are not representative of its members.<sup>84</sup> However, in the last decades, this has not always been the case. For instance, seafarers' unions' claims in the US seem to be more focused on salaries and marginal benefits for their members than the fights promoted in the past. Consequently, as presented earlier, US seafarers' salary (and benefits) on average is twice the average of countries with a similar cost of living.

According to Blom-Hill (2013), the support of unions is the bond that maintains the survival of the Jones Act in the US. She documents the number of organisations that were supporters of the Act, such as the Maritime Trades Department of the AFL-CIO,

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<sup>84</sup> Presented in *Seymour v. Olin Corp.*, 666F.2d 202, 208 (Former 5th Cir., 1982).

the International Longshoremen Association (ILA) and the Warehouse Union, the Sailors' Union of the Pacific, the American Maritime Officers, the International Organization of Masters Mates and Pilots, the Seafarers International Union, the Marine Engineers Beneficial Association (MEBA) and the Inland Boatmen's Union. In coalition they make a strong force since the Department of Defence – particularly the Navy – reinforced its discourse on national security statements. Curiously, this is a case in which the maritime companies appear to be in favour of the unions' claims.

As demonstrative of their power, disputes between unions and maritime providers have provoked serious interruptions to the economy of the coastal states in the US. For example, in February 2015 the unions declared a lockout of the dockworkers in all of the 29 ports of the US west coast<sup>85</sup> until their proposals had been accepted by the maritime providers (DePillis, 2015). This dispute between the employers and the long-shore union was described as the worst in recent US history in terms of delays and consequences for carriers and shippers (Vitasek, 2015). It is estimated that the impact on costs during the nine months of this labour conflict was around \$7 billion, leading to spoiled goods and understocked shelves. Although the issue was solved after months of differences, for some it is a matter of time. The fact is that contracts come up for renewal every five years, and the recurrent disagreements with the unions have existed for decades. For instance, Vitasek (2015) summarises the dramatic conflicts of 2008 in which the employers locked out long-shore workers, creating regional chaos for 11 days. Unlike in 1971 the strikes lasted for 134 days, the effects were less dramatic because the dependency of maritime transportation to trade was lower. While the unions have performed well in horizontal organisation across all the US ports, they are failing in organising, training and supporting efficiency skills in their members rather than being a tighter bottleneck to commerce. Therefore, carriers operating under an open registry (not tight to the Jones Act) have the flexibility to hire crews from around the world and can therefore avoid the higher costs associated with US crews (USGAO, 2013).

Apparently, a lack of efficiency and issues of lading are recurrent in maritime shipping as well as in inland transport. Trucking associations are confronting problems in

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<sup>85</sup> From the port of Bellingham in Washington State to the Port of San Diego in California.

dispatching containers to inland destinations. Although new ships are more efficient, with a bigger capacity to transport a much higher number of boxes than regular vessels, the lack of space to unload them is creating disruptions for the supply chain participants. A few ports report a lack of drivers, because many of them have stopped working at the port as they cannot make enough pickups to earn a living. In addition, the processing of shipments or the maintenance of port equipment delays the new receipts. Apparently, 'there's no real consistency on who is hauling what cargo and where it's going to go', states Weston Labar, director of the Harbour Trucking Association (DePillis, 2015). Another issue concerning container carriers is related to the availability of functional chassis in ports. It is relatively common for these services to be under third-party leasing companies and not under the port's management providers. Consequently, the responsibility for storage and maintenance shifts from them to the shippers, causing inconvenience to service providers, particularly those that truck big boxes off the docks. The mentioned examples provoked supply chain disruptions that eventually raised the costs of products, affecting consumers.

### **3.6.0 Conclusion**

This review of maritime management and cabotage shows its complexities and its needs of research. Differences between the US restrictions and various countries were presented. So far, the EU is the only trade bloc of significance that has embraced the virtual elimination of restricted access to cabotage among member states. Changes are taking place in Asia that expected to eventually lead to actions in similar approaches of the EU, but it in the US seems stagnated.

Those markets that have relaxed or liberalised their cabotage policies did so in the interest of promoting trade in marine services, improving transportation efficiency and aiming to achieve flexible forms of trade. In general, the majority of the exceptions in the cabotage policies in the countries contrasted are based on allowing foreign-flag vessels market entry, but the flag of convenience is also now becoming common. These initiatives occur due to the lack of motivation of their domestic maritime companies to address their internal deficiencies, provoking negative impacts on their own domestic markets.

The theory of a free market to promote competition is the basis supporting the majority of the econometric analyses about cabotage, but difficulties in accessing data are recurrently mentioned due to the fact that they are protected under the right to conduct business. It is clear that, since cabotage was legislated in the US, the administrative system associated with it has evolved dramatically through a vast number of policies, agencies, programmes and protocols with huge budgets to influence the market. We suspect that US people are not aware of the effect of the Act on their economies because its cost and inefficiencies are easily diluted in the massive economy and gigantic population. However, the examples of cabotage in islands with small economies show policies liberalised or more relaxed unlike the US cabotage framework.

In the case of PR, although various authors (Clar, 2013; Rivera, 2007; Alameda, 2002; Herrero et al, 2001) suggest that the US Cabotage Act is an anti-competitive NTM for PR's economy, none of them demonstrate their argument by using an international method of classification. Other authors (Cruz et al, 2014; Estudios Técnicos, 2013) suggest that the US Cabotage Act maintains a competitive advantage for PR by enabling it to access one of the biggest markets in the world and at the same time helping national security. However, others (Jewell, 2013; Transportation Institute, 2013) consider the Act as restricting trade at the domestic level but arguing that its (discriminatory) cost effects are direct and fairly distributed among the native citizens – as the price for security – hence it is an internal issue to be decided by them rather than an international matter.

A recurrent theme among PR's researchers is the need for the Government to collect more useful information to determine practices and enforce competition on its market rather than to rely on the private multinational companies that are the beneficiaries of current practices. Nevertheless, little has been said about the inefficiencies in the supply chain structure of commerce and internal factors related to cabotage that may affect PR's agribusiness competitiveness. The theory that supports the research problems under study is described in the next chapter.

## CHAPTER IV

### THEORETICAL FRAMEWORK

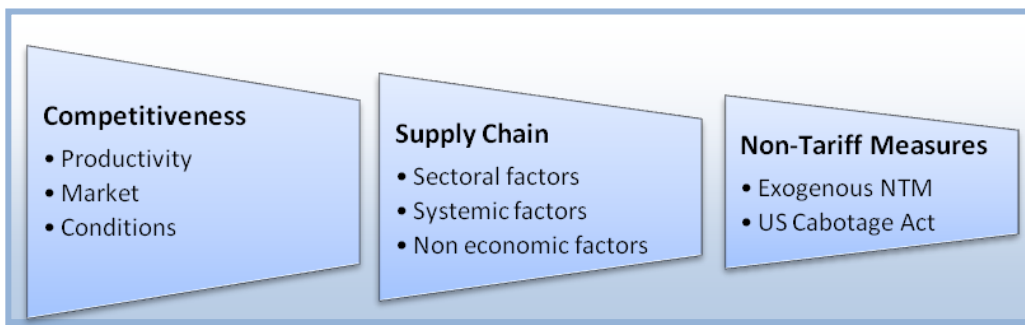
#### 4.0.0 Introduction

In the previous chapter the concept of maritime management was explored considering various scenarios of sea cabotage policies. This chapter reviews the approaches presented in the academic literature, to establish the theoretical bases for this thesis. Aspects of competitiveness in general, competitiveness in agribusiness and supply chains in a small island economies and/or small developing state or territories (SIDSs) are analysed critically in relation to their influences on the efficiency of the food chain. Furthermore, the non-tariff measure (NTM) as a concept is developed, along with its classifications and its effects on the supply chain, trade and costs, especially for the agrifood sector. The complexity involved in measuring NTMs' effects on the supply chain is discussed.

#### 4.1.0 Theoretical outline

To describe how external policy measures affect the development and productivity of the agribusiness sector in Puerto Rico, this thesis considers the views of different interests. The aim is to explore the problem that is perceived to be affecting the country's development and its supply chain, using various theoretical perspectives. The figure below outlines the topics that will define our theoretical framework. Three main topics were identified (Fig. 18) and analysed in the following sections.

Figure 18: Flow chart for the analysis of technical barriers to trade



Although this research is focused on the effect of maritime policy on trade in domestic agrifood markets, the concepts cannot be clearly understood without a framework of firms' competitiveness. Firstly, the concepts of competitiveness and productivity are defined and contrasted to allow application of some principles to analyse the agribusiness sector in general and the reality of SIDSs more specifically. Three frameworks (Porter's diamond, the industrial district approach and the sustainable product chain) are proposed in the literature to evaluate competitiveness and productivity in agribusiness. They are discussed to provide the basis of our theoretical overview.

Secondly, the concept of a supply chain and its relationship with competitiveness in agribusiness are presented to open the discussion on trade policies to non-tariff measures more specifically. Theoretical descriptions, the effects on supply chain competitiveness and some common methods to measure them are revealed.

Reforms in the regulatory structures for trade play complementary roles in enhancing competition to give consumers and businesses non-discriminatory access to a wider selection of inputs. Consequently, market liberalisation is the approach commonly used in the literature to analyse the topic of maritime cabotage policies. However, in this thesis the phenomenon is explored as an 'external non-tariff measure' for imports, focusing on its effect on the agribusiness supply chain's domestic market of an SIDS.

#### **4.2.0 Firm base competitiveness frameworks for agribusiness productivity**

Small states tend to be highly exposed to external economic shocks because of their inherent characteristics, mostly associated with trade openness (Briguglio et al, 2008). Their very high level of dependence on importation, their small domestic markets and the limited availability of natural resources demand high levels of efficiency. While competitiveness does not simply refer to low prices or cheap labour, in the food sector, anti-competitive policies could increase the cost of business by their indirect effects on the supply chain, affecting domestic productivity. Low productivity may eventually affect the national economy and its ability to withstand external shocks



(Briguglio, 2014). For instance, poor performances in the food supply chain may increase the cost of food, induce produce scarcity or dislocate the activities of other sectors in the domestic economy. Besides, SIDSs, particularly those located in remote areas, face additional disadvantages associated with transportation costs and uncertainties relating to the delivery of industrial supplies. The characteristics of small states, associated with exposure to economic shocks and competitiveness constraints, pose serious limitations for their economic development. However, identifying the supply chain inefficiencies in the agrifood sector is an important step in building domestic resilience and developments to guarantee the citizens' access to food.

#### **4.2.1 Competitiveness and productivity**

Trade theorists and policymakers have ignored trade costs until recently (Ferrantino, 2012b). As tariffs on trade have fallen, it is apparent that trade costs are important obstacles that are not simply determined by geographical or commodity characteristics. Policy frameworks, internal and/or external, may affect the competitiveness level of a firm, cluster, city, nation or region. Barriers to imports can limit firms' access to the goods and services needed to compete locally, regionally and/or internationally. Therefore, it is theorised that more liberal trade policies allow firms to benefit fully from international networks to produce in different ways (OECD, 2010a).

In the literature there is no agreed definition of competitiveness. However, during the last two decades, there has been a sudden increase in interest in the concept from a variety of viewpoints, and it seems that there are a wide range of definitions or analyses of this term (Atkinson, 2013; Gorton et al, 2013; Balkytė & Tvaronavičienė, 2010; Pitts & Lagnevik, 1998). Competitiveness can be analysed at the level of the whole economy, an individual sector or industry or the supply chain. Although there is an agreement that the only meaningful concept of competitiveness at the national level is productivity (Porter, 1990), a set of factors determine this at the firm, cluster, industry and country levels (Schwab, 2012). Therefore, competitiveness as a system refers to the analysis of productivity as a phenomenon but at different points: meta, for example human capacity building; macro, for example social security and development policies; meso, for instance natural resources and infrastructure; and

micro, for example transportation costs, firm advantages or innovation and cultural issues (Rojas & Sepúlveda, 1999).

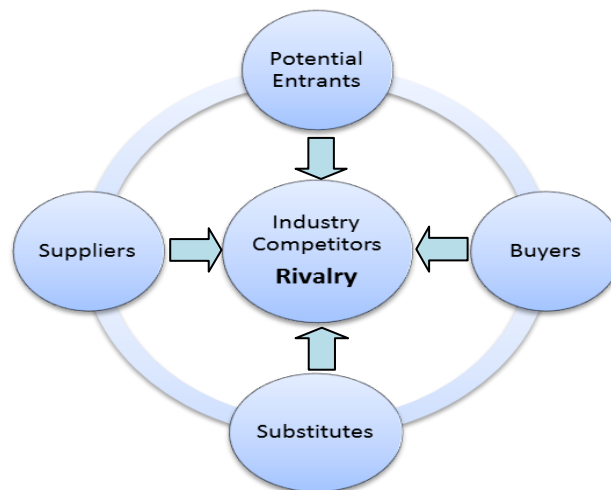
Competitiveness as a topic of analysis has its origins in the classical economic theories, such as Smith's absolute advantages theory (eighteenth century) and Ricardo's comparative advantage (nineteenth century). Several authors stress that competitiveness is measured under the assumption of an ideal world of no government intervention, such as free trade or an open market. This is what distinguishes it from competitive advantage (OECD, 2010b). According to Peña-Vinces (2009) many classical economic theorists define competitiveness considering only international trade capacity or export performance. Competitiveness studies published after the 1960s incorporate new theories of domestic supply and demand, product, product life specialisation or differentiation and scale economies (e.g., Krugman, 1979). However, those theories are not enough to explain competitiveness in the globalisation era.

It is well documented that many countries have prospered without abundant natural resources while many resource-rich countries are not so well developed. Thus, the original theories based on competitiveness as a function of capital, labour and natural resources seem to be limited (Cho & Moon, 2005). Atkinson (2013) posits that competitiveness relates only to the economic health of a region's or nation's trade sectors, defining health as jobs and the amount of value that firms add to the purchased inputs of production. According to him, the true definition of competitiveness is 'the ability of a region to export more in value added terms than it imports' (p.2). On the other hand, Krugman (1994) argues that competitiveness is another term for productivity. He posits that it is a measure not only of jobs and trade but also of economic growth and other dynamic entrepreneurship activities that allow a sustainable environment of well-being for participants – clients, firms, employees and employers, clusters or nations.

Porter (1985 and 1990) develops one of the most valuable theories to explain the competitiveness of firms and nations. Using new paradigms, named the five forces (Fig.19) and the competitiveness diamond, he criticises the limitations of formal

economic models of competitiveness, stating that they may capture only those aspects that can be solved mathematically thereby reducing the multidimensionality of the phenomenon (Magretta, 2012). His framework aims not to declare an industry or nation as attractive or unattractive but to gain insights into firms' performance, value chain and factors for trade. Porter's first model shows the five forces that affect the competitive environment of a small business and the 'diamond' of factors<sup>86</sup> that affect a nation's competitiveness and its industries. Additionally, he posits that a nation's prosperity is dependent not on its endogenous factors but on its capacity to innovate, recreate and update. Porter (1990:p.19) states that 'environment' means more than geographic location with its infrastructure and history, because 'as long as the local company remains the true home base by retaining effective strategic, creative and technical control, the nation still reaps most of the benefits to its economy even if the firm is owned by foreign investors or by a foreign firm'. However, if the limitations are on the business environment, both domestic and foreign firms would face the same 'given constraint' to trade.

Figure 19: The five competitive forces that determine industry profitability<sup>87</sup>



Source: Porter (1985:pp.5–6).

Other important factors related to competitiveness and productivity are the way in which managers and workers are trained, the nature of the company's important customers, the nature of related and supporting industries and the role of national

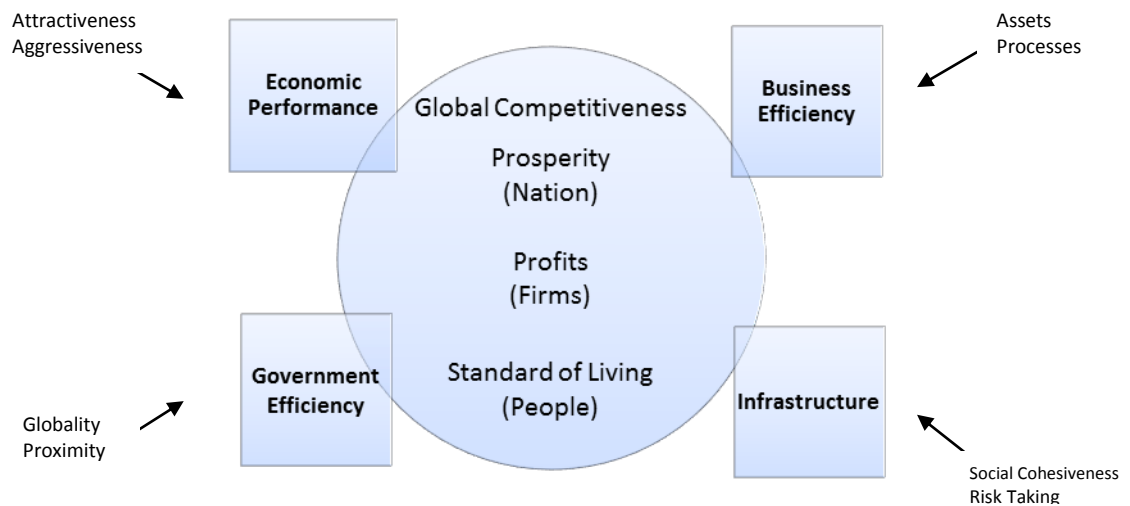
<sup>86</sup> These factors are: conditions; firm strategy, structure and rivalry; demand conditions; related and supportive industries; and government and chance.

<sup>87</sup> This version was modified by its author in 1998 by adding two new concepts – government and foreign direct investment – and combining his original five-forces framework and the diamond in one diagram.

and local government (Pitts & Lagnevik, 1998:p.18). Cho (1994) states that, although Porter's model is valuable, it does not consider at least two other highly influential factors in competitiveness capacity: human-labour-political (HLP) factors and physical factors that affect the domestic demand for trade. Barney (1991) posits that Porter's model assumes that firms have the same resources or access to implement their strategies for competitiveness. Wehrich (1999) concludes that, although Porter's model is a useful framework for analysing the economic environment, it does not require government policymakers to develop responsible alternative strategies that create and maintain a competitive advantage for their nation. For him Porter's model is mainly descriptive and does not necessarily result in the formulation of alternative strategies.

Plenty of studies undertaken since the publication of Porter's theories evaluate firm and national competitiveness using his models, in research related to market resources and capabilities, market demand conditions, local suppliers and complementary industries, and firm characteristics (Berger, 2008; Snowdon & Stonehouse, 2006; Wehrich, 1999). The study of competitiveness is a multifaceted concept that leads to a proliferation of definitions. As a result, in the last decade, various institutions have redefined competitiveness. For instance, the International Institute for Management Development (IMD, 1996:p.42) defines competitiveness as 'the ability of a country to create added value and thus increase national wealth', implying that, although the GDP and productivity are highly related to competitiveness, its definition cannot be reduced to the mere notions of them (Cho & Moon, 2005). In 2014 the IMD incorporated other criteria and dimensions to evaluate competitiveness (Fig.20). Similarly, the World Economic Forum (1996:p.19) defines competitiveness as 'the ability of a national economy to achieve sustained high rates of economic growth, as measured by the annual change in gross domestic product per person'. Nevertheless, it redefines it as a 'set of institutions, policies, and factors that determine the level of productivity of a country' (WEF, 2012: p.4).

Figure 20: The IMD competitiveness cube



Source: Garelli (2014:p.499).

Competitiveness becomes the productivity with which a firm, cluster, nation or region utilises its human, capital and resources (Porter, 2012). Productivity ultimately depends on the microeconomic capability of the economy, rooted in the sophistication of companies (both local and subsidiaries of multinationals), the quality of the national business environment and the externalities arising from the presence of clusters of related and supporting industries (Porter et al, 2008:p.51). Porter's definitions of competitiveness merge systematic and systemic elements that in management should promote sustainable growth (Garelli, 2014:p.497). For instance, systemic elements are those that are more related to the value-added logistical integration system based on technologies for greater productivity and efficiency. On the other hand, systematic elements are those that show clarity of the policy framework for conducting business. Facts and policies together define the strategy and the freedom of action of a nation to establish the right competitive framework, conceived from a long-term perspective and to sustain more value creation for its enterprises (IMD, 2014).

Competitiveness is ultimately about raising the prosperity of people, which can be defined as a mix of income, standard of living and quality of life, thus reducing inequalities (Garelli, 2014). Porter theorises that a rising standard of living at the national level depends on the capacity of a nation's firms to achieve high levels of

productivity and to increase productivity over time (Huggins & Izushi, 2012). Although nations' and/or firms' goals evolve with their level of development and their perception of prosperity, access to food, shelter and education for the population are basic priorities as mechanisms for national self-protection.

The concept of self-sufficiency in food is no longer synonymous with food security. Currently, completely self-sufficient nations are practically non-existent due to the liberalisation of markets. Through better interconnectivity of markets and more distribution channels for trade, access to food has been enhanced (Slone et al, 2010). Market proximity and openness, infrastructure and new technology raise more opportunities for trade to the benefit of less developed countries. However, it should not be forgotten that companies form the basis of the economy and are direct creators of wealth. In the case of access to food, companies' efficiency level and market competitiveness are related to the agricultural sector's dependence on imported inputs, national food security and the security of energy supplies (Hubbard & Hubbard, 2014). Therefore, the elements of competitiveness that are explored in this thesis are focused on domestic policies and their effects on supply chain efficiency and the nation's food production.

#### **4.2.2 Firms, small countries and competitiveness**

Similar operations with identical products, technologies and processes can perform very differently in different countries or different regions in the same territory. This is simply because the political context or business condition is different. Coining an idea from Schumpeter's theories (Fajnzylber, 1988; Schumpeter, 1934), it can be said that the attitudes of entrepreneurs or negative impacts on their capacity to produce could be detrimental to internal markets. Consequently, an improvement in the macroeconomic environment will be merely 'cosmetic', or superficial, if it is not accompanied by factors such as policy, infrastructure, markets and efficiency (Ballarin, 2005:p.8).

Economic activities require resources such as materials, land, water, energy and accessibility (ECORYS, 2011). In remote and SIDSs' markets, the management of these resources is challenging and they may be either, very scarce or absent and hence

imported. Consequently, the capacity to be harmed by external shocks is generally higher than in other countries (Briguglio, 2014). Besides, the paucity of public resources, such as government, infrastructure, technology, finance and markets, may affect efficiency, increasing the costs of trade. Therefore, companies in SIDSs need a high level of efficiency in their domestic production, particularly those related to the food sector.

Domestic food producers sustain the nation's supply chain. They can help to reduce vulnerability to food scarcity. This may be important when the most common interpretation of low self-sufficiency is that the country is dependent on imported foods and that undermines food security (Hubbard & Hubbard, 2013:p.143). Furthermore, the market structures in SIDSs' scenarios may affect their internal competitiveness due to the fact that consumers represent a captive market for companies. If an external policy that limits the firms' capacity to trade is added to this structure, then these elements together will reduce efficiency early in the chain and may provoke distortions for companies, consumers and the food security of the whole nation.

While it is true that a high level of competitiveness in all areas is improbable and weakness in one domain may be compensated by strength elsewhere, analyses of this topic in the SIDS agribusiness sector are relatively uncommon. In the literature a competitive sector is defined as:

One in which companies improve their performance by increasing productivity through managerial and technological activities and offer better quality or lower priced goods and services thereby expanding demand for their products, but also as a sector with the capacity to generate domestic growth. (Manyika et al, 2010:p.10)

Applying this definition to SIDSs' agrifood markets, a sustainable competitive advantage appears to be highly challenging in open-market conditions. Generally, agribusinesses in SIDSs have limited comparative advantage due to their remoteness, lack of natural resources to produce high volumes, extra cost of transport for exports and in some cases the scarcity of the labour force. Additionally, elements that are

more related to firms' consolidation and lack of modernisation in the agribusiness sector do not follow the patterns of modern industrial high-value-added sectors.

The challenges of climate change and the volatility of food prices could present difficulties regarding access to food. Although issues of food security are normally associated with low-income countries, in the last decade some high-income countries have become increasingly concerned about ensuring an adequate supply of food for their citizens (Hubbard & Hubbard, 2013:p.142). Theoretically, better access to markets, openness to trade and balanced supply and demand may sustain the population's needs. However, some authors advocate domestic food production as a safety net to guarantee the right to food of a population (Balkytė & Tvaronavičienė, 2010).

Several researchers argue that smallholder farmers enjoy some advantages over large commercial farmers as a small business may generate better-paid jobs in rural areas (Hinrichs & Charles, 2012). Organisations of small producers may stimulate national entrepreneurship and eventually some access to the international market (Thapa & Gaiha, 2014). In SIDSs the production of smallholder farmers and medium-sized agribusinesses is generally intended to supply the domestic market. For instance, animal feed grain importers using the international market to buy raw material may sustain a whole chain of domestic livestock production. Similarly, traders of fruits and vegetables supply retailers, supermarkets and other domestic companies. Both agribusiness examples should fully exploit all their resources, efficiency and competencies to affect as little as possible the capacity of production of the other chain segments. Otherwise, their effects would have an impact on small and medium-sized producers, eventually increasing their production costs and the costs of consumers. Therefore, avoiding failure in open-market conditions requires efficiencies and innovation in the products' transformation or, on the contrary, choosing to change business.

Competitiveness analysis encompasses policies, strategy, structure and other fields, such as human resources, corporate culture and consumer behaviour (Garelli, 2014). For instance, some policies can require changes to the value added in production due



to their uniqueness in protecting the environment or embracing sustainability, but others can reduce firms' capacity to trade and productivity, affecting the rest of the supply chain. Additionally, competitiveness at the national or enterprise level requires a global perspective and holistic point of view including efficiency, choices of resources to be transformed, infrastructure and the business environment (Evans, 2014; Tuna, 2014; Gorton et al, 2013). For example, importers' efficiency may have an impact on the rest of the food chain, especially in limited markets such as those in SIDSs. If trade policies affect efficiency early in the chain, the domino effects could influence the competitiveness of the SMEs negatively. For that reason, this thesis is focused on the systemic element of productivity, analysing how domestic food security could be affected by an external policy on the *modus operandi* of the agribusiness sector in an SIDS.

#### **4.2.3 Frameworks for evaluating agribusiness competitiveness**

Chapela (1997) states that in agriculture there are three groups of problems: competitiveness issues, a lack of supply chain integration and macroeconomic policy defects. Certainly, a plethora of models to evaluate competitiveness have been published in the literature. In the agricultural sector, a number of studies are available on specific components of competitiveness, for example productivity or efficiency. However, Gorton and colleagues (2013:p.8) argue that competitiveness research in the European food industry largely ignores social and environmental costs and benefits. The literature is relatively limited in the analysis of other factors that affect competitiveness, such as food supply chain segments and trade policies (e.g. non-tariff measures), but in the case of SIDSs it is very small. This research aims to contribute to the debate on the effect of non-tariff measures on the efficiency and competitiveness of the agribusiness supply chain.

Considering competitiveness as one of the root topics generated from our analysis, three main business structures were derived from the data: firms, clusters and collaborative or joint ventures. As a result, this section develops an explanation of some theoretical frameworks relating to the agribusinesses explored.

In the mid-1990s a few important Latin American agricultural institutions proposed their own methodological frameworks for analysing competitiveness. The Instituto Iberoamericano de Cooperación Agrícola (IICA) was the most active, proposing a simple system for private and public agents in their decision making (Jaffé, 1993). This framework is based on three root elements: firm, government and external or independent hard-managed factors (Fig.21). IICA's publications highlight how the space–site–localisation factor has an impact on food supply chain competitiveness. Similarly, the Food and Agriculture Organisation (FAO, 1997) estimated that a firm's or nation's competitiveness is conditioned by factors agglomerated into four dimensions: internal, sector, systemic and microeconomic development level. Although the two institutions differ in their explanation and definition of the complexity of competitiveness in agriculture, their suggestions for promoting it are similar. However, it is clearly recognised that agribusinesses are highly sensitive to the availability of resources and highly influenced by the environment, and their operations may have significant social impacts. Whilst the use of the IICA's framework is well recognised in Latin American competitiveness studies on agriculture, it is highly influenced by other competitiveness theories (Chavarría et al, 2002; Bourgeois & Herrera, 1996; García, 1995). Porter's competitiveness frameworks (Fig. 19 above and Fig. 22 below) have been popular since the early 1990s and are highly quoted by the researchers of productivity in agribusiness (Dlamini et al, 2014; Topolansky-Barbe et al, 2013; Lowe & Davis, 2007; Venturini & Boccaletti, 1998).

Productivity is the prime determinant in the long run of a nation's standard of living. The productivity of human resources determines wages and the productivity of physical assets may determine the return that capital investments earn for investors (Huggins & Izushi, 2012:p.9). As shown in the IICA's figure (21) and in the figure below, three common factors are recognised that affect the structure of competition at the industry level and ultimately influence the competitive position of the firm, cluster or nation. Certainly, the profitability of agrifood products is highly influenced by demand conditions, the regulatory environment and by support industries. However, the elements associated with efficiency in logistics should be considered because once the internal factors are recognized and assessed the firms may take advantage of the external ones.

Figure 21: IICA framework of factors that affect competitiveness

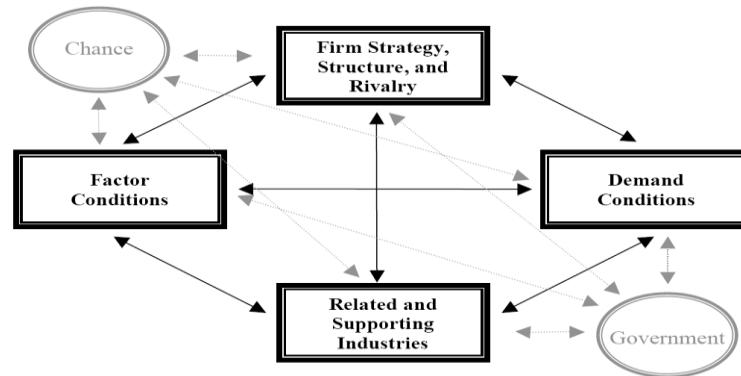
FACTORS		
Firm internal	Government	External/Independent
Strategic	Environment to do business	Prices at global market
Products	Currency rates	Demand and offer conditions
Technology	Taxes and fees	Impacts on trade equality
Trainings	Basic salary	Impacts on trade environment
R&D	Policy to trade	
Production costs	Tariff and NTM	
Strategic alliances	Trade agreements and regulations	
Supply chain	Research and development policy	
	Human capacity building policies	
	Strategic alliances	

Source: Rojas et al (2000:p. 12). Translated by the author.

Porter’s diamond framework (Fig.22) is regularly mentioned in analyses of industry innovation and cooperation as forms of competitive advantage. On the other hand, Mugerá (2012) argues that Porter’s (1998) five-forces perspective is one of the two theoretical frameworks that are more commonly used in management research to analyse sources of competitive advantage. He states that Porter’s perspective highlights a competitive advantage as a position of superior performance that a firm achieves through offering cost/benefit advantages (p.12). Similarly, Lado et al (1992) assert that Porter’s models also attribute competitive advantages to the external environmental factors that a firm must respond to, such as barriers to competitors’ entry, product differentiation and other requirements related to cost. Arguably, Porter’s frameworks for evaluating competitive advantages are paradigms that are more focused on firms’ or clusters’ traditional strategies rather than a link between strategies and/or internal resources to achieve a competitive advantage (Wright et al, 1994). Thus, Porter’s frameworks seem to be flexible and useful approaches to evaluating agribusiness productivity or efficiency for traditional agro-industrial structures. However, Gorton et al (2013:p.8) posit that agrifood competitiveness studies rarely adopt a specific approach to supply chain analysis. In Latin America Ruiz-

Torres et al (2015) report an even greater scarcity of publications on supply chain quality management.

Figure 22: Porter's diamond framework



Source: Porter (1990:p.127).

Basically, a competitiveness analysis covers whatever the market requires: openness to international trade, competence of participants through product differentiation, cost optimisation through technological innovation or logistics and a favourable environment supported by the government through stable macroeconomic policies (Traill & Pitts, 1998). Some agribusiness studies also include the capacity to sell goods in the market under fair competitive conditions because it may translate into people's well-being (Rojas & Sepúlveda, 1999; Fajnzylber, 1988). Additionally, competitiveness analysis of industries that are highly affected by climate change due to their need for seasonal and perishable products should consider their level of vertical coordination to achieve a high level of efficiency. In the literature it is argued that adhering to the environmental regulations through non-tariff policies may enhance companies' competitiveness and encourage technological development (ECORYS, 2011:p.24).

Agribusiness supply chain competitiveness analyses are regularly focused on quantitative indicators but qualitative variables can be useful for evaluating other aspects that may affect firms' performance (García, 1995). Qualitative analyses to evaluate entrepreneurial activity, supportive factors at regional or national levels and access to information have been given more consideration in recent Latin American agribusiness analyses (Pini-Rosales et al, 2012). They are included to a great extent by companies in the evaluation of their internal efficiency in supply chain segments.

Recent studies of firm competitiveness also tend to include the social conditions in which the product is traded. Consequently, competitiveness in agriculture should be studied through the eyes of sustainable development in which the dimensions of economic, socio-cultural, environmental and policy implications converge (Rojas et al, 2000).

Venturini and Boccaletti (1998) posit that the presence of internationally competitive supplying industries or related industries is the third broad determinant of a national advantage in Porter's diamond but it is also highlighted in Porter's five-forces framework. Close working relationships with sophisticated suppliers help firms to apply new technologies and allow quick access to information, innovation and insights as well as cost-effective inputs to obtain greater efficiency. In the case of SIDSs, these are often very limited-size markets and the high cost of investment may represent a heavy barrier to new participants or make it less lucrative for foreign direct investment. As a result, monopolistic or oligopolistic structures could emerge with impacts on some dimensions of firms' or nations' competitiveness. Policy makers could develop instruments to the benefit of a limited group of firms' participants. Indirectly, these actions would affect the business environment by limiting competition and eventually discouraging innovation and modernisation activities. Subsequently, the paucity in technological investment and limits on the types of assistance given to supportive partners will eventually increase the country's level of vulnerability to external shocks.

Pitts and Lagnevik (1998:p.23) state that the resources of a region are commonly based on unique historical conditions or are in socially complex interactions<sup>88</sup>. These interactions may increase the level of complexity in the study of agribusiness supply chains. For that reason and due to its similarities to and differences from Porter's framework, the industrial districts approach (IDA) is included in this discussion of theoretical bases (Table 13). Although not as well known as Porter's frameworks, the IDA is another relatively common theoretical paradigm used for the analysis of agribusiness competitiveness.

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<sup>88</sup> Among others, these interactions could be between a group with economic commitment and/or between the government and industry.

Table 13: Differences between IDA and Porter's (1990) diamond

Aspects	Porter	Industrial District Approach
Point of Departure	Global	Local
Theoretical Base	Economic theory	Multidisciplinary
Nature of Cluster	National in a global context	Regional in an international context
Methodology	Economic context	Socio-economic context
Driving Forces of Competition	Rivalry	Rivalry and cooperation

Source: Pitts and Lagnevik (1997:p.30).

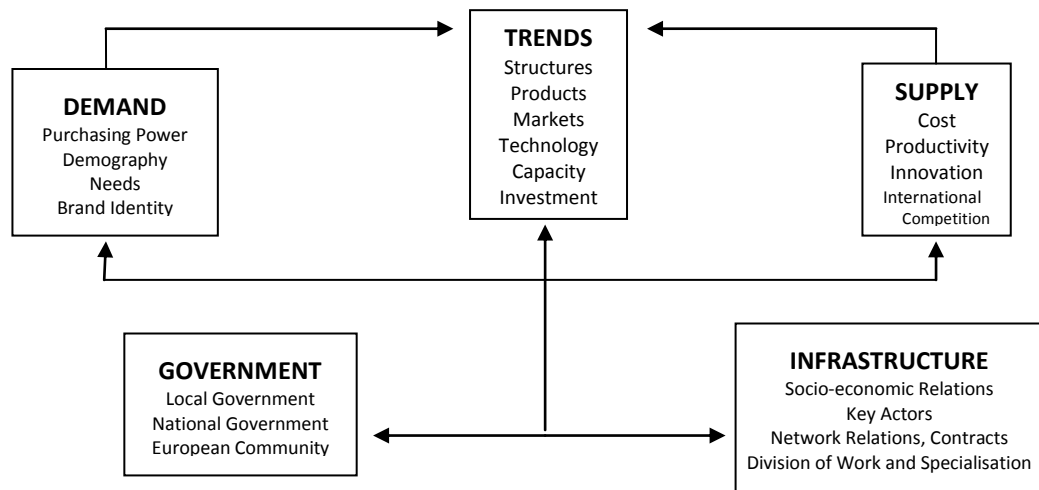
Brasili and Fanfani (2006) assert that the IDA became an important tool to analyse the roles of small and medium-sized enterprises (SMEs) in the remarkable economic performance of Italy during the mid-1980s. This approach is attributed<sup>89</sup> to Becattini, who allegedly rediscovered and adapted it from Marshall's cluster concept, which is useful for describing different patterns of development of SMEs belonging to certain districts with respect to bigger enterprises. The IDA framework illustrates that, despite existing in the same country, environmental differences may change not only the type of product specialisation in the same firms but also their structure, socio-economic context, relationships between national and international markets, productivity and efficiency of production (Brasili & Fanfani, 2006:p.3). Pitts and Lagnevik (1997:p.24) state that one characteristic of firms to be analysed through the IDA is their capacity to evolve jointly and dynamically, with a process of mutual adaptation to changing socioeconomic conditions. Other studies of competitiveness in the Italian agricultural sector consider the IDA as a valuable analytical method to evaluate geographical agglomeration effects in agribusiness (Tocaceli, 2015; Becattini et al, 2009). Indeed, agglomerations of companies that are closely interconnected, specialised and co-located in a specific place have been the subject of empirical observations and research over the years. The IDA is basically designed for specialised production of related firms in that scenario.

The IDA could be a logical thought in the study of agribusiness competitiveness in SIDSs due to the fact that in SIDSs the main port is generally established in the main city or closer. Many importing companies are agglomerated there for two main reasons: the volume of businesses and population – which in the case of PR represents

<sup>89</sup> The Marshallian industrial district (MID) plan originates the IDA core as a theoretical framework for explaining SMEs' capacity, persistence and diffusion in dealing with external economies and changes in business atmosphere (Becattini et al, 2009).

a third of the nation – and the access to a more dynamic maritime infrastructure. Therefore, a ‘prima facie’ study of the agribusiness importers’ sector in a SIDS could consider this approach to analyse its competitiveness by geographical agglomeration. For that reason, it is considered necessary to include the IDA as an alternative paradigm for evaluating competitiveness (Fig.23). However, we must highlight that the distribution of PR’s grain-importing sector seems to be more complex. Although they have cross-business interaction and intercompany relations or cooperation and common interests, 50% of the animal feed producers are located in different municipalities and thus have dissimilar site conditions.

Figure 23: The industrial district approach (IDA)



Source: Pitts and Lagnevik (1998:p.25).

Arguably, the IDA has strong similarities to economic cluster analysis. Porter et al (2004) state the importance of ‘cluster thinking’ in rural economic development. For them a ‘cluster-based approach’ is an essential tool for involving the private sector and an ‘overarching organisational structure’ for economic development. It is generally believed that economic clusters in less developed areas show poorer performances than those in developed regions, but they argue that more research is worthwhile to gain a better understanding of the social and business interrelations. A geographical agglomeration of companies or ‘industrial clusters’, which include their suppliers and service providers and associated institutions in a particular field, could be linked by externalities and complementarities of various types in a web that is complex to analyse (Porter & Ketels, 2009).

According to Toccaceli (2015:p.2), the 'clusters' approach and MIDs (or IDA) are neither synonyms nor concepts conceived in same scientific context or with reference to identical economic and societal environments, although they have common roots'. Contrasting the Porter and IDA frameworks, although both involve building up a good picture of firms, the IDA starts from the region, the companies and the society in the zone considering services and other cross-interactions. On the other hand, Porter's approaches view the situation from economic ties rather than socio-economic regional interaction, which is the origin of the IDA. However, Pitts and Lagnevik (1998:p.25) state that one of the main strategic weaknesses in the use of the IDA as a tool for the analysis of agrifood industries is that local systems cannot easily spread to or be replicated in other areas. Clearly, some successful policy conditions or business traditions cannot be transferred, nor the differences in infrastructure or service providers. Therefore, to explore an issue using a more qualitative, although less explicit, approach, Porter's frameworks seem to be more flexible in adapting to multiple discussions, industries or scenarios.

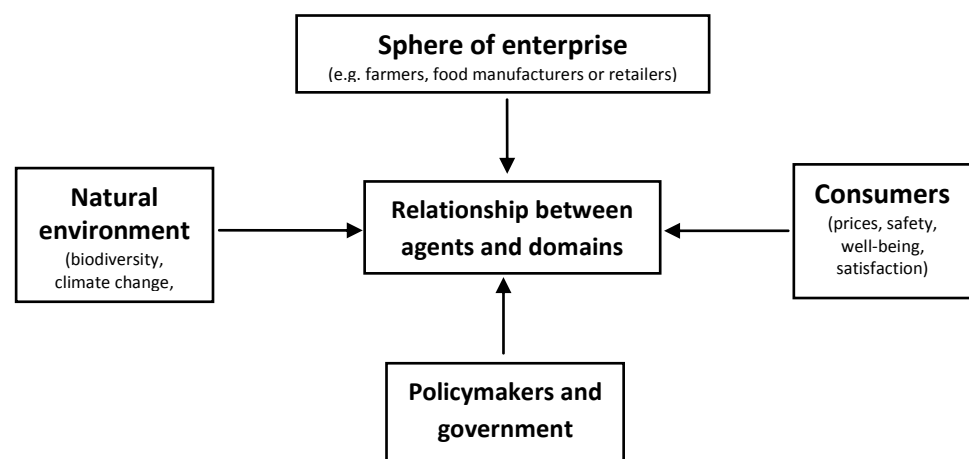
The most common competitiveness factors in the literature discussed previously are market, infrastructure and government. Albeit in different interactions with other indicators – external or internal – it is clear that the weight of these three concepts is important in competitiveness analyses at the firm, cluster, regional or national level. Considering that, Gorton and colleagues (2013) propose a new conceptual framework (Fig.24) to evaluate sustainable competitiveness in the agrifood supply chain. Their approach is centred on four elements – market level, modular, relational, captive and hierarchical – which interlinked, may define their relationship or at least offer an understanding of the governance of the supply chain.

A sustainability trend in products and practices is currently promoted in developed markets because consumers are more conscious of climate change implications. At the firm level, companies are more aware in the analysis of the environmental factors that may affect its supply chain. However, that is not necessarily the case with other factors such as the level of firm's dependency on external providers, percentage of products imported from a narrow group of suppliers with highest risk assessment,



infrastructure and access inefficiencies, that may affect it delivers from its origin to its final market. Perishables are highly affected by climate and might be affected by all of these factors, implying risks for the supply chain and therefore markets' vulnerability. Consequently, the natural environment, market openness and domestic efficiency are factors that should be considered in the analysis of the agrifood supply.

Figure 24: Conceptual framework for analysing sustainable product chain competitiveness



Source: Gorton et al (2013:p.36).

Gorton and colleagues (2013) develop an outline of the relationships of elements and determinants of competitiveness in agriculture (Table 14). For the purpose of this thesis, the focus is on the external determinants of government interventions (policy regulations) and their effects on investments in infrastructure (in our case controlled by firms) that seem to be significant for the efficiency of the agribusiness supply chain.

Tuna (2014) posits that government policies can both act as barriers to entry and support competitiveness. Referring to Skuras and colleagues (2006), Tuna (2014:p.20) emphasises that 'there is little or even a negative relation between government's supports, technical efficiency and competitiveness on the level of the food sector'. Unlike the other approaches discussed, the IDA is the only framework that explicitly considers the European Commission, a foreign policymaker, as an example of an external government that may exert an impact on competitiveness. Consequently, it is reasonable to theorise that large regulatory institutions could affect the

competitiveness of a market by imposing generic policies without taking into account the nation's particularities.

Table 14: Determinants of competitiveness in agriculture

<b>Endogenous determinants</b> (controlled by firms)	<b>External determinants</b> (beyond the firms)
• Size of the business	• Factor endowment (e.g. resources in labour, capital and land)
• Legal status (ownership)	• Consumer demand
• Factor intensity (e.g. capital–labour ratio and land–labour ratio)	• Government intervention (e.g. policies, regulations, taxation)
• Product specialisation vs. diversification	• Research and development
• Production and marketing practices	• Investment in infrastructure
• Structure of factors of production (land, labour and capital)	• Firm location
• Characteristics of (farm) labour	

Source: Gorton et al (2013:p.29).

In the literature the effects of trade policies imposed by large economies affecting the exports from less developed countries (LDCs) are not rare. Some policies could limit the market liberalisation and base their application on environmental and/or consumers' protection standards (Beghin, 2013). Other regulations are associated with protecting traditions, culture and infant companies or niche markets. However, several policy measures concerning maritime transportation in some markets could restrict trade, not only affecting firms' competitiveness but also increasing market vulnerabilities. For instance, trade limits on the use of liberalised transportation services could constrain the offer to a small group of suppliers that, in an oligopolistic structure, could provoke an increase in trading costs and eventually products, reducing the purchasing power of consumers. In this example, trade policies and business structures interact, affecting consumers. Nevertheless, if to that business environment the climate change effect is added onto the supply chain plus importers' lack of efficiency, undoubtedly an increase in costs would affect the 'relationship between agents and domains' more and thus the nation's well-being.

#### 4.2.4 Competitiveness and supply chains

Constraints to supply chain development are generally related to market access, capabilities and institutions (Trienekens, 2011). Indeed, access to markets (local, regional and international) allows continuous trade and growth, but its capacity will be limited by the resource availability, infrastructure and regulatory or normative business framework (Meier & Rauch, 2005). Strong linkages to food producing regions, both domestic and foreign, assure a steady flow of raw agricultural material and processed and fresh food into the markets, but it is accessible when it is complemented by infrastructure (Coyle et al, 2004). Nevertheless, pressures on resources are increasing, and if the current trends continue with respect to the growth of the global population, the more intensive use of the world's resources will put pressure on the security of the supply (Matopulos et al, 2015; Hubbard & Hubbard, 2014).

SIDSs, for instance, tend to be inherently prone to external shocks, over which they have very little or no control (Briguglio et al, 2008). Thus, their food security and market practically rest on their structural openness to trade and domestic firms' efficiencies. Although there are five principal modes of transport – air, road, rail, water and pipeline–, to supply these geographically limited markets external arrivals by air or sea are obviously the two most common alternatives. However, to complement islanders' needs, the most cost-effective mode of transport is by sea. In this scenario its disruption can be costly and damaging, affecting not only firms' competitiveness capacity but also the other elements (*echelons*) of the chain and finally the consumers.

The agrifood supply chain for produce transformation is one of the highest levels of value added, focusing on safe and good quality products. A wider definition, attributed to Porter, asserts that a supply chain is the activity when value is added by improving information and control, coordinating related activities and optimising the total costs across multiple activities (process) to reduce enterprise transaction costs rather than sub-optimising logistics or other functions (Chadist, 2012:p.26). On the other hand, Trienekens (2011) associates value added with a change related to quality, costs, delivery times, delivery flexibility, innovativeness and other aspects of a

product. For both researchers, the size of the value added will be decided by the end-customer's willingness to pay. In the agrifood sector, the value chain or value added may involve different secondary processes related to sub-sections, multi-processes, sub-standard products and waste. Agrifood products often face large uncertainties; thus, contractual agreements and partnerships are critical to their value added and distribution (Ruben et al, 2007).

Matopoulos and colleagues (2015:p.219) argue that the majority of work conducted in the supply chain context either ignores the availability of natural resources as a potential supply chain risk factor or, when it does not, fails to recognise the implications and links of resource efficiency for the supply chains' overall competitive advantage. Supply chain distortions can and should be measured with wide-ranging forms due to their impact across the production process. Chadist (2012) highlights that the supply chain measure are vital to efficiency through their effects on business organisation and its costs, financial metrics performance, its reputation, competitive position and internal capacity. However, direct procurement and improvements in production, transport and supply chain technologies make it possible to identify accurately the operational risks that could potentially have an impact on supply chains' *modus operandi* as well as the suppliers that may favour the value chain's competitiveness (Mangan et al, 2012). In fact, it is well known that multinational and transnational companies consider these factors when moving production to places where costs are competitive (WEF, 2013a, 2009). Nevertheless, this is not necessarily the case for traditional small-medium domestic importing companies, which should also consider those other segments of the entrepreneurial chain that are associated with them.

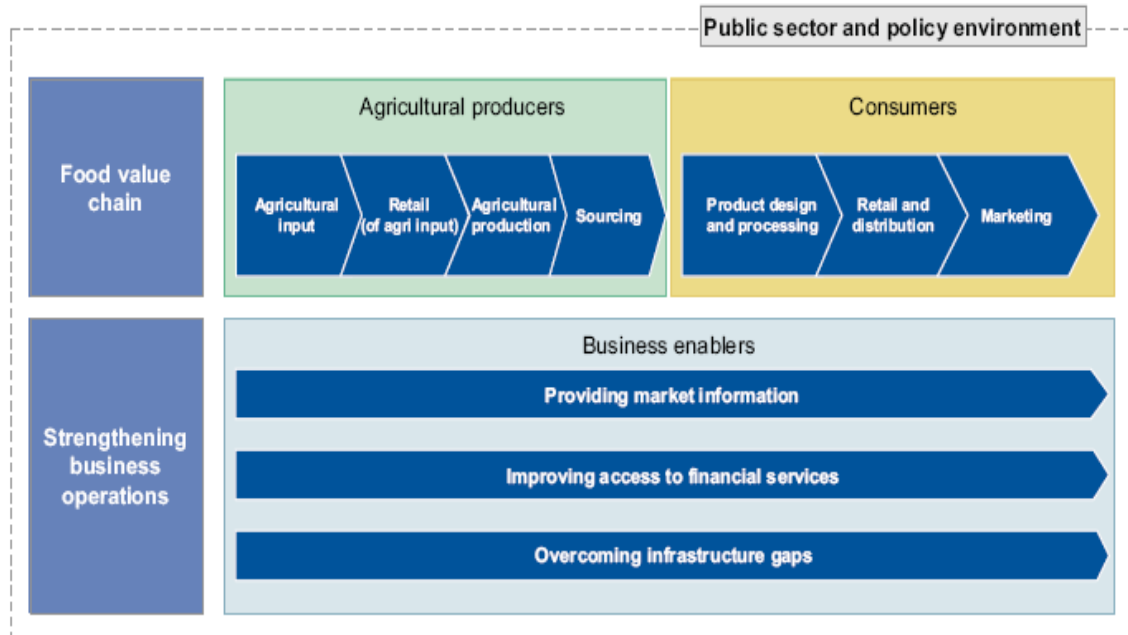
Typically in the literature the concept of a supply chain refers to the set of buy-sell interactions (sourcing, buying, transporting, making, transforming, selling, distributing, etc.) as goods and/or information flow, from raw materials through production to the final retailer and their consumers (Emmett, 2005). Mangan and colleagues' (2012) definition of this term refers to a network of organisations that are involved through upstream (supplier end) and downstream (customer end) linkages in the different processes and activities that create value. Clearly, in supply chain studies, it is

recognised that products rather than isolated elements involve active processes, such as sourcing agricultural produce from farmers or selling products to farmers in accordance with firms' profit-seeking model. Products and/or producers interact with other elements of manufacturing or services, such as raw material availability, infrastructure and equipment, storage, product management or handling, and transportation. The study of disturbance elements that affect products' distribution tends to assess multiple control points that may need multidisciplinary approaches (Velasco-Sánchez, 2013). Indeed, the literature associated with supply chains encompasses a number of key flow processes, such as the physical flow of materials, information and resources, to help with the operability (Denk et al, 2012; Pini-Rosales et al, 2012). Therefore, the purposes of supply chain management are to create value, enhance efficiency and satisfy consumers.

As in the studies of competitiveness discussed previously, supply chain research in agriculture should be multidimensional (Fig.25). Various authors propose integration as a requirement if the level of uncertainty with respect to the timing, volume and mix of orders is high (Van Donk & van der Vaart, 2005). Nevertheless, the question should be 'how can the location of the problem be identified?'

Widely varied methodologies may cover empirical techniques (case/field study, survey, archival research, action research, etc.) or modelling techniques (optimisation, simulation, systems, etc.). For instance, Van Donk and van der Vaart (2005) investigate the level and scope of integration that can be achieved in a supply chain dominated by shared resources. Accordingly, they use a variety of data-gathering techniques, such as process mapping, semi-structured interviews, studying and observing procedures and analysing production-related data as recorded in the company's information systems. The use of empirical methodologies, both qualitative and quantitative, to evaluate supply chain management is more common currently than before but apparently less frequent than expected in agribusiness supply chain studies. However, Teuteberg and Wittstruck (2010), in their review of academic publications about this topic, report that almost 48% of them do not explicitly mention their research method for exploring the phenomenon and an important portion of the others show multidisciplinary approaches.

Figure 25: Food chains' basic opportunities for intervention



Source: World Economic Forum (2009:p.12).

The concept of supply chain management is a relatively new one, and more recently multidimensional approaches associated with productivity have been used for its analysis, in which the old term of logistics is substantial. Although it is believed that the word logistics has its roots in the Greek empire (λογιστικός), there is some consensus that it was adopted by the English language in the nineteenth century. Principally, it is thought that it was incorporated by its military application with regard to the organisation of moving, lodging and supplying troops and/or equipment. Currently, small–medium companies with a logistics division, associate it with trucks and sheds.

The Council of Supply Chain Management Professionals (CSCMP, 2013) defines logistics as that part of the supply chain process that plans, implements and controls the efficient–effective flow and storage of goods, services and related information from the point of origin to the point of consumption to meet customers' requirements. Mangan et al (2012) posit that logistics involves at least eight rights: getting the right product, in the right way, the right quantity and right quality, in the right place, at the right time for the right consumer and at the right cost. Thus, it means more than trucks or sheds, but in the case of perishable goods, logistics requires careful consideration of its efficiencies.

Porter (1985:p.39) identifies five categories of primary activities involved in industrial competition, all of which are dependent on the industry and its strategy. He states that each category of primary activities, to some degree, plays an important role in adding competitiveness to the firm's processes but more to identifying strengths and effectiveness. The categories proposed are *inbound logistics*, associated with receiving, storing and disseminating inputs to the product; *operations*, activities related to transforming inputs into the final form; *outbound logistics*, associated with collecting, storing and physically distributing the finished product; *marketing and sales*, inherent in providing a means by which buyers can purchase the product and inducing them to do so; and *service*, actions that enhance or maintain the value of the product by attending to the customers' needs.

In agribusiness, these elements, in addition to many other biotic and/or abiotic factors, may directly or indirectly make the supply chain more complex and increase the vulnerability level, demanding strategic and precise logistics to minimise the risks and impacts on competitiveness (Beilock, 1988). Qu and colleagues (2010:p.6904) note that the use of 'analytical target cascading' is an effective method for resolving supply chain configuration problems, because it is the number of autonomous stages and links between these stages that define the complexity. Analyses to evaluate the complexity of the chain and its elements are not only vital at the firm level but might also be useful in exploring national food security vulnerabilities further. Decomposing the supply chain may allow the identification of 'bottleneck' segments that destabilise or discourage productivity to develop strategies or innovations that promote efficiencies, reducing domestic vulnerabilities and encouraging businesses (Ferrantino, 2012a). A methodology named 'supply chain design decomposition' developed by Schnetzler and colleagues (2007) consist of an axiomatic matrix design for systematically analysing the process of transformation structured in four clusters: intelligence, design, choice and implementation. Their methodology tries to develop new supply chain strategies or improve existing ones.

Porter (1985) posits that, to diagnose firms' competitive advantage, the study of their value chain is the basic tool, because for him the essence of strategy is inherent in the

firms' activities. He argues that the level of integration defines the division of activities between a firm and its supplies, channels and buyers (p.55). To measure its efficiency and performance, it is necessary to take into account the fact that control is no longer based on ownership only but rather on networking across interfaces. Gousia-Banu and Venkata-Rao (2015) suggest that many management failures have been attributed to the lack of a system to bind various sub-systems within geographically widespread enterprises. Thus, to evaluate the effects of a policy on the supply chain, it is necessary to decompose it to identify the weaknesses in its sections or fractions (echelons).

Some authors believe that the concept of competitiveness in supply chains is substituted by management because it is associated with efficiency (Velasco-Sánchez, 2013; Lozano-Rojo, 2002). As conceptualised today, supply chain management (SCM) implies high levels of optimisation and performance through the participating elements, resulting in competitive advantages. Although in the literature it is clear that SCM is intrinsic to a long process of materials' transformation into a finished product, its main objective should be validated over the whole process with a continuous search for inefficiencies to optimise costs (Radanliev, 2014). SCM aims to improve the competitiveness of the chain as a whole by integrating organisational units (echelons) along the chain and coordinating materials, information, transportation and financial flow efficiently to fulfil the firms' needs (Kilger, 2015). Therefore, SCM is a cross-functional activity from a truly process-based perspective and is not limited to one functional area considered as a strategic factor to enhance competitiveness (Govindan et al, 2015; Mangan et al, 2012).

Competitive strategy related to the supply chain is another challenge for organisations. Van Hoek (1998) argues that companies are no longer units in a competitive battle; supply chains compete with each other. For him the supply chain management perspective is a view of the customer rather than just a control based on networking the integration of processes across functional, geographical and organisational interfaces (p.187). For this reason he believes that real firm logistics optimisation is based on the notion that sub-optimisation at one point in the logistics organisation is permitted as long as it contributes to the overall optimisation. From a



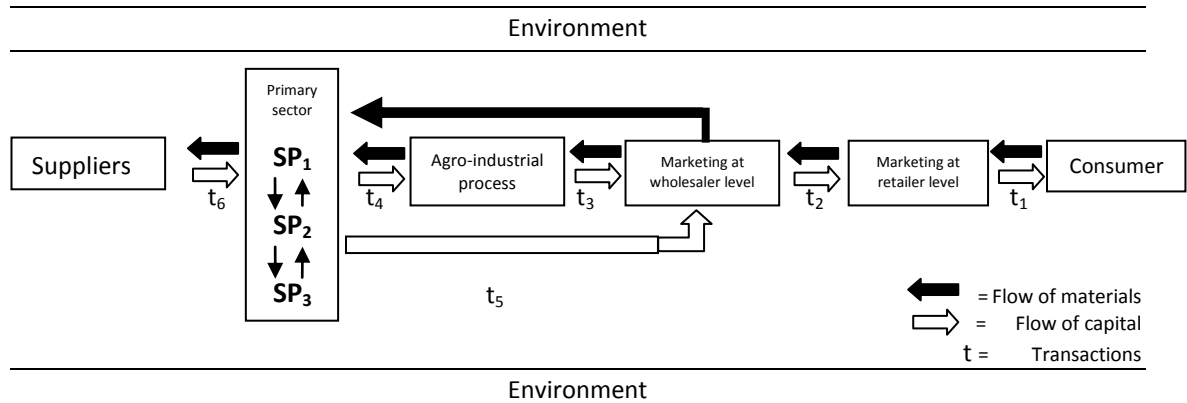
supply chain view, this will be expanded across all of the interfaces at the chain-wide level. Thus, the 'bottleneck' in one section of the chain may represent direct or indirect efficiencies for the other echelons.

Radanliev (2014) summarises the most common problems attributed to the supply chain in four groups of skills: (1) anticipating the demand for a product, market standards and influencers, product variety and life cycle; (2) constant research on internal and external factors; (3) focusing on the supplier or customer and the level of integration; and (4) considering trust and commitment or interdependence and organisational compatibility. Generally, all of them are highly associated with conditions of poor information flows and a fragmented supply chain. Kunaka (2011:p.24) sustains that, although this flow is the first barrier to overcome to achieve competitiveness, improvements in information and technology innovation will allow adjacent steps in the value chain and hence greater integration of the firm's supply chain. Wognum et al (2011) posit that from a supply chain perspective, the complexity and challenges in the agrifood sector are more demanding because it is characterised by increased imports and exports, dependency on transport at the global level and sourcing of seasonal, perishable, highly regulated products. Planning practice in food-processing industries is often not easy to accomplish, because to be efficient they must balance production with flexible performances. Furthermore, uncertainty increases the need for more supply chain integration, while shared resources (e.g. transportation) limit the possibility of reaching a high level of integration (van Donk & van der Vaart, 2005). In summary, the formulation or design of a supply chain strategy must also anticipate operational capabilities through internal competencies. If there is a lack of such capabilities, the strategy must consider inter-organisational integration in combination or cooperation with other operations (Pérez-Franco, 2010).

Rojas and colleagues (2000) analyse the competitiveness of the food supply chain by evaluating a group of firms with primary production to distribution at the industrial level (Fig.26). They posit that, in the agrifood supply chain, three groups of factors should be accounted for because of their influence on businesses' competitiveness. Firstly, there are *sectoral factors*, which are variables highly controlled or influenced by the firm's decisional context and producers such as: those related to management,

the organisational structure, technological and cooperation activities to promote or optimise competences and network strengthening. Secondly, there are *systemic factors*, which are external economic elements that affect the firm or its business environment, such as access to finance and the institutional or technological infrastructure (internal and external) that affects the firm’s innovation or diversification. Thirdly, there are *non-economic factors*, such as social (culture, religion, education and family economic structure) and political factors (trade agreements and legal differences). According to Rojas and colleagues (2000), although these factors do not directly consider other elements that may affect the firm – such as the international context, sustainability and public corruption – they are the bases for an analysis of the firm’s supply chain competitiveness at the domestic level.

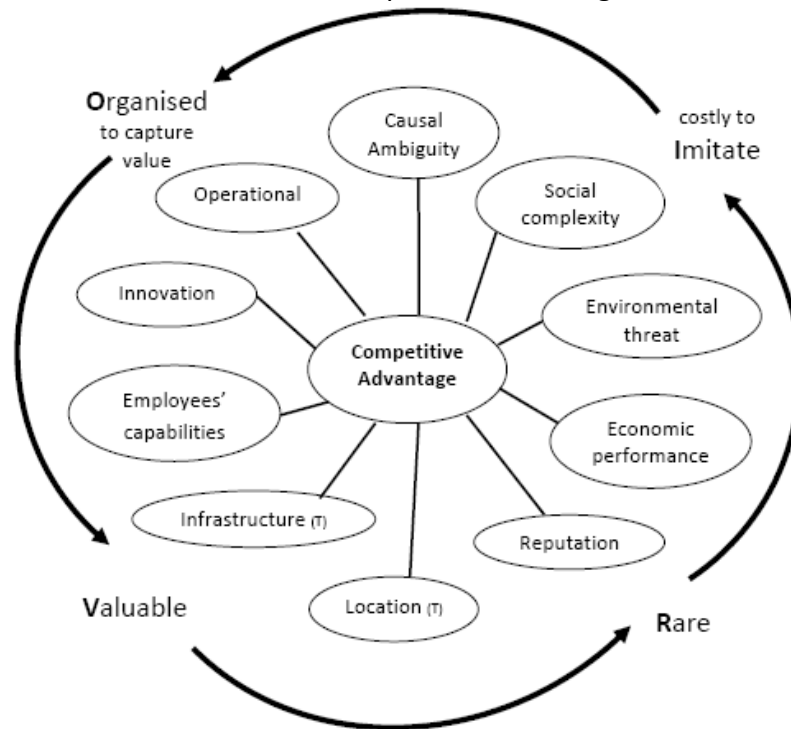
Figure 26: Model of a productive food supply chain



Source: Original by Rojas et al (2000:p.29). Translated and adapted by the author.

About the sectoral elements associated to firms’ resources, Barney (1991) includes all assets, capabilities, organisational processes and other controlled by the firm that may improve efficiency. To highlight its importance Barney develop a (VRIO) framework in which the elements of (V) valuable, (R) rare, (I) costly to imitate and (O) organised to capture value, in tangible and intangible form of resources, are considered due to its potential to affect or sustain competitiveness (Fig. 27). Thus, to enjoy competitive advantage the firm must implement asynchronous strategies, routinely take more advantage of its resources and focused on its heterogeneity-immobility assets in comparison to its competitors (Barney, 1991). However, in an industry in where firms have the same resources and implement similar strategies of efficiency the first movers may enjoy a sustainable competitiveness, otherwise it is hard to achieve.

Figure 27: VRIO: sources of sustained competitive advantage



Adapted from: de Sousa et al, 2010, p. 305.

For these researchers (Barney, 1991; Rojas et al, 2000) those firms with the highest level of organisation to capture value, interrelationship between their echelons, and with identified limitations besides a high level of innovation, will show the greatest possibilities of competitiveness if their planning and priorities to improve their infrastructure are focused on consumers. Additionally, they suggest that firms with higher levels of innovation in the process of product transformation have a basic competitive advantage if they consider inefficiencies related to transportation, routes and other aspects at the port level. Therefore, we must conclude that ‘the strength of a chain lies in its weakest link’: the real challenge is to identify it.

From a brief look at the literature on global value chains, the interaction of the previously mentioned factors is characterised by falling barriers to international trade due to decreasing tariffs and the lowering of subsidies and price support. Simultaneously, some increases in firms’ consolidation and/or concentration in all the links of chains can be observed (Wright & MacCarthy, 2011). Furthermore, new technologies for communication and changes in transportation costs seem to be

positive in facilitating the interactions between chain participants (Mangan et al, 2012). Arguably, the standardisation of processes and the improvements in communication technology, rather than firms' integration, have been more positive for SMEs than for multinational firms (Gereffi & Lee, 2012). However, LDC producers are confronted with asymmetric power relationships in a race that has an impact on the distribution of costs and benefits over the chain participants.

Transportation, for instance, is an element that may affect all three groups of factors mentioned by Rojas et al (2000). Obstfeld and Rogoff (2000) suggest that large hidden costs to trade, particularly in transportation, may explain most of the discrepancies between cost model estimates and trade statistics. Radelet and Sachs (1998) posit that countries with high shipping costs show much less economic growth than those with transport advantages. Indeed, those distortions could be due to inefficiencies in the supply chain or trade policies. However, we are of the opinion that they are due to both.

In an agrifood supply chain, there are some specific characteristics that differentiate it from other chains and directly interfere with its performance (Table 15). Climatic events and market or supply chain distortions may increase the real cost of transporting a product, affecting consumers. For instance, grains are generally the starting point of the food chain and agribusinesses in many economies, but as a high-volume/low-cost perishable agrifood good it is affected by high 'transport cost sensitivity of freight', thus affecting consumers' purchases. Although freight transport is an integral part of SCM and represents an increase in the product's basic cost, it is regularly regarded as a non-value-added activity. Cargo transport plays a vital role in the supply chain and, if properly managed, may induce efficient production and effectiveness, thus affecting the firms' competitive advantages (Burns, 2015).

Currently, the transportation of agricultural products and other comparatively high-volume/low-cost freight, in general, show increases in size (volume), value and distances travelled. More processed food or ready-to-cook products are traded. Furthermore, many food producers, rather than transporting bulky products, now

tend to trade and add value to the product near to the point of production. In addition, an increase in competition regularly forces companies to reduce their costs.

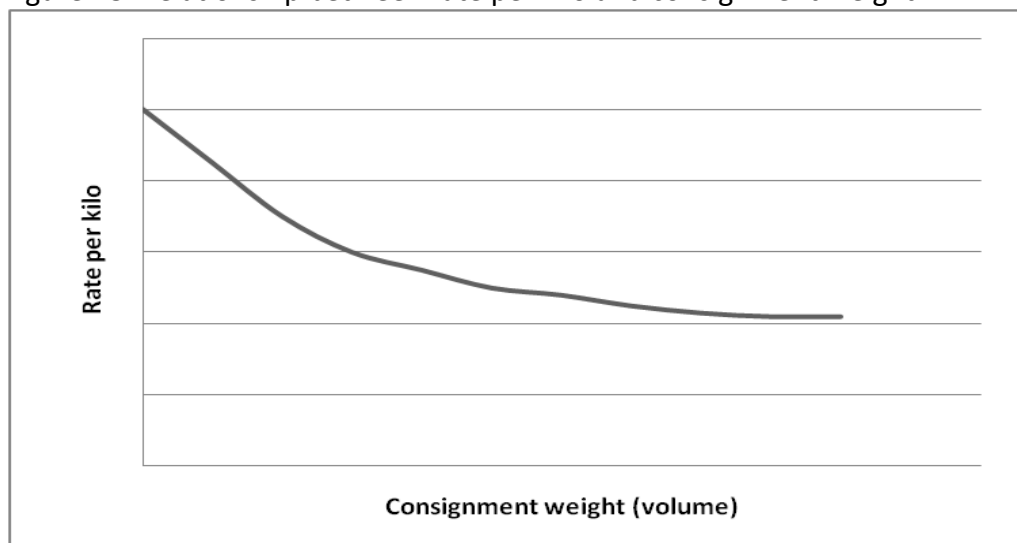
Table 15: Specific characteristics of an agrifood supply chain

Seasonality in the availability of raw materials	Perishability of the final product
Seasonality in consumption and production	Behaviour and preferences of consumers
Perishability and variability of the quality of raw material	Sensory properties of the product
Quality and safety of food	Necessity for transport and storage condition
Dependence on the natural conditions of farm products	Consumer preoccupation concerning the method of production

Source: Pini-Rosales et al (2012:p.3).

Due to the fact that the rate per kilo transported is generally inversely proportional to the consignment weight, high volumes of produce may mitigate sensitivity to transportation costs (Fig.28). According to Mangan and colleagues (2012), higher-value goods are better able to absorb the transportation costs imposed by having to move freight over distances. Consequently, this may affect the cost of trading agricultural products in low-volume markets and may exacerbate vulnerabilities for SIDS. Due to these limitations, companies' participation is reduced and thus the competition between them.

Figure 28: Relationship between rate per kilo and consignment weight



Source: Mangan et al (2012:p.125).

In agribusiness the potential for losses in the logistics system is particularly high for perishables. They are very sensitive to time, climatic conditions and handling. The journey, distances or days travelling from the port of origin to the destination are crucial in determining the basic conditions of weather, storage and other needs (Beilock, 1988). Some agrifood commodities are more susceptible than others, such as green-leaf produce. For instance, for lettuce, even with expedited handling from field to store, it is common for retailers to discount or discard between 6% and 20% of each shipment due to quality degradation over time. On the other hand, apples can be stored in a controlled environment for a month without complexity. In both cases many variables could be involved, but regulations and inspections have considerable importance.

Ruben and colleagues (2007) summarise the critical interfaces between agrifood supply chain dimensions (Table 16). They identify how the interaction between those elements may affect the chain's performance. In the matrix the first element under consideration is the channel choice. According to these authors, this is the process by which a product or service is made available for use, intermediate and/or final consumption. They posit that its analysis requires a broad view of how the actors in the chain bridge the gap between the echelons, because it implies total planning, in a mix of processes searching for the optimal result for the entire chain. Consequently, the number of echelons, their performances, the channels' integration and the type of institutional (firms') governance regime may affect the chain's efficiency levels because they are variables with strong effects on costs.

Supply chain management in agricultural products has received more attention lately due to issues related to public health (Schanbacher, 2014; Ahumada & Villalobos, 2009). Issues that are more associated with traceability, quality and authenticity are part of a new holistic approach to the food chain integrity strategy (Hoorfar et al, 2011). Similarly, health-conscious and better-informed consumers who want to have accurate information about the farming, marketing and distribution practices used to bring the agricultural products to the shelves of the neighbourhood supermarket have emerged (Ahumada & Villalobos, 2009). This complexity is critical in the case of perishable agricultural products.

Table 16: Critical interfaces between supply chain dimensions

	<b>Performance is influenced by:</b>			
<b>Having an effect on:</b>	<b>Channel choice</b>	<b>Governance regime</b>	<b>Quality performance</b>	<b>Value-added distribution</b>
<b>Channel choice</b>		Transaction costs and risk management	Standards, labels and branding	Sorting and delivery contracts
<b>Governance regime</b>	Vertical integration and trust relationships		Quality enforcement; monitoring, control and sanctions	Market differentiation and collective action
<b>Quality performance</b>	Subcontracting or outsourcing: integral quality control	Quality assurance and certification		Economies of scale and scope: location choice
<b>Value-added distribution</b>	Market competition and dedicated suppliers	Bargaining opportunities and power relations	Co-innovation and co-operation	

Source: Ruben et al (2007:p.15).

The supply of agrifood consumer products may demand sophisticated systems among the supply chain. These may increase the cost of products, and in some scenarios infrastructure investments and/or changes in trading protocols are needed. Although the trend for liberalised markets for trade has strengthened, it has been accompanied by a higher level of public scrutiny for the food supply chain practices and produces. As a result, more regulations and policies are being developed. The new standards may affect the design and operations of the already-complex supply chain management. These must be taken into account by firms in their analysis of demand potential and consumer behaviour. Whilst it is true that markets potential in relation to external elements<sup>90</sup> may have implications for transaction costs, the improvements in efficiency, productivity and purchase conditions may help to reduce their effects (Zúñiga-Arias & Ruben, 2007).

<sup>90</sup> Such as resource scarcity, trade barriers and geographic distance.

### **4.3.0 Policy instruments affecting competitiveness in agribusiness**

The concept of competitiveness has evolved incorporating variables measured by quantitative and qualitative analyses. The analysis of policies or regulatory instruments becomes important in providing a proper business environment and flexibility for trade. Gorton et al (2013:p.12) state that competitiveness depends on well-functioning public and private institutions, their infrastructure and a stable macroeconomic environment. Tariff and non-tariff measures are policy instruments that may enhance or limit these elements by their effects on firms' supply chain and their competitiveness in trade. This research is focused on the effects on trade of a non-tariff measure as a policy instrument. As a result, this section of the theoretical framework defines and classifies the concepts but also presents some paradigms identified in the literature and used analysis.

#### **4.3.1 Non-tariff measures for trade**

Anderson and Van Wincoop (2004) indicate that, due to the hidden costs of trade, the costs associated with cross-border trade, even between well-integrated countries, are higher than those that can be explained by distance and traditional policies. Non-tariff measures (NTMs) influence these costs. They could be defined as policy instruments related to trade, concerning labelling or packaging requirements, content or product traceability, micro-policies and macro-policies that by their particularity imply an extra indirect cost for businesses and/or changing the quantities traded or the prices or both or all of the above (Beghin, 2013; Nicita & Gourdon, 2013; Mimouni et al, 2009). Fisher and Serra (2000) define NTMs as barriers whereby the minimum standard exceeds what the planner would adopt if all the products were domestic. Their framework makes it possible to enhance the effect of a standard (rule) in the presence of non-beneficial externalities, taking domestic welfare into account. Generally, NTMs that exert an impact on trade are more associated with exporters than importers (Reis & Farole, 2012). Despite their effects on competitiveness, NTMs seem to be increasingly used to regulate international trade; hence, their study becomes more significant and the need to update data even more important.

Deardorff and Stern (1997) assert that trade policies need to be contextualised because nations may differ in the ways in which they manage public ownership, the



concept of monopolisation and the regulation of economic activity. Understanding those differences should help in analysing how public trade policies can interrupt the interests of producers. In some countries NTMs may act as a 'Damocles sword', damaging their own competitiveness and making it difficult for domestic producers to access critical inputs in a timely manner and at the right cost. NTMs are policies, regulations or procedures that 'generate a wedge between the domestic and world prices of one or several traded goods or services' (Cadot et al, 2012:p.10). Unlike tariffs, quantifying the effects of non-tariff measures is not easy (Rivera-Batiz & Oliva, 2004). The relevant information is often hidden in legal or regulatory documents or protocols that are generally established by public policies but also sometimes beneficial for a small group of private companies. The access to data is limited and, if collected, data are commonly not centralised; thus, multiple technical agencies intervene, looking for specific related elements but without considering the whole phenomenon. These issues make the collection of data on NTMs a very resource-intensive task. Moreover, their effects are indirect, often very case-specific or technical, and their monitoring at the international level seems to be affected by a paucity of transparency (UNCTAD, 2013a; Beghin, 2006; Coughlin & Wood, 1989). Hence, these factors make it difficult to understand their implications, which is troubling for policymakers, trade negotiators and development agencies.

In the literature related to international trade, the argument that restrictions on trade generally have costly national consequences is not rare. Throughout history, examples of protectionist policies imposed by empires on their colonies or against enemy territories have been the origins of some of the current regulations on trade. In the last century, protectionist promoters argued that regulatory frameworks, currently named non-tariff measures (NTMs), were provoked as a control measure after the reduction or elimination of the tariff mechanism in trade (Deardorff & Stern, 1997). Although it is not clear when they were named non-tariff measures or when their study as a research topic on the international market began, Coughlin and Wood (1989) state that restrictions on international trade in the form of NTMs dramatically multiplied in the 1980s. Laird and Yeats (1989) identify that in 1966 only 25% of imports in the major developed countries were affected by NTMs but by 1986 the percentage of impacted products rose to 48%. It is believed that the protectionist

pressure increased in part due to the trade imbalance in the US market, but some supporters also assert that it was a consequence of the increase in international trade. Certainly, trade grew rapidly between the 1990s and the 2000s, driven by a mix of technological and policy changes. Consequently, some academic institutions and international organisations intensified their interest in NTMs on trade.

In 1994 UNCTAD started data collection to develop and classify tariff and non-tariff measures using its customized Coding System of Trade Control Measures (TCMCS). Later, in collaboration with the World Bank, the data became accessible to researchers through new software named TRAINS. UNCTAD's prototype classification consisted of six core categories: 1) price control measures; 2) finance measures; 3) automatic licensing measures; 4) quantity control measures; 5) monopolistic measures; and 6) technical measures. With the Sao Paulo Consensus in 2005, it was agreed that the method of experts' meetings would develop the methodologies, classifications, and quantification of development impacts of NTMs. The Multi-Agency Support Team (MAST) paved the way in Geneva for global consensus building on the interest in studying, defining and classifying NTMs as well as facilitating an understanding of their effects and an awareness of such measures among less developed countries (LDCs).

While tariffs have been reduced since the GATT/ WTO interventions, NTMs continue to limit access to markets. Penello-Rial (2014) believed that in some cases NTMs' effects on a market could be higher than tariff for trade. Imposing unobservable costs on trade through NTMs may be the protectionists' political answer to tariff reduction (Beghin, 2013; Mohan et al, 2012). In fact, it appears that governments have been more creative in the last three decades, with a plethora of justifications defending their right to impose limits on trade. As a result, market access negotiations in merchandise trade at the multilateral (bilateral, regional and so forth) level commonly cover changes to tariffs and non-tariff measures. However, studies show slow advances in that direction. Nicita and Gourdon (2013), analysing a group of products affected by NTMs, contrast their type and percentage for the years 1999 and 2010. They report an increase in three of the four groups of NTMs considered (technical measures, price control and other measures), the most significant being the group of

technical measures to trade (TMTs), which showed a 15% increase (37% in 1999 and 52% in 2010). Cadot and colleagues (2012) indicate that, independently of the region, TMTs are the most-used form of NTMs, especially in Asia and Latin America, where a large number of quantitative restrictions (mostly in the form of licensing) are implemented.

#### **4.3.2 Non-tariff measures in supply chains**

The cost behaviour of activities cannot be understood without simultaneously examining the costs of the imports used to produce them and their linkages during making (Porter, 1985:p.89). Regulatory issues may affect cost behaviour in the logistic and supply chain process. The effect of supply chain barriers may differ between companies and industries and depend on product characteristics, such as time sensitivity or perishability (WEF, 2013a:p.4). Basically, a supply chain consists of at least three players, namely the supplier, the manufacturer and the customer. However, it may be much more complex when the supply chain is extended to include wholesalers, traders or distributors, and service providers (Hasachoo & Kalaya, 2013; Mangan et al, 2012).

Historical examples of production fragmentation may date back to ancient times. Currently, it is a method of production that is practically widely adopted, and policies on NTMs may have implications to trade. NTMs may lead to higher domestic prices than would have been observed in their absence but also may cause losses in competitiveness by acting as barriers to trade (Ferrantino, 2006). According to UNTACD (2013a:p.1), in practice NTMs 'have the potential to substantially distort trade'. Specifically, some NTMs may involve quantitative import restrictions, variable import charges, minimum import prices and discretionary licensing, all maintained or limited through state-trading enterprises or agencies (Laird, 1998). Others may exclude suppliers or goods, besides discouraging some sectors of the domestic market (Galvão de Miranda & Schuh, 2008).

Some NTMs have effects on supply chain procedures, which may increase the chain's cost to business. Nevertheless, it seems that this kind of analysis is relatively limited in the literature. For instance, companies may respond to delays and unreliability by

holding additional inventories, which may imply higher inventory costs, storage space, costs for energy and so forth (WEF, 2013a). Highlighting this, Fugazza (2013) argues that, from the producer point of view, compliance costs may include fixed costs of upgrading the equipment and/or practice codes, obtaining certification, altering marketing strategies and so forth. Additionally, Cadot and associates (2012) state that restricting access to key inputs and intermediate products, as well as the multiple complex procedures for importing, for instance, may cause delays or more costs to firms, hurting small and medium enterprises. Stone and colleagues (2015) suggest that the effects of some NTMs are also influenced by the relationship between the inputs produced by different firms. One of the methods that can be used to analyse their effects on the agrifood system is the analysis of the supply chain (Hasachoo & Kalaya, 2013). Indeed, different types of NTMs associated with different stages in the movement of goods or accumulated in long supply chains may imply more complex trade-distorting effects for goods produced in a fragmented manner than for those in vertical integration (Ferrantino, 2012b).

Some SIDSs have developed strategic initiatives to reduce the potential cost effects of NTMs on trade in their production process. This action has made Singapore one of the most open economies in the world (WEF, 2013b). On the contrary, in publications of LDC case studies, arguments about the negative effects on trade provoked by NTMs imposed by some larger economies are not rare (Mohan et al, 2012; Nardella & Boccaletti, 2004). Besides, in some cases, formulations of NTMs' may discriminate against a country's trading partners. Laird (1998) postulates that NTMs are: costly to administer, costly to consumers, inefficient ways of creating jobs and lacking transparency. Nevertheless, the elimination of an NTM without a comprehensive analysis could be disastrous if it does not take into account its multi-dimensional nature (Cadot et al, 2012).

Beghin and Bureau (2001) posit that those NTMs that restrict trade by chance while correcting market inefficiencies and addressing legitimate concerns to protect consumers should not be qualified as barriers without analysis. From the producer point of view, these types of NTMs may facilitate the technical measures enhancing import demand rather than penalising foreign suppliers through higher costs (Xiong &

Beghin, 2012). On the consumers' side, however, a technical measure may increase the demand for imports if the measure is informative (Fugazza, 2013), but the product's new price may also affect consumers' purchasing power. The work of regulators should be in parallel with competition policy through promoting access and restricting the ability of incumbent firms to exercise market power to the detriment of rivals and ultimately consumers (Banda et al, 2015). Consequently, the implementation, elimination or improvement of NTMs should be based on supporting sustainable firm competitiveness.

### **4.3.3 Non-tariff measures classifications**

Currently, it is argued that differences exist between NTMs and non-tariff barriers, particularly because the latter generally operate as a discriminatory process imposed by governments to favour domestic over foreign suppliers (UNCTAD, 2013a). Beghin (2013) states that some NTMs are useful if not imminently necessary for the market function, particularly across borders in aspects that may affect consumers' health and safety. It seems that some NTMs' frameworks make it possible to enhance the effect of a standard (rule) in the presence of non-beneficial externalities, taking into account the domestic welfare. As a result, the motivation, complexity and effects of these policies are wide and different, as are the approaches to understanding them (Cadot et al, 2012).

Coughlin and Wood (1989) conduct a supply and demand analysis to identify and organise NTMs by type and effects on trade. They classify them indirectly into two basic groups: marginal measures and hard measures. In their opinion, those measures related to marking, labelling, content identification, packaging and product traceability may cause marginal effects on trade. These kinds of NTMs or regulations, although adding costs, are not generally discriminatory and have reasonably low compliance costs and thus relatively minor effects on trade (Nicita & Gourdon, 2013:p.1).

For Coughlin and Wood (1989), NTMs for trade such as quotas, voluntary export restraints (VER), trade restraints under the multi-fibre arrangement (for textiles), non-automatic import authorisations (TMT equivalent) and variable import levies (at

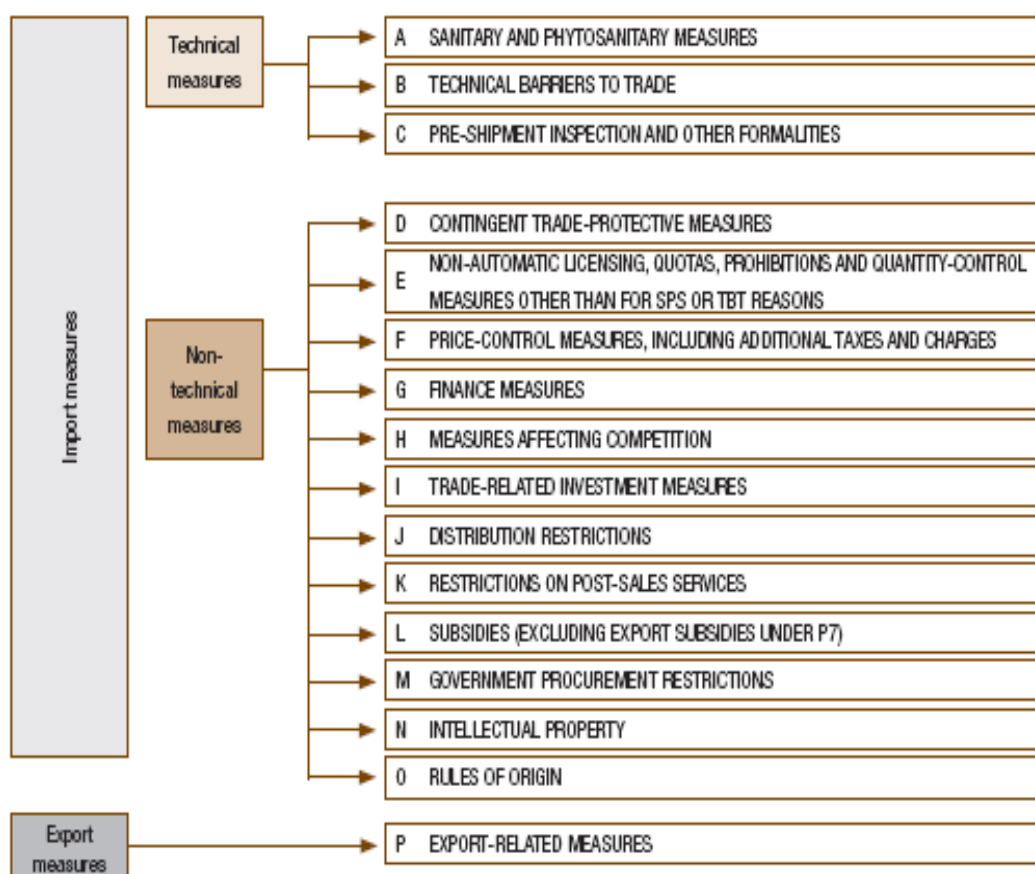
customs) are considered in the group of hard measures. In the literature it is believed that, in comparison with the first group, these last five measures have much more significant effects because they are designed to reduce imports. Thereby, the quotas and VER are the most frequent forms of measures to directly benefit domestic producers. Arguably, their effects are relatively easy to measure and tend to be less complex to quantify (Husted & Melvin, 2013). Cadot and colleagues (2012) categorise those five instruments previously mentioned as quantitative non-tariff restrictions and the others as technical regulations (e.g. product SPS measures). Currently the use of quotas and VER is declining significantly since most of them were made illegal by the World Trade Organization (WTO) rules (Nicita & Gourdon, 2013).

Roberts and associates (1999) classify NTMs by their effects on welfare reduction or welfare enhancement. They use three broad goals for technical measures to restrict trade: 1) to protect the economic interests of producers, 2) to protect the health and economic interests of consumers and 3) to protect the national environment. Through these outlooks, the requirements might also be divided into risk reducing or non-risk reducing. Hasachoo and Kalaya (2013) present a 2007 version of NTM classification developed by Worasakyothin and Tiranutti for the ASEAN Secretariat. According to them, their proposal was arranged in five classes: 1) para-tariff measures (e.g. customs/import surcharge), 2) price control measures (e.g. variable charges), 3) finance measures (e.g. advance import deposits), 4) monopolistic measures (e.g. having a single channel for imports) and 5) technical measures (e.g. product characteristics, quality or safety). However, considering the multitude of NTMs, other authors categorise them by groups and/or systems such as: 1) price and quantity control measures, 2) threat measures (e.g. anti-dumping), 3) sanitary and phytosanitary (SPS) technical measures on trade and 5) other categories (such as quotas, subsidies, restrictions on post-sales services, measures related to intellectual property rights and rules of origin) (Husted & Melvin, 2013; Vancauteran, 2013; UNCTAD, 2010a).

The Multiagency Support Team (MAST, 2009) launched the collection of NTM data in seven pilot countries starting in 2008, and in 2010 a classification following a hierarchical 'tree' design was adopted (Cadot et al, 2012). Interestingly, after some

amendments and clarifications, the last classification version was officially published in 2013 by the United Nations Conference for Trade and Development (Fig.29). The tree/branch figure categorises the non-tariff measures into two main sections: import measures and export measures. These sections are then divided into technical measures to trade (TMT) and non-technical measures (NnTM) conformed by 16 chapters or classes (between letter A and letter P). Nicita and Gourdon (2013) assert that the idea within the categorisation was to group measures with similar purposes. Currently, the collected database contains NTM information from more than 50 countries, which include over 25 LCDs, the European Union and Japan (Cadot et al, 2012). However, in this thesis it is demonstrated that a cabotage measure is not clearly classified in the NTMs list by its multidimensional effects or interactions with others NTMs.

Figure 29: Classification of non-tariff measures



Source: UNCTAD Secretariat, in UNCTAD (2013a:p.4).

The increase in costs resulting from applying an NTM may affect not only the exporting country but also businesses and consumers in the importing country or region. For instance, a relatively new concept of NTMs named 'localisation barriers' (which could be categorised as NnTM-J or distribution restrictions) are a range of measures that favour the domestic industry at the expense of foreign competitors in restrictions imposed on input markets by a mode of local content requirements (Stone et al, 2015). 'Localisation barriers' are an example of the complexity of the policy structure that surrounds the firms in a cluster or region; thus, analyses of such policies should consider their multidimensional effect. Non-tariff measures for trade – technical and/or non-technical standards – may create supply chain difficulties, such as the certification of foreign production facilities. For example, sanitary and phytosanitary (SPS) measures may affect or inhibit trade by requiring every shipment to be inspected, rather than using risk profiling and technology (e.g. X-rays) for inspections, reducing the time and number of interventions (Cadot et al, 2012).

Historically, agricultural produce has been at the core of the debate on NTMs and their reduction is one of the main areas for further market access negotiations in traded goods. More than ever before, research studies on regulatory mechanisms associated with complex logistics activities are considering its effects on productivity, safety and quality (Beghin, 2013). Plenty of research studies analyse the effects of TMTs related to the agribusiness sector. In agrifood goods the effects are more obvious because of their high degree of sensitivity to the climate, transport and SPS conditions. Management of these products tends to have higher cost and complexity due to its perishability, their susceptibility to rejections and other costly precautionary regulatory measures (Reis & Farole, 2012). Indeed, high levels of responsibility to guarantee product quality to consumers may not necessarily be protectionist, but competitiveness is the challenge.

According to Nicita and Gourdon (2013), SPS measures and TMTs in practice often result in diverting trade from LDCs, where production processes and certification bodies may be insufficient, or they represent a higher cost of compliance, thus affecting their competitiveness negatively. However, they notice that simple questions regarding which policy measures are imposed by whom or which types of measures



are faced by products cannot be answered in the vast majority of cases because of the lack of adequate data. The classification (Fig.29) presented above, developed by the UNCTAD, simplifies data collection and is an endeavour to achieve standardisation (Fig.30). However, as previously discussed, in most cases there is not one central national repository agency of NTM data.

Figure 30: Description of the chapters in the NTMs classification

<b>Chapter A</b>	on sanitary and phytosanitary measures refers to measures affecting areas such as restriction for substances and measures for preventing dissemination of disease. It also includes all conformity assessment measures related to food safety, such as certification, testing and inspection and quarantine.'
<b>Chapter B</b>	on technical measures refers to measures such as labelling and other measures protecting the environment, standards, on technical specifications and quality requirements.'
<b>Chapter C</b>	classifies the measures related to pre-shipment inspections and other customs formalities.'
<b>Chapter D</b>	group of contingent measures implemented to counteract particular adverse effects of imports in the market of the importing country, including measures aimed at "unfair" foreign trade practices, contingent upon the fulfilment of certain procedural and substantive requirements.'
<b>Chapter E</b>	on licensing, quotas, and other quantity control measures groups the measures that are intended to limit the quantity traded, such as quotas. It also covers licences and import prohibitions that are not SPS- or TBT-related.'
<b>Chapter F</b>	groups price control measures implemented to control or affect the price of imported goods in order to, inter alia, support the domestic price of certain products when the import prices of these goods are lower; establish the domestic price of certain products because of price fluctuation in domestic markets, or price instability in a foreign market; or to increase or preserve tax revenue or other measures (para-tariff) that increase the cost of imports in a similar manner.'
<b>Chapter G</b>	on finance measures refers to measures restricting the payments of imports, for example when the access and cost of foreign exchange is regulated. It also includes measures imposing restrictions on the terms of payment.'
<b>Chapter H</b>	refers to measures affecting competition. These measures grant exclusive or special preferences or privileges to one or more limited groups of economic operators. They refer mainly to monopolistic measures such as State trading, sole importing agencies or compulsory national insurance or transport.'
<b>Chapter I</b>	on trade-related investment measures groups the measures that restrict investment by requiring local content, or requesting that investment should be related to exports in order to balance imports.'
<b>Chapter J</b>	on distribution restrictions refers to restrictive measures related to the internal distribution of imported products.'
<b>Chapter K</b>	refers to the restriction on post-sales services, for example: restrictions on the provision for accessory services.'
<b>Chapter L</b>	contains measures that relate to the subsidies that affect trade.'
<b>Chapter M</b>	on government procurement restriction measures refers to the restrictions bidders may find when trying to sell their products to a foreign Government.'
<b>Chapter N</b>	groups restrictions related to intellectual property measures and intellectual property rights.'
<b>Chapter O</b>	on rules of origins the measures that restrict the origin of products, or their inputs.'
<b>Chapter P</b>	on export measures groups the measures a country applies to its exports. It includes export taxes, export quotas or export prohibitions, etc.'

Source: UNCTAD (2013a:p.3).

Policies affecting trade are often promulgated by different regulatory institutions, agencies and in some cases governments, making this an exhaustive challenge, plus the risk of omission or inaccuracies in the data scrutiny. This research shows how the

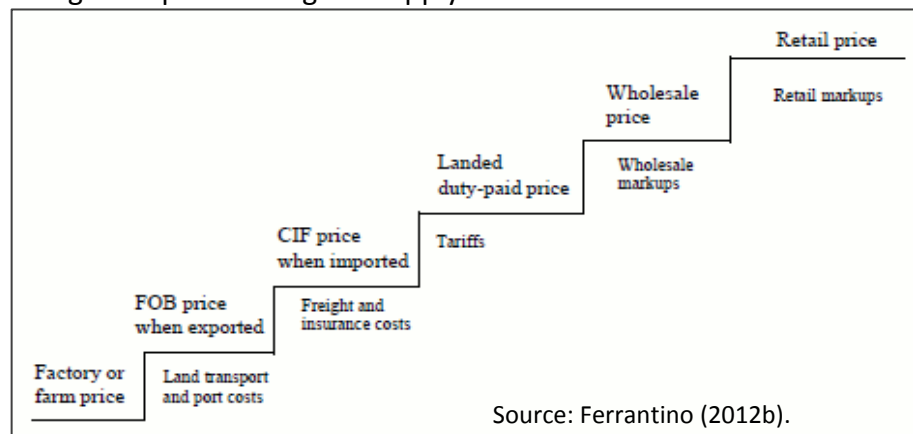
phenomenon under study could act as a multidimensional NTM and thus may relate to different chapters in the UNCTAD figure.

From the producer point of view, Fugazza (2013) states that a major difference between measures falling into TMTs and other NTMs is the existence of compliance costs that do not translate straightforwardly into production costs. According to him, the negative effects will be on exports, consumption and eventually welfare. Cadot and associates (2012) posit that TMTs are the category of NTMs that have the greatest effect. They estimate that approximately 30% of products and trade values are affected by TMTs and another 15% receive an impact from SPSs. The second-largest category of NTMs is quantity or volume controls, which affect around 16% of products and 20% of trade. According to them, the third group is led by non-technical measures to trade (NnTMs), affecting approximately 20% of trade and products. Finally, one of the least-used forms of NTMs is price control measures, which applies to 5% and 2% of trade and products, respectively (Cadot et al, 2012).

#### 4.3.4 Measuring a NTM: Quantitative and qualitative forms

NTMs could generate categories of economic effects that are not *prima facie* trade cost effects, although they may translate into an impact on prices and quantities (Beghin, 2006). Ferrantino (2012b) proposes decomposing the supply chain to study the movement of goods to estimate or identify the effects of NTMs (Fig. 31). He states that ‘ideally, one would follow a typical exported good from its location of production through multiple steps in the process of shipping and delivery’ (p.1).

Figure 31: Traded goods’ prices along the supply chain



With a simple decomposition, it may be possible to identify the inefficiencies in the chain, but oligopolistic structures or a lack of transparency could complicate the analysis. Subsequently, whilst the literature shows multiple possibilities, some quantitative methodologies to estimate NTMs' effects may include inventory measures, the computation of price gaps and/or the estimation of ad valorem equivalents (Nicita & Gourdon, 2013).

### **Quantitative analyses**

Rivera-Batiz and Oliva (2004) note that the two most frequently used quantitative methods to measure NTMs are the 'frequency ratio' and the 'coverage ratio'. These methods consist of calculating the proportion of products covered by one or more NTMs and the proportion of trade value, respectively, but both methods are calculated based on the tariff classifications. However, Rivera-Batiz and Oliva (2004) posit that these two methods by themselves do not capture the intensity of the NTMs' dimensions set by the country.

Fugazza (2013) describes the 'frequency ratio' as an index that accounts for only the presence or absence of an NTM and summarises the percentage of products affected by one or more NTMs. For instance, the 'frequency ratio' - as a percentage - could be calculated by identifying its tariff classification number of goods affected by a particular NTM. Nevertheless, one disadvantage of it is that it does not capture the relative importance of the different tariff categories. The 'coverage ratio' may correct this inconvenience by weighting the tariff classification by volume of import. Using the 'inventory approach', Nicita and Gourdon (2013) state that 'coverage ratio' seems to measure the importance of NTMs to overall imports.

For Cadot and colleagues (2012), a 'coverage ratio' that is relatively higher than a frequency index can be explained by two factors: the import composition and/or the level of NTMs on high-traffic products. First, it refers to the frequent importing of larger volumes of products for which NTMs are more extensively used, for instance agricultural products. Regarding the second factor mentioned, they associate it with consumer protection. It is believed that, to analyse the NT-TMT (C) or pre-shipping inspection, these two basic methods are easy to manage and valuable if the data were

collected accurately. Shipment inspections (pre and/or post) are widely used in Sub-Saharan Africa, the USA, the EU and Japan, while in other regions they seem to be limited to food products, textiles, apparel and footwear. Both empirical methods (frequency and coverage ratio) to evaluate NTM are frequently mentioned in the literature. However, to evaluate the effects of a NTM on the maritime transportation, its application seems limited due to the fact that all goods in the vessel are equally affected by cabotage.

Another method to measure the effects of NTMs reported by Rivera-Batiz and Oliva (2004) is the price comparison or price gap measure (implicit tariff rate). It is the difference between the price of a good produced domestically and the price of an imported perfect substitute good. An alternate method for assessing the impact of NTMs is to estimate quantity gaps. Both methods may provide useful information for welfare cost analyses (Deardorff & Stern, 1997). However, Ferrantino (2012a) states that these procedures are useful when 'the NTM is absolutely prohibitive, so that no prices are observed, or when the product is highly differentiated, hence that unit values are either not observed or lack information' (p.3). Besides, serious conceptual and data problems are likely to arise in estimation because it assumes perfect substitution between imported and domestic goods (Fugazza, 2013).

According to Fugazza (2013:p.9), the main objective in the quantification of NTMs is to produce price effect estimates and translate them into ad valorem equivalent measures (AVEs). Kee et al (2009), using cross-country econometric analyses, develop a method to estimate the ad valorem equivalents (AVEs) of NTMs organised in a restrictiveness index. For Fugazza (2013) the AVE alone, while useful, may show half of the story and not necessarily reflect a restrictive quantity of NTMs' effect. Cadot et al (2012) consider that, to address the effects of NTMs to trade on legitimate goods, a fully fledged cost-benefit analysis would be helpful, more so if the intention of the analysis is to reach a consensus with interested parties for a reduction in restrictions to trade. Thus, the ideal empirical analysis of NTMs' effects should provide estimates of both quantity and price effects to allow for proper qualification and identification of their impact (Fugazza, 2013).

In the study of quotas as NTMs, the use of tariff-equivalent estimations, equilibrium analysis and elasticity analyses is shown in the literature. Besides, some gravity models and other econometric methods to analyse prices and trade flows are also used to estimate NTMs' effects (Xiong & Beghin, 2012). To analyse the rise in price as a result of NTMs' implementation as quotas, Roberts et al (1999) distinguish the economic effects of the regulations using three different classifications according to their effects on welfare reduction or welfare enhancement. Theoretically, their system provides frameworks for exploring the possible effects of the barriers on economies, such as (p.2):

1. The regulatory protection effect, for example the rents to the domestic sector.
2. The supply shift effect on the domestic supply induced by the compliance cost.
3. The demand shift effect arising from new information that increases the consumer demand for the product.

Through these outlooks, requirements might also be divided into risk-reducing or non-risk reducing. Roberts et al (1999) also argue that the price wedge method is the most appropriate for measuring trade volume effects, suggesting that this process should be part of the cost–benefit analysis for companies and policymakers. Fugazza (2013) affirms that quantitative estimations of the NTMs' effects through price wedge analysis or similar methods, could be applied to the study of voluntary export restraints, variable levies on imports, government procurement regulations or other measures with the objective of deliberately limiting the imports of a specific good. However, Deardorff and Stern (1997) clearly affirm that this method is valid only under the assumption that the imported goods are perfect substitutes for domestic goods.

Ferrantino (2006) suggests that 'handicraft' and complementary methods to estimate and compare the prices of goods under the influence of NTMs are successfully applied in the literature. For instance, the use of the price gap method for the analysis of transport costs theoretically may be helpful for cost estimation since the CIF and FOB

prices do not include tariffs. However, the quality and amount of information required makes them impractical to use for broad comparisons across products, industries and countries (Ferrantino, 2012b). On the other hand, using the same method but with Japanese apple imports, Calvin and Krissoff (1998) estimate the cost of tariff and technical barriers (tariff rate) for equivalent apples (i.e. the same variety, grade and size), also accounting for the cost of transportation. Furthermore, for some NTMs the use of 'shadow price' analyses has become relevant, especially in cases in which governments purchase local products to balance the market (Deardorff & Stern, 1997).

In the literature another relatively common method for measuring NTMs' effects is systematic cost-benefit analysis. Do the social benefits of higher product quality and safety or service compensate for the costs of imposing the regulation? Indeed, the OECD's publications since the late 1980s highlight the importance of policies' cost-benefit analyses prior to implementation. Non-tariff policies are no different; thus, some analyses to answer the previous question should be conducted to evaluate the extra cost that taxpayers and consumers will pay and to validate the legitimacy of regulations in specific economic sectors (Arrow et al, 1996). These last arguments are specific to environmental and health regulations and do not consider the effects of regulations on trade mobility. However, how can the costs of an imposed external standard established for almost a century but without other comparable scenarios be estimated?

Although for all those methods the availability of information is crucial, the data for trade flow analysis are regularly more accessible than other data. The drawback of these quantity and price measures is that they reflect the interaction of supply and demand rather than NTMs' properties themselves (Fugazza, 2013). Nevertheless, regulation costs have different effects on SME firms or small countries in comparison with large firms or countries because they are more aware of measure the before and after effects of the NTM's implementation (Galvão de Miranda & Schuh, 2008). Moreover, regulations may modify the structure of competition in some sectors, affecting mark-ups and product viability (Beghin & Bureau, 2001). Box-checking

approaches may miss important issues that only detailed fieldwork base analysis can explore. Standard quantitative approaches may be limited in scope and problematic to validate in the evaluation of the multidimensional effects of NTMs on domestic imports. That may be the case in markets limited by a paucity of information, affected by larger economies and/or controlled by oligopolistic private structures.

### **Qualitative analyses**

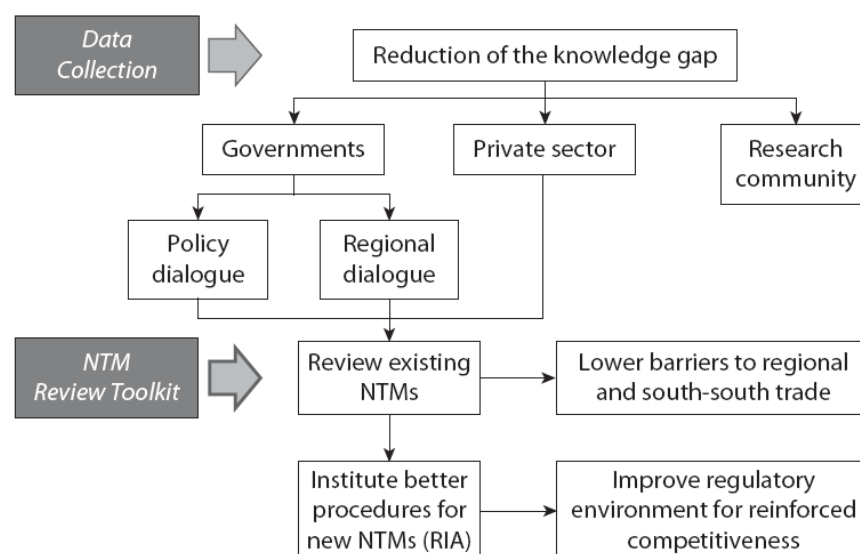
The most common qualitative challenge in NTM analysis is classifying a law or regulation into an appropriate category. Most countries do not have a repository of NTMs or analyses associated with their effects on trade. Recognising that as a fact, the MAST initiative carried out surveys and/or face-to-face interviews to evaluate NTMs' effects in some countries to identify potential 'bottlenecks' and burdensome frameworks for business (Mimouni et al, 2009). For instance, tariff rate and quotas (TRQs) for agricultural products are often administered through an import-licensing procedure (Cadot et al, 2012). However, the paucity of the interagency synchronisation in policy promulgation and regulatory frameworks may complicate, contradict or make redundant some processes in the supply chain, thus affecting the business environment. For example, one of the most frequent concerns of the private sector, particularly of SME, is poor interagency communication and coordination.

Kirkpatrick and Parker (2007) postulate that the core component of the framework of regulatory impact assessment (RIA) is its method-analysis to help policymakers establish the likely and actual consequences of proposed regulation. The first step is to consider the cost of regulation alone, then to undertake a cost-benefit consideration and finally to determine how the regulation can contribute to the public objectives. Kirkpatrick and Parker (2007) state that this framework, which contributes to public regulation analysis, should consider the three basic pillars of sustainable development: economic, social and environment.

Using the regulatory impact assessment (RIA) framework, Cadot et al (2012) redesign a flowchart that is useful for analysing NTMs (Fig.32). Their scheme is designed to help the review of existing measures as a response to specific demands from countries struggling with the legacies of complicated parameters. Their proposal is structured to

analyse the phenomenon by the use of mixed methods. Besides, they argue that a fair analysis of NTMs and their improvements will require a sustainable institutional set-up. In addition, they suggest representativeness, broad participation and good analysis to ensure continuity in the process of improving the trade competitiveness of firms as the business environment evolves and the stock of regulations grows (p.5).

Figure 32: NTM toolkit flowchart



Source: Cadot et al (2012:p.5).

Another qualitative form to identify the effects of NTMs is a schematic analysis of the principles of efficiency. The OECD Trade Committee identifies six 'principles of efficient regulation' to help in assessing the extent to which regulations are both economically efficient and promote a friendly business environment (Kleitz, 2001):

1. Transparency and openness of decision making;
2. Non-discrimination;
3. Avoidance of unnecessary trade restrictiveness;
4. Use of international standards as a basis for regulations;
5. Recognition of equivalent foreign measures; and
6. Use of competition principles.



Using some parameters to explain and analyse every one of the OECD principles for efficient regulation, Cadot et al (2012) add a further three to the list:

7. Use of regulatory impact analysis (RIA) to assess the need for new regulations and to review the impact of existing regulations.

8. Administrative simplification to minimise the administrative burdens on firms in complying with regulations.

9. Ensuring the quality of conformity assessment procedures.

In the literature it is not clear how these principles were developed or used by a schematic qualitative analysis. Deighton-Smith (in OECD, 2011a:p.36) reports that, in the last decade, the majority of OECD members have applied this framework for most of the analysis of their new regulations because RIA is based on benefit/cost analysis. It is said that in practice a dichotomy exists in the responsibility between RIA and competition policy analysis because coordination in the conduct of these two is often insufficient. However, whilst Kleitz (2001) highlights that these exercises may not be valid in all cases or scenarios among countries, these practices are worth consideration in the context of national efforts to evaluate some NTMs.

#### **4.3.5 Anti-competitive and non-technical NTMs**

According to Cadot and colleagues (2012), the process for a given NTM requires that a trading partner must demonstrate a rule violation at the WTO level. The importing country must then show that the measure falls within the policy objectives, that the application of the measure does not discriminate arbitrarily between countries where the relevant conditions are the same and that it takes relevant differences into account. However, in the case of small territories that are highly affected by regulatory frameworks imposed by a large economy, the access to international forums is limited or absent. Similarly, the possibilities to negotiate concessions with large economies on their frameworks or agreements to redesign regulations among trade are issues that are not related exclusively to the sovereignty of countries but are also linked to their market capacity and resources.

The term 'competition policy' refers to the measures that governments take to suppress or deter anti-competitive practices and promote the efficient and

competitive operation of markets. Therefore, anti-competitive NTMs (ACMs) are practices that undermine the business environment and consumers' welfare. They can occur locally, nationally, regionally or internationally by public interventions as well as by private interest. ACMs may involve government actions that empower some private interests to obtain or retain artificial advantages over their rivals (Abbott & Singham, 2013:p.26). It is believed that the majority of anti-competitive practices in LDCs are directed against other businesses rather than against final consumers (WTO, 1999). Certain practices (Table 17) – infrastructure monopolies and undue buyer power in distribution chains and cartels – particularly affect businesses' capacity to trade, limiting their success. However, there is no 'one-size-fits-all' answer to the question of how best to deal with ACMs; thus, they need to be evaluated on a case-by-case basis (International Trade Centre (ITC), 2012). These rules often stretch beyond national frontiers; in that case and for this thesis the term 'external NTMs' is proposed.

Table 17: Some anti-competitive practices that affect LDCs' business environment

Practice	Definition	Potential adverse impact on LCD suppliers
Cartels	Price fixing or market allocation arrangements between suppliers.	Raise prices or reduce the availability of the industrial inputs or infrastructure services needed to market a product.
Abuse of a dominant Position	Dominant firm practices that extract high profits from users and/or exclude potential competitors.	As above. Can also prevent new entrepreneurs from entering a market dominated by an entrenched supplier.
Anti-competitive mergers	Combining of two or more firms to create a monopoly or dominant place.	Can reduce the supply, raise the prices of necessary goods and/or make abuse of a dominant position more likely.
Anti-competitive vertical market restraint	Contractual or similar arrangements between firms at different levels of a production chain that limit competition or entry by new suppliers.	As above. Arrangements can form a barrier to export market penetration by developing economy businesses.

Source: ITC (2012:p.3).

Abbott and Singham (2013) categorise these ACMs, which artificially alter the cost base, as being among the most harmful between competing firms because the effects of their cost change on market shares may be large and thus work immediately on trade flows. Recognising that competition promotes efficiencies, increasing productivity as an essential pace for economic growth along with increased

employment and consumers' well-being, the OECD developed its Competition Assessment Guidance.

Further competition assessment proposed by the OECD (2011a) is based on a 'Competition Checklist'. This checklist provides the framework for qualitative analysis that is useful for policymakers to mitigate or avoid potential competition problems. The general idea of this paradigm is to mitigate or reduce potential harm to competitiveness (at the firm, cluster, regional or national level) whilst continuing to achieve the desired policy objectives. The system is based on four questions or categories of questions. If the answer to any of these is affirmative, then it means that the policy may affect some angles of competitiveness and the policymaker should consider the effects of the proposal. The OECD (2011a) Competition Checklist question categories are:

1. Are there limits on the number or range of suppliers?

In this category the OECD suggests reflection on the risk of market power by reducing rivalry. Indeed, as argued earlier in this chapter in relation to competitiveness schemes, a reduction in suppliers may diminish competition or collusion among participants, thus increasing their opportunity to raise prices.

2. Are there limits on the ability of suppliers to compete?

This reflects on how the regulation can affect the ability of suppliers to compete in different ways, reducing the intensity of the dimensions of rivalry and affecting the consumers' access to goods by cost-price, information or variety. Additionally, it could be about how this policy may limit firms' innovation capacity, cause a lack of intensity in production or impede the entry of new firms to compete.

3. Are there reductions in the incentives for suppliers to compete?

This encourages reflection on the possibility that the proposed regulation may promote or facilitate coordination between suppliers and its effect on reducing

consumers' willingness to buy. In this case the suppliers may feel comfortable competing less vigorously or adopting cartel-like behaviour. Generally, firms' cartels are harmful because they restrict output and raise prices, promoting their mutual interest rather than considering consumers' well-being.

4. Are there limits on the choices and information available to customers?

The OECD (2011a) considers that limits on consumers' choice can be harmful to competitiveness, because suppliers may feel discouraged from satisfying consumers' needs by delivering high-quality produce at a fair price. The same may occur for services to trade, such as transportation. Reducing the mobility of customers by limiting offers, allowing high 'switching costs' or limiting the access to information may enable companies to take advantage of consumers' inexperience. Regarding the information published by suppliers, in some scenarios this may indirectly provoke 'cartel-like behaviour' further if the information is not gathered primarily by the government to support consumers with some frequent general statistical data.

Certainly, this basic competitive assessment may suggest a deeper and more comprehensive analysis of the regulation to classify it properly as an anti-competitive measure. Accordingly, Deighton-Smith (in OECD, 2011a:p.35) proposes the use of the RIA framework discussed previously. Indubitably, the access to data and adequate information to validate each of these questions properly or to apply the RIA is a major challenge. Most existing policies have not been subject to this kind of assessment, principally due to the lack of well-founded information. An additional critical issue is to identify which policies are priorities in the way of competitiveness.

Increasing transparency and improving regulations through the market are important to facilitate the predictability of the business environment globally. Multiple international trade agreements serve as a check against subtle forms of protectionism. Attending to firms' and countries' claims, some international forums associated with trade (the OECD, WTO and UNCTAD) provide guidelines on regulation evaluation, requesting greater transparency. At the level of firms, tracing and sustainability

requirements are pushing them to more consciousness of their products and more value for the data – with the aim of improving their logistics – to make savings. Substantively, trading rules at the global level require non-discriminatory treatment. Although governments are allowed to preserve their level of protection, the paucity of valid data is still a core problem in validating them.

#### **4.3.6 Sea cabotage and its multidimensionality**

The maritime transport services policy framework can be under both domestic and international regulations (OECD, 2011a). Similarly, services can be classified into different types, such as navigation, shipping or freight, access to ports, auxiliary services and interface services (e.g. between land and sea transport) in one or multi-modal ways. Many other facets related to sea transport as an economic activity, such as seafarers' or maritime-related labour policies, shipbuilders' regulations or subsidies, port administration efficiency or management, auxiliary port services and so forth, are important considerations in the analysis of anti-competitive measures in the maritime sector (Liu, 2009). Each of these services is organised in different and complex forms and a plethora of regulations is leading the process related to them (Mangan et al, 2012). Some are classified as technical measures (TMTs) and others as non-technical measures (NnTMs). As mentioned previously, the most common NTMs in the agribusiness literature are related to TMTs, but, indirectly, the NnTMs in maritime transportation may also have an effect on them that could distort the product's cost, its availability and the firms' competitiveness.

Since the mid-1990s policymakers have been more interested in cabotage or regulations directly associated with maritime transportation to phase them out gradually or amend them in other cases to reduce the costs to trade by market openness. Despite retaking the '*Mare liberum*' discourse to raise global trade, a slow or no change has occurred in the topic of cabotage since the Uruguay Round. However, albeit with different scenarios, New Zealand and the member states of the European Union are two well-documented cases of change in these policies. Currently, countries such as Brazil and China are considering reforms, but that is not the case for the USA.

### **Could it affect the food security in a small island developing country?**

There are many references demonstrating that restrictiveness on trade in services and investment incurs high costs and trade liberalisation can lead to welfare gains (Hoekman & Primo-Braga, 1997). In general, particularly for LDCs, the elimination or transformation of anti-competitive measures has potentiated their production level and trade. On the other hand, it is suggested in the literature that less mature markets tend to be more vulnerable to anti-competitive practices (ITC, 2012:p.5). Dutz (2002) posits that some reasons for this may include high 'natural' entry barriers due to an inadequate business infrastructure, inefficient distribution channels, asymmetries of available information and the strength of their credit markets.

Maritime cabotage may have effects on the technical efficiency of shipping services. In the literature the liberalisation theory opposing cabotage is based on the benefits of better maritime services through market competition. It is believed that in open-shipping trade, larger and more efficient ships operating on global routes will replace small and inefficient ships. It is thought that openness to competition will improve the service of the maritime domestic sector (Liu, 2009). However, this specific argument may represent a big challenge for small markets in which trade is limited by infrastructure, low-yield unloading and low cargo volume, thus making them less attractive from the point of view of the shipowners, whose ultimate goal is to maximise their profits. Moreover, the maritime transport companies available to serve these small markets, organised in monopolistic structures or engaging in cartel-like behaviour, may limit national firms' flexibility and hence their competitiveness. Therefore, exploring the effect of anti-competitive measures on maritime transportation – the primary point in the food supply chain – seems to be a basic requirement to enhance SIDSs' competitiveness and vital for territories that are affected by external policies designed for a market different from theirs.

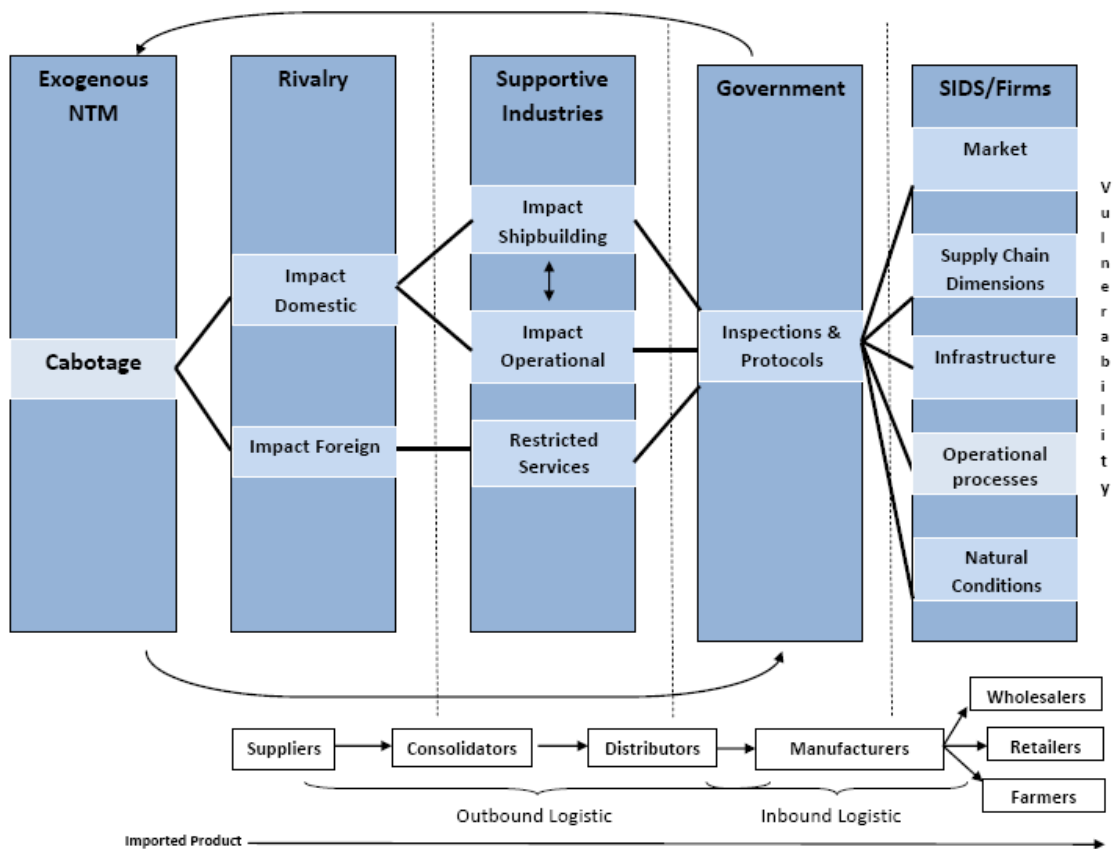
#### **4.4.0 Conceptual model**

Yin (2003) concedes that for some topics *'existing works may provide a rich theoretical framework for designing a specific case study, while in other situations, the*

appropriate theory may be a descriptive one' (p.29). He posits that in some cases 'the existing knowledge base, may be poor and/or the available literature, will provide no conceptual framework' (p.30). However, in order to achieve a basic structure, the analysis of a case study would take the form of an exploratory research.

Due to the lack of previous publications evaluating the relation between competitiveness-agribusinesses - supply chain and NTM in a SIDS, integrating these routes at once is complex. Additionally, the need to understand the current 'operational processes' relevant for the analysis on the effects of cabotage on the agribusinesses supply chain, may increase the challenge. In order to provide a conceptual framework that integrates the research gaps and the findings from the reviewed literature and in context, the following diagram (Fig.33) summarise our research approach (1.6).

Figure 33: Research conceptual model



#### **4.5.0 Conclusion**

The developed countries have much to gain from a more integrated global economy, and they have much to gain from reducing their distortionary policies. Certainly, they can sustain and afford the luxury of their inefficiencies. However, the LDCs cannot if they want to sustain growth. (Stiglitz, 2000:p.453)

From the macro to the micro level, it presented the topic of competitiveness, supply chains, NTMs and their basic characteristics, the classification of anti-competitive measures (ACM) and how to measure their economic effects and finally maritime cabotage as a multidimensional NTM. It may distort markets, affecting the volume and costs of trade but also anti-competitive practices may imply more constraints on consumers' well-being (ITC, 2012). However, a change or elimination of them 'is no strong reason to expect their effect on growth to be quantitatively similar to the consequences of changes in trade volumes that arise from, for instance, reductions in transport costs or increases in world demand' (Rodriguez & Rodrik, 2001:p.264). Other variables should be considered.

The relationship between policy instruments and the supply chain will depend on the host country and its external characteristics, notwithstanding openness may not always be conducive to productivity. Those at the firm level will have an effect on growth and competitiveness and thus on the country's resilience. Growth and welfare are not synonyms; thus, some trade policies may have positive effects on well-being without affecting the rate of economic growth. As a result, in any case of analyses of the relationship between trade policies, growth and their welfare implications, the empirical results regarding this link (positive or negative) must be treated with caution.

The preceding discussion provided an overview of the focus of this thesis. Besides, a theoretical conceptual framework was provided justifying the use of multi-criteria analysis to evaluate a NTM. The next chapter explains the methodology applied to explore the effect of the maritime cabotage phenomenon on the agribusiness trade between the US and PR.



## **CHAPTER V**

### **METHODOLOGY**

#### **5.0.0 Introduction**

This chapter presents the research methodology applied to building and validating the conceptual framework. It includes the justification for the methodology, details of the methodology, ethical considerations for the research and for the data collection process and conclusions.

The data collection relies on multiple sources of evidence to explore the Cabotage as a NTM phenomenon. Predetermined theoretical schemes were considered. The researched topic presents a scenario that includes multiple variables of interest generated from the data; therefore, the exploratory process required multiple sources of evidence to validate the interacting elements. Details are provided to address questions associated with sample reliability and validity. The collection process is described and the units of analysis are included. The data check processes are described, including the recording techniques and data transformation.

Finally, various research approaches designed for specific strategies were considered. A general overview and description of the research paradigm and the approaches are outlined, based on the existing literature and field experiences.

#### **5.1.0 Research questions and objectives**

As presented previously (Chapter 1) two research questions were formulated to explore the effects of the US Cabotage Act as an NTM on PR's agribusiness.

1. What are the effects of US Cabotage for the PR's agribusinesses supply chain?
  
2. What challenges and opportunities does the Cabotage policy present for the competitiveness of PR's agricultural sector?

To fill the gap in the literature, these research questions will be answered using the OECD assessment for competition principles (OECD, 2011a, 2011b), mentioned in the

Chapter 4 (4.3.5). Besides, a reflection of food sustainability (affordability, availability and quality) will be considered in addition to the analysis of the internal and external factors associated to the phenomenon under study.

The research objectives were separated into areas of research and relate to formulating a strategy to analyse the effects of a NTM on the food supply chain in a SIDS.

1. To explore if the US Cabotage could be considered as a barrier, affecting cost of production for the native agribusiness and livestock producers.

2. To clarify and quantify, if possible, the effect of an external non-tariff measure on the food sector in a small island developing nation.

3. To identify areas of opportunity in supply chain competitiveness for the sectors under exploration.

### **5.1.1 Research paradigm and dimensions**

This research takes a pragmatic type in a heterodox economic framework. In terms of philosophical orientation, it applies critical realism and asserts the nature of reality is independent of human existence; thus, the reality can be understood and verified through sensory perception and rational thought (Guba, 1990). The approach applied is similar to realism but with built-in scepticism and self-awareness. There are also ethical and axiological qualities associated with the research paradigms but this section is reserved for the methodological particularities used in this thesis (Table 18). This research relied on multiple sources to reduce the distortions in the research, analysis and interpretations.

Table 18: Research dimensions and descriptors

Study Dimensions	Descriptors
<b>Purpose of the study</b>	Exploratory and theory building
<b>Type of investigation</b>	Pragmatic
<b>Paradigm bases</b>	Critical realism theory
<b>Research design</b>	Mixed method- convergent (Appendix A)
<b>Extent of researcher's</b>	Case study, action research
<b>Study setting</b>	Field study
<b>Unit of analysis</b>	Organisational level/ small and medium traditional agribusinesses
<b>Sampling design</b>	Non-probability, snowball sampling
<b>Data collection methods</b>	Methodological and data triangulation
<b>Time horizon</b>	Primary data: Dec. 2014 to Feb. 2015
	Secondary qualitative data: Feb. to April 2015
	Secondary quantitative data: 2005 to 2014
<b>Analysis</b>	Qualitative primary data: GTM
	Secondary qual. data: content analysis
	Quantitative secondary data

### 5.1.2 Research design and strategies

The topic of cabotage was explored in a context of time (after free-trade agreements), space (SIDSs) and culture (traditional production). This research combines sustainable development aims (UNSDSN, 2014) on the bases of food security, theories of economic vulnerability (Briguglio, 2003) and supply chain competitiveness (Porter, 1985) to analyse the effects of the US Cabotage Act as a non-tariff measure on PR's agribusinesses.

The case study method<sup>91</sup> is the most basic scheme for the needs of this research. In this respect, Voss and colleagues (2002) present three main points that must be evaluated in selecting the case study method to conduct research, and this research is framed in all of them, namely: a) the phenomenon can be studied in its natural environment, b) to respond to questions about 'why, what, how' with an understanding of the nature and complexity of the phenomenon as a whole and c) when little is known about the research topic (Pini-Rosales et al, 2012). Therefore, considering the information available associated to the phenomena, a mixed research was designed based on the premise that an exploration is needed because 'measures or instruments are not available or inconclusive, the variables are not clear or

<sup>91</sup> It was also applied in the Literature Review.

unknown, and there is not a clear guiding framework associated to' the phenomenon under study (Creswell and Plano Clark, 2011: p. 86). One purpose of this research includes illustrating the multidimensions of cabotage particularly in topics not considered by previous publications. Consequently, this design includes a qualitative component prioritized during the analysis steps. However, by the limited time to collect data and the sample's availability, the data (qualitative and quantitative) were collected concurrently in one visit to the field (Appendix A). Collecting the two forms of data will bring a better insight into the problem. Nevertheless, the exploratory component was developed through the grounded theory method. After the qualitative analysis, a sequential quantitative design was developed to estimate costs per sector of production. The rationale for this approach is that the qualitative data would help to elaborate on the particularities of the phenomenon and also on the quantitative results. Therefore in Chapter 6, the quantitative and qualitative analyses are merged and discussed by agribusiness group.

Accordingly, through semi-structured interviews the researcher decomposed the initial steps of the supply chain process and by secondary economic data contrasted the maritime trade logistics (foreign vs. domestic), their costs and effects. At the end, the researcher combined complementary quantitative and qualitative results to develop a more complete understanding of cabotage.

The interacting elements associated with the phenomenon under study (Brandon-Jones et al, 2014) as a potential limitation to the competitiveness of the importing companies were explored. Their effects on the native agribusinesses, particularly the sectors of fresh produce and grain for animal feeding, were taken into account. For instance, it is believed that the limitation of options to transport grain for animal feed has a negative impact on grain costs and on the sequential segments of the supply chain. As a result, the country's level of economic vulnerability could be limited, hence diminishing the possibilities for sustainable development from the perspective of food security. The process of relating topics in the literature and outlining the themes is summarised in the following table of research gaps (Table 19).

Table 19: Issues discussed and outlined by the authors

Authors	Competitiveness	Food supply chain	Cabotage	Containerisation	Raw materials	Maritime cost	Port infrastructure	Port efficiency	Well-being cost
Alameda (2002)			X	X		X			
Alameda and Valentín (2012)	X		X	X		X			X
Alameda and Valentín (2014)	X		X	X		X			X
Anaya-Oviedo (2012)				X			X	X	
Bello-Olowookere (2011)			X	X		X			
Blom-Hill (2013)			X					X	X
Bloomberg Views (2013)			X	X		X		X	X
Brackins (2008)			X			X	X	X	X
Branch and Robarts (2014)				X		X	X	X	
Brooks (2009)				X		X	X	X	
Burns (2015)				X	X	X	X	X	
Castro-González et al (2013)	X			X		X			X
Clover and Harris (1965)	X		X	X		X			
Collazo (2012)			X	X		X		X	X
Comas (2009)		X				X			X
Cruz et al (2014)	X		X						X
Denktas-Sakar and Karatas-Cetin (2012)				X		X	X	X	
Dlamini et al (2014)	X	X			X				X
Doyle (2011)	X	X	X			X			X
Eastman and Marx (1953)	X	X	X		X	X			X
Estudios Técnicos (2013)	X		X	X		X		X	X
FAO (2011)	X	X				X	X		X
Federal Reserve Bank of NY (2012, 2014)	X		X	X		X			X
Frankel (2002)	X		X	X		X	X		X
Galbraith (2014)			X	X		X		X	X
Giannopoulos and Aifandopoulou-Klimis (2004)	X		X	X		X	X		
González and Gregory (2014)	X	X			X				X
Gorton et al (2013)	X	X							X
Hansen (2012b)			X	X		X			X
Herrero et al (2001, 2010)	X		X	X		X			X
Hubbard and Hubbard (2014)	X	X							X
Jackson and McKetta (1986)	X		X		X	X			X
King (2014)	X		X		X	X	X	X	
Korinek and Sourdin (2009a, 2009b, 2011)				X	X	X	X	X	X
Krueger et al (2015)	X		X	X		X			X
Lawrence and Lara (2006)	X		X	X	X	X			
Lewis (2013)	X		X			X			X
López-León (2015)		X	X	X		X			X
Márquez-Ramos et al (2007)				X		X	X	X	
Martínez-Zarzoso et al (2004)	X			X		X	X	X	
Meersman (2009)	X			X		X	X	X	
Micco and Pérez (2002)	X		X	X		X	X	X	
MIDA (2015)	X		X	X		X			X
Novianti et al (2015)	X			X		X	X	X	X
Okoroji and Ukpere (2011)	X		X	X		X	X		X
Pavlo (2012)	X		X			X			X

Quiñones-Domínguez (1990)	X	X	X			X			X
Romero-Barceló (2009)			X	X		X			X
Rosado-Dávila (2002)	X		X	X		X			
Sánchez et al (2003)	X			X		X	X	X	
Santos-Santos (1997)	X		X			X			X
Stiglitz and Medish (2015)	X		X			X			X
Stochniol (2011)		X			X	X			X
Vega-Rosado (2011)	X			X		X			X
Villamil and Pagán (2014)	X	X	X	X		X			X

### 5.1.3 Generating theory

First assumption:

1. The literature states that competition is basic to price reduction and innovation. Firms' strategies and activities, infrastructure and methods are used to become different from rival companies (Porter, 1990).

Second assumption:

2. The notion of vulnerability is widely applied in different contexts of social and risk management (Briguglio, 2004) as well as for the analysis of food insecurity (Løvendal et al, 2004). Food vulnerability considers the limitations in food accessibility and affordability that could be provoked by internal or external economic and political factors (Scaramozzino, 2006).

Third assumption:

1. Case studies and open or semi-structured interviews are valid and useful methods of obtaining data regarding how managers apply new practices to their strategies, while data-gathering and triangulation approach can be applied to capture different viewpoints (Silverman, 2011).

Having collected the data, it was grouped into three dimensions: internal, external and cultural. Through a NTM, all dimensions may affect competitiveness (World Bank, 2011). For instance, the first two dimensions were segmented into hard infrastructure and soft infrastructure. Hard infrastructure indicators refer to the physical infrastructure. They were considered to measure the level of development and the quality of ports, equipment and draught, access roads and information technology and communications. In turn, soft infrastructure indicators include border efficiency

measures (such as time, cost and the number of documents required for import procedures) as well as regulatory and business environment procedures.

### **5.2.0 Qualitative stance through the grounded theory method (GTM)**

GTM is a research approach that was developed in the late 1960s by Glaser and Strauss. It consists of the 'design to develop a well integrated set of concepts that provide a thorough theoretical explanation of social phenomena under study' (Strauss & Corbin, 1990:p.5). The method is suitable to 'produce meanings and concepts used by social actors in real settings' to develop new theories based on empirical data. This method consists of systematic yet flexible guidelines for collecting and analysing qualitative data to construct theories that are 'grounded' in the data themselves (Charmaz, 2006).

GTM consists of several steps: collect data, code, compare and categorise the sample and eventually develop and generate a theory (Walker & Myrick, 2006). It is erected on two core concepts: 'constant comparison' and 'theoretical sampling' (Suddaby, 2006). 'Constant comparison' involves simultaneous collection and data analysis in combination with an induction and deduction processes to test the field findings for confirmation (Sauders et al, 2007). Theoretical sampling, means that the data collected are chosen in accordance with the theory constructed (Denk et al, 2012). Additionally, the approach assumes that data and theories are not discovered but constructed by the researcher and the participants in the exploratory process (Charmaz, 2006).

From the data collected, the key points are marked with a series of codes, which are extracted from the text (Allan, 2003). The coding process entails sorting the data into concepts, aggregated into categories, and establishing a relation of concepts and subcategories. The unification of all the categories around a core category represents the core phenomenon under study (Suddaby, 2006). The codes are then grouped into similar concepts to make them more workable.

Along with other qualitative data analyses, GTM seeks to organise the data gathered to establish a new form of view through an interactive process and a well-defined process of data analysis from basic description to conceptual ordering (Hocke, 2014; Radanliev, 2014; Denk et al, 2012). According to Lozano and Huisingh (2011), it is a very useful method for exploratory research because it explains the way in which people resolve their central concerns, regardless of time and space (Allan, 2003). Therefore, the exploratory character of the research, due to the lack of knowledge and theory in the field, justifies the methodology selected.

The logic of the GTM calls for the emerging analysis to direct data gathering in a self-correcting, analytic, expanding process (Charmaz, 2006). In addition, this method allows the constant collection and analysis of data from the beginning of the study to the end, allowing the researcher to move in an area as unknown and as subjective as human motivation (Hocke, 2014; Suddaby, 2006). Furthermore, GTM interviews are used to tell a collective story, not an individual tale, in a single interview (Charmaz, 2006; Allan, 2003). Therefore, by interviewing 17 firms, it is possible to collect data that could be used for developing a theory that explains the effects of the Cabotage Act on PR's agribusiness. However, the researcher is obligated to be reflexive about what the participants bring to the study, what they see and how they see it (Charmaz, 2006).

### **5.3.0 Secondary sources**

The sources included historical and earlier publications relevant to the research area. Principally, the secondary quantitative data used were collected from government reports and semi-government publications. In this regard, the official data on imports were obtained from the External Trade Statistics of PR developed by the PRPB Governor's Office. The maritime trades included in this database show more than 445,000 transactions of goods by code, their volume and their value for the years between 2008 and 2014. Several reports from the PR Department of Agriculture and the US Department of Agriculture were used to validate the historical categories. Publications of the Port Authority of PR provided some information. Various reports from the US Maritime Administration were consulted to analyse the costs of services



to trade (e.g. fees, inspection costs, requirements, procedures, etc.). Other data were obtained from the reports of the US General Accountability Office, the US International Trade Commission and the US Department of Commerce. These reports were available on the official websites of PR and the US. The secondary qualitative data analysed were the hearings of PR's Congress Senate Special Commission (between January 2014 and May 2015) interviews about the effects of the Cabotage Law on PR's economy (SR 237) and anti-monopolistic affairs (RC 1205 and RC 437).

Basic data on the international market value and cost estimations were collected and analysed from official websites, such as the OECD, IndexMundi and PROCOMER in Costa Rica. Data from the US Grain Council regarding the grain sector, such as origins, amount and variety, and loading and shipping protocols in the US and foreign countries, were used.

As part of our literature review earlier researches in the form of textbooks, journal articles, newspapers, a few theses, professional and magazine reports, which were mostly available via the libraries of the University of Bradford and the University of Puerto Rico, were revised. The historical archives of the Fundación Luis Muñoz Marín were consulted

The projections of Alameda and Valentín (2014) and Estudios Técnicos (2013) were used as basis on which to evaluate and contrast our findings. Nevertheless, it is important to clarify that the two studies are designed to evaluate the impact of the US Act on the whole economy of PR using different approaches and reach dissimilar conclusions. In addition, both studies use strictly econometric analyses, avoiding the particularities (e.g., technical, logistic and management issues by product) normally required in analyses of the agricultural sector.

All of these sources were useful in providing a general understanding of the topic to clarify the gaps as well as the theoretical framework to approach the phenomenon under study. The study of the literature was helpful in developing a theoretical and conceptual framework on non-tariff barrier effects as the basis for the analysis. In this respect, for the analysis of NTMs, two approaches were considered by the researcher:

the trade-oriented approach (Maskus & Wilson, 2001) and the welfare perspective (van Tongeren et al, 2009). Following the welfare approach to NTM analysis, this research incorporates the topics of sustainability, economic vulnerability and national competitiveness.

For the trade-oriented approach, the data on grain imports analysed were for the period after CAFTA-RD, which is after 2006. The method of price comparison was applied to identify and measure the difference in the costs of transport of imported grains, through a theoretical exercise of feedstuff formulation. Due to the lack of suitable data to validate the feedstuff formulation by sector, this research could not offer a complete cost analysis for the livestock sector. However, by understanding the difference in the costs of sea transportation (foreign vs. US flagged), the researcher estimated some costs of the Cabotage Act for PR's livestock sector. A comparative exercise was also presented by containers but considering the distance in nautical miles (n.m.).

### **5.3.1 Secondary data segmentation**

The process started by initially gathering and reviewing the mentioned secondary data sources to confirm the validity of the research questions. The analysis of historical documents resulted in the identification of the facts needed to reconstruct the historical evolution of the practical problem in the selected case study. These included historical reports (from the late 1940s, mid-1950s, early 1960s and some publications from the 1970s and some others from the 1980s onwards). Limited statistical data were available on the subject. Three types of secondary data collection were applied at this stage, including documents and archive records.

1. Secondary data collected from multiple sources to present a multidimensional profile of the US Cabotage Act activities in the context of the lack of sovereignty as a political issue in Puerto Rico.

Fewer than 15 publications analysing the topic were found for the period between 1956 and 2008; 4 publications consider the issue of the US Cabotage Act using classical trade theories for the whole economy of PR through econometric models and

trading generalisations. None of them considers the use of qualitative analysis or observational fieldwork by specialised sectors such as the food and agricultural sector. Neither performance concepts nor supply chain or infrastructure considerations are exposed in the publications available. However, the only publication available that considers a specialised sector was commissioned in 2012 by the PR Industrial Development Company (PRIDCO) of the Government of Puerto Rico. Their analysis focuses on the fuel cargo Cabotage Act liberalisation for PR's domestic trades.

2. Secondary data collected from the hearings and depositions of US Congress and PR's Congress. These gave us access to historical data to learn how the public policy institutions planned to address the issue locally. Similarly, more than 30 institutions participated by expressing their opinion about the US Cabotage Act's effects on PR's economy. Furthermore, 3 academics showed different econometric analyses demonstrating disagreements about the methods and analysis used to estimate the welfare cost for the local citizens. The hearings were also useful in validating the limited discussions of PR's vulnerabilities to food security, the effect of the US Cabotage Act on the island's food supply chain, the local food sector's capabilities to trade globally and its port infrastructure.

3. Secondary data collected on the factors that cause competitiveness of the agribusiness internal market. These were necessary to understand the relationship between the formulation of the US Cabotage Act as a NTM and the agribusiness supply chain. As a result, the effects on the smallholders and medium livestock producers, underlying factors or capabilities and overall competitiveness of the agribusiness importers' strategies of the participants involved were explored.

The secondary data analyses were based on Ritchie and Lewis's (2003) categories: description, comparative research, restudy or follow-up study, reanalysis, research design and methodological advancement, verification, and teaching and learning. The most applicable of these was reanalysis of qualitative data. We believe that it permitted a new interpretation, research questions, research perspectives and reflective tools implemented during the analytical process of the existing data. This research combined all of the secondary data to explore the available information

related to the research questions and the primary data generated by the interviews prior to proceeding with theory generation (Glaser & Strauss, 1967). The secondary data collection stage was supported with primary data collection.

New variables associated with supply chain management and the importers' perceptions were generated by primary data using semi-structured interviews and discourse analysis. The subsequent segments describe the study design, covering the sampling strategy, the data generation methods, the analytical approach and the ethical issues to take on board

### **5.3.2 Time horizon**

The research was performed as an ongoing process starting in December 2013 and finishing in December 2015. Fieldwork and interviews were performed between December 2014 and February 2015.

### **5.4.0 Sampling and interviews**

Maxwell (1997, p: 87) defined purposive sampling as a type of sampling in which, "particular settings, persons, or events are deliberately selected for the important information they can provide that cannot be gotten as well from other choices". In the process of ensuring coverage of the sample data, this investigation focused on the agrifood importers firms. The main concern addressed in the theory building was the diversity of the sample population. The theory-building process was not focused on representing a large population; instead, the main concern was the display of the variability that is present in the larger population. To address this concern, the investigation continued into the richness of the cross-industry sector and the sample population's representativeness to determine whether the sample was sufficient to build a commendable theory.

The qualitative component of this thesis was based on information obtained via interviews to explore the perception of the importing companies' competitiveness in relation to the Cabotage Act. Interviewing owners, presidents, CEOs, managers, company's accountant and technicians our data was generated to understand how the

phenomenon is affecting their firms' competitiveness. All of the interviewees had more than 10 years of experience working in a related field. A description of sample is presented in the Appendix B. However, in many of the cases the companies' confidentiality policies limit our range of actions.

The group of importing companies in PR is relatively small; thus, our stakeholders were selected according to their agribusiness activities (Table 20). The first group contained fresh-produce importers. Although it consisted of seven companies in a market estimated at \$230 million per year, three of them accounted for more than 75% of the produce sales. The second group was associated with the importing of grain, raw material and other goods to be used in the animal feed sector. Due to the specificity of the topic, the participants were limited to six operational companies and another two that currently are not operational. In this group of importing firms, all existing operational companies were interviewed as well as representative from two firms no longer in the market.

The sector of fertilisers, in which the overall sales may reach over \$40 million per annum, was not analysed in this research. However, some of the participants were related to that agribusiness. Only one company is currently producing and manufacturing fertilisers in PR by importing the raw materials. Five other firms are importing manufactured products by containers. The effects of cabotage on this product could be analysed for the local manufacturers and the local retailers. It would certainly have an effect on the cost of production, but lack of data is a limitation.

Initially, the companies were selected according to the public NMR (National Merchants Registration) registry on the PR Treasury Department's official website. We should clarify that the data published by the official institutions and included in the External Trade Statistic report, although accurate in most respects, do not mention the importers' name. The technique of snowball sampling was also implemented (Bryman, 2012). Secondly, to assure that our sample was selected representatively, a few consumers (e.g. livestock farmers) and field technicians of the public ministry of PR's Agriculture Department were consulted. Finally, to reconfirm, national importing

agribusinesses were asked about the number of competitors in the market and segmented by the level of importation.

Table 20: Information of the participating organisations and importing companies

<b>A. Private sector</b>		
<b>Grain Importers</b>		
Federación de Asociaciones Pecuarias de PR	ADM (Master Mix)*	Precision Microblenders, Inc.*
Procesadora de Granos de PR/ Molinos del Sur**	ADM (Nutrimix)*	El Borincano Mill
GABSO, Inc.	Pan American Grain Co, Inc.	Ardent Mills, Inc./ Molinos de PR
<b>Logistics and Service Providers</b>		
Transmaris, LTC	Diversified Marine	
<b>Fresh-Produce Importers</b>		
Hill Brothers	Caribbean Produce Exchange	Puerto Rico Supplies
<b>Fertiliser</b>		
AgroServicios	Pan American Fertiliser	Cordero's Dairy Farm
<b>B. NGOs</b>		
Acción y Reforma Agrícola	Asoc. de Agricultores de PR	
<b>Secondary Data</b>		
PR Maritime Alliance	Cámara de Comercio	Asoc Productos de PR
Asoc. de Industriales	Asoc. para el Mercadeo de la Industria de Alimentos (MIDA)	
<b>C. Public Sector</b>		
Governor Chief of Staff	Secretary of Agriculture	PR Port Authority
<b>Secondary Data</b>		
Senate of PR, Commission	House of Representatives, Commission	

\* New consolidation/\*\* currently non-existent.

To ensure consistency and validity, the questions were formulated in relation to the purpose of this research. The basic group of questions was constructed using Porter's (1990) conceptual framework but including some elements of visibility in the supply chain of Brandon-Jones et al (2014). The types of questions to be asked varied from one category of participants to another according to the sector. For example, logistics managers were asked about the level of complexity in management and other services required. They were also asked about the external services or firms contracted

through the chain between the origin of goods and the goods (grain or fresh-produce) importer and their intercommunication during trade. On the other hand, accountants were asked about the costs of freight and other costs that they consider to have an impact on the product at the end of the supply chain. Nevertheless, it is important to clarify that not all companies have the same level of complexity or management structure; thus, it was expected that the division of responsibilities would differ between companies. Two maritime service providers were included in the study due to their vital intervention in the chain. The researcher included them to consider specific types of services that are directly related to maritime transportation and logistics.

Representatives from the most important non-governmental organisations and public ministries were interviewed. The participants in this category presented their perspective, experiences and/or knowledge about innovative strategies used by other producers, their opinion about the implications of the US Cabotage Act for market competitiveness, public or social initiatives and/or worries about it. Flexibility in using semi-structured interviews gave the participants the freedom to talk about the subject in detail and offering room to probe beneath the surface for explanations and clarification as and when they were deemed necessary.

The participants' responses contributed to ascertaining the extent to which the Cabotage Act, as an NTM on maritime transportation, affects the agribusiness sector. Their interviews generated rich information about the operational challenges to be faced. At the end, this research developed a new perspective based on three dimensions: external, internal and cultural. These dimensions were framed by the vulnerability to trade, the managers' perception of business competitiveness, the level of supply chain complexities and the strategies implemented to deal with maritime transportation costs.

#### **5.4.1 Supply chain culture and capabilities**

To ensure that all the relevant supply chain culture, assets and capabilities data were collected from the sample population, methodological triangulation was applied in the form of: a) document analysis, participant observations, direct observations and

interviews, with a particular focus on extracting tacit knowledge through the analysis of the operational activities; and b) data analysis by: time, space and participants were taken into account during coding. The process of designing and applying the methodology and data triangulation is documented (in Spanish) for the benefit of future researchers on this topic.

#### **5.5.0 Data collection, generation and analysis**

These tasks relied on multiple sources of evidence analysed in a triangulated fashion and on predetermined competitiveness' schemes that enabled the monitoring of the data collection and analysis in a methodological manner. The researched topic presents a scenario including multiple variables of interest; therefore, it required multiple sources of evidence. To ensure an understanding of all the elements in the present scenario, an initial understanding of the phenomenon was considered crucial to the research objectives.

##### **5.5.1 Generation and analysis**

To generate rich quantitative and qualitative data for this research, secondary sources and semi-structured interviews constituted the instruments for the primary data collection. Firstly, a profile of PR's livestock sector was developed through the framework of the basic goals of sustainability (UNSDSN, 2014). Consumption analysis, national production and farmland availability for the livestock sector were assessed as the base for the following analysis. Secondly, Porter's competitiveness framework was used as a conceptual framework to gain a better understanding of the factors related to the internal agribusiness competitiveness through the dimension of an external NTM. In this context Porter's framework was considered to assess the impact of formulation on the competitive advantages of land, location, natural resources, infrastructure and activities. To analyse the creation of competitive advantages arising from formulating an integrated supply chain, Briguglio's vulnerability conceptual framework for SIDSs' economies was taken into account to determine the level of dependence on strategic imports. Thirdly, the current prices of grain in the domestic market were investigated at the end of the chain as well as at the origin using international market data as the reference point. Fourthly, the level of openness to



trade in grains was considered using secondary data from the External Trade Statistics and USDA reports to identify the origins and restrictions, respectively. Similarly, the level of consumption and remoteness of those goods was considered (Korinek & Sourdin, 2009a, 2009b) in the evaluation of comparable costs. In addition, the researcher considered how the importers deal with changes in costs due to volatility in the grain's value. Finally, the role of the Government and non-governmental organisations was considered. The cost of mooring in a port, fees related to handling, insurance and inspections and other national regulations imposed by local or federal agencies were explored.

The conceptual frameworks and diagrams were used to assemble a visual representation of the agribusiness activities, infrastructure and supply chain flow. For the quantitative data analysis, Microsoft Excel software was employed to generate descriptive statistics involving numbers, percentages, tables and figures. Consequently, this research methodology attempted to explain the complexity of the formulated phenomenon by studying it from more than one viewpoint (Silverman, 2011).

It is important to highlight that during the analysis the researcher took into account a few technical aspects specific to PR's market. Firstly, seasonal imports could be irregular and negatively affected by factors that were not considered in this research. Secondly, as agricultural goods they could be affected by other technical considerations also classified as NTMs, restraining the options to import and therefore affecting the costs of trade but not necessarily associated with the Cabotage Act. Thirdly, the decline in the national level of animal farms and the human population will naturally reduce the level of consumption; hence, a reduction could change the type of transport, causing differences in costs. To support the arguments concerning the validity of the conceptual method designed for analysing real-world scenarios, the research methodology implemented intensive analysis of the participants and the impact of the supply chain strategy.

Porter's (1990) framework was used in our exploratory study of supply chain competitiveness in this sector. As mentioned, the semi-structured questions were

constructed following its design but also including the topics of market interconnectivity (Latruffe, 2010). The relationship between importers and suppliers at the global level was investigated to evaluate their supply chain visibility level (Brandon-Jones et al, 2014) during the importation process. Some systematic points in De Martino and Morvillo (2008) were used to identify key factors of port competitiveness that exert an impact on the supply chain network.

During the fieldwork we ensured the use of the same language and protocol with everyone. The data collection was entirely executed in PR and the interviews conducted in Spanish. Although we had an interview schedule and previously planned list of topics, the participants were invited to add other items to the interview agenda. This would offer more engagement of the participants. The goal was to make it simple for the interviewer to learn more about interviewees' perceptions, logistics and strategies for dealing with the cabotage challenges in their supply chain as part of their business. Our aim was to develop a flexible instrument to give the participants the freedom to talk in detail about the subject and allow for clarification. The interviews lasted between 45 and 90 minutes. They generated information about the operational challenges of competitiveness and vulnerabilities in their firms as well as the national food security plans.

After every interview the researcher transcribed and became familiar with the data collected and reflected through writing memos during the entire project as part of the process. This was followed by a process of coding, which involved organising the data into patterns and then creating thematic networks based on the conceptual framework previously discussed. Categorical coding was applied to sort the findings into formulated concepts and areas of decisions (internal or external to the firm). Once the thematic networks had been created, the data were integrated and interpreted. The last stage of our analysis involved a coherent integration of qualitative data and quantitative data as a whole. This method enabled the study to collect and evaluate the operational activities simultaneously and then apply individual operational activities to the formulation criteria.

The flexibility given to individual participants in the process of collecting and evaluating field data resulted in a greater contribution than expected in a relatively shorter period of time than anticipated. These steps represented the starting point in the methodology design, at which the formulation criteria were determined by identifying areas of the agribusiness strategy that provide insights into the NTMs' effects on the supply chain activities. The second step was to link the formulation criteria hierarchically<sup>92</sup> by referring to the criteria of infrastructure limits on their supply chain. Finally, the third step was to relate these aspects to competitiveness.

### 5.5.2 Sample segmentation

Careful consideration was applied to cover people from multiple levels of the importing companies. Only some of the interview participants were predetermined in the initial selection and the rest were chosen based on the development of the research (Table 21). The multiple levels consisted of:

Level A interviewees who influence the agribusiness, international trade and food supply chain strategy (presidents, owners, CEOs or senior directors);

Level B interviewees who are supervised by level A (directors, managers or controllers) and contribute to the strategy formulation indirectly;

Level C interviewees who are members of the public ministry or NGOs related to the agribusiness sector.

Table 21: Participant segmentation

Level A	Level B	Level C
1. Company Owner (3)	1. VP Controller (1)	1. Public Ministry (3)
2. Principal Shareholder (1)	2. Senior Purchasing Manager (1)	2. NGO Representative (2)
3. Executive President (1)	3. Purchasing Technician (3)	3. Logistic Provider (2)
4. Chief Exec. Officer (CEO) (1)	4. General Sales Manager (3)	
5. General Manager (3)		

Semi-structured interviews were undertaken with levels A and B covering functions such as logistics, purchasing, marketing/sales, infrastructure, discharging efficiency and quality assurance across fifteen firms. Although using semi-structured questions,

<sup>92</sup> In relation to the raw material and its volumes.

a different approach was used for level C interviewees. The participants were three members of the public ministry, two managers of third-party maritime companies and two representatives of NGOs. Inquiries were made about public policy, national strategic plans, institutional opinions, personal experiences and/or services provided.

Initially our sampling guidelines were to perform at least two interviews per firm, amounting ten qualitative interviews of which 50% would represent level A while the remainder would be from level B. However, during the fieldwork we discovered that in the grain sector the topic is only managed by the level A participants and in only one company level B interviewees have some knowledge about this kind of process. Therefore, the number of participants by company was in 90% of them limited to level A interviewees (Table 22).

Table 22: Codex of participants by sector and level

<b>Business</b>	<b>Participants</b>					
<b>Grain</b>	<b>ACo1</b>	<b>ACo5</b>	<b>BCo1</b>	<b>BCo5</b>	<b>C<sub>3</sub>Co3</b>	<b>C<sub>2</sub>N1</b>
	<b>ACo3</b>	<b>ACo6</b>	<b>BCo2</b>	<b>BCo6</b>		
	<b>ACo4</b>	<b>ACo8</b>		<b>BCo7</b>		
<b>Fresh Produce</b>	<b>ACo9</b>	<b>ACo10</b>	<b>B<sub>1</sub>Co9</b>	<b>B<sub>2</sub>Co9</b>	<b>C<sub>2</sub>N2,</b>	<b>C<sub>1</sub>P3</b>
			<b>BCo10</b>	<b>BCo11</b>		
<b>Fertilisers</b>	<b>ACo11</b>	<b>ACo13</b>	<b>BCo6</b>	<b>BCo12</b>	<b>C<sub>2</sub>N1</b>	
	<b>ACo14</b>					
<b>Maritime Services</b>	<b>AC<sub>3</sub>Co15</b>				<b>C<sub>1</sub>P1</b>	<b>C<sub>2</sub>N1</b>
	<b>AC<sub>3</sub>Co16</b>				<b>C<sub>1</sub>P2</b>	<b>C<sub>2</sub>N2</b>

Legend: The first letter is the level; Co#=firm. Level C requires some specificity, hence the numbers.

Recognising that the sample was small, the researcher decided to interview the vast majority of the companies recognised in PR as importing agribusinesses for the period between 2000 and 2015. Face-to-face interviews took place between December 2014 and February 2015. Due to the fact that one of the participants selected through purposive sampling was living in the USA, this interview was conducted via Skype. Theoretical saturation was reached after the fifth interview. All the participants approved audio taping and transcription, which produced a total of 26 hours and over 200 pages of transcripts.

### 5.5.3 Interview structure

The majority of the participants were previously invited by letter one month before the call to confirm the interview. The date and venue for the interview were selected by each participant. Two days prior to the interview the participant information sheet was delivered (Appendix C) and it was 'face to face' discussed with each interviewee before the interview. They had no restrictions on time to respond to the semi-structured questions designed in the instrument. Each interview was organised approximately in the following manner: introduction 2 minutes, pre-structured questions 25 minutes and open questions 30 minutes, semi-open questions 15 minutes and focused questions 5 minutes. The times given were only used as guidelines and if the interviews were rich for example in the open questions content, the timings were changed to allow more time for the open questions. The technique of interview applied was, 'what and how or why', which consist of every time interviewee was asked 'what' the next question that followed would be started with '*how or why*'.

Generally, the introduction was used as part of the interviews to request permission to record the interview and to answer any questions that the interviewee might have, such as questions regarding the confidentiality of the recordings. In the introduction and/or as pre-structured questions, placement inquiries were asked. For instance: 'Could you describe your present role within the company?'; 'What is the level of involvement in designing the business strategy?' and/or 'Could you please tell me about your academic background or years of experience in the business?' After the placement questions the interview continued with the next stage. The main reason for asking open questions was to find out about the tacit aspect of the interviewees' experiences or opinion regarding the US Cabotage Act and its effects on their business or Puerto Rico's market. It is important to highlight that the questions were structured in a way that would relate to the interviewee's job role while attempting to gain knowledge about the tacit supply chain strategy. Additionally, some subjects focused on exploring the environmental implications and requirements to validate the supply chain impact; logistics; multi-modal transportation; the effects and influence on the sustainability of competitive commerce of the agribusiness strategy; and the relationships between individual agribusinesses and the formulation of an integrated

supply chain strategy to deal with the cost to trade. Furthermore, the potential for overcoming or identifying other implicit barriers or inefficiencies associated with the US Cabotage Act was explored in the interviews. Finally, the context of the interviews was structured to ensure the maximum benefit of it.

#### **5.5.4 Measurement of variables**

Questions were designed to explore the Cabotage Act's effects on the agribusiness supply chain. Through semi-structured open questions, we explored the operational activities, the integration into the supply chain, business importing logistics and other secondary activities related to operational processes or independent variables associated with maritime transportation.

The semi-structured questions facilitated comparative research as different respondents answered the same common questions, although there was scope to probe and explore the specific responses provided by individuals (Radanliev, 2014). The flexibility of the semi-structured interviews allowed individual interviewees to relate the issues to their own values, beliefs, language and to organise these around their own ideological frameworks or knowledge (Wengraf, 2001).

The variables used in the research study emerged from the critical summary of the existing literature. The semi-structured question instrument is summarised in Appendix D. The semi-structured questions were carefully designed to reflect each of the themes in the research's conceptual framework and its relationship with the research aim and objectives. To reduce 'cognitive dissonance', the instrument was designed to balance strategy and operational firms' activities than on participants' beliefs of the phenomenon. It was helpful to identify the internal factors that may affect the supply chain. Furthermore, it was considered crucial to limit the information regarding to the phenomenon in order to collect the participants' experiences.

To address the topic of how the interview questions related to the aim and objectives of the study and to ensure that the questions were suitable for drawing appropriate conclusions, a number of pilot interviews were conducted prior to the actual interviews to assess whether the translated questions were appropriate and could be

understood. The pilot interviews involved five Spanish speakers' colleagues related to the agribusiness sector and/or some experience of the supply chain. The assessment of the translation process was carried out to assess whether the translation retained the original intended meaning. Their comments led to slight amendments to the wording of some questions so that they were more comprehensible to the respondents.

### 5.6.0 Quantitative estimation analyses

Feedstuff formulations are dynamic and varied among the animal feed mills; however, their major differences are in their micro-mineral mixing, which is the secret formula registered by each manufacturing firm. Consequently, the cost analyses are based on proportions of one macro ingredient for dairy cattle, poultry and hogs.

#### Dairy

To estimate the total volume (MT) per ingredient imported, a basic formulation of 70% maize was considered. The consumption average was estimated per cow in production, considering the average volume of feedstuff consumed (9 kg per day per unit). It was assumed that in PR a dairy cow under production consumes around 1 MT of feedstuff every 3.8 months. This will depend on many factors, such as the number of units in production, pasture availability, the season of the year and so on. Due to the lack of space and the climatic conditions in PR, the use of feedstuff is relatively larger than in nations with less intensive systems of production. The current number of units in production is estimated to be 90,000 cows<sup>93</sup>.

$$CC_{(j)} = (BF_j * K\tau) * (DM_j * X * PF)$$

The equation contains the cost of cabotage (CC); ingredient % in dairy bovine formulation (BF); total consumption per cow per year in metric tonnes (K $\tau$ ); domestic imports per ingredient per year (DM<sub>j</sub>); over-cost's coefficient in domestic (X) in USD; PF=per farm; and j = ingredient.

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<sup>93</sup> Data provided by PR's Extensionist Dairy Man.

## Hogs

To estimate the total volume (MT) per ingredient imported, a formulation of 65% maize was considered. More than 70% of swine producers in PR limit their production cycle to 125 lbs (57 kg) per unit. The average is 2 cycles per year, but they could converge in some points of the production, particularly between autumn and winter. The total consumption per unit per cycle of 185 days was estimated to be 0.21 MT (206 kg). The number of hog farmers and current annual production in PR was estimated using non-official fieldwork data provided by the professionals of the Department of Agriculture and the Agricultural Extension Service of PR. The current number of units in production is unknown; thus, the base of 55,000 hogs was the estimation for 2013.

$$CC_{(j)} = (HF_j * K\tau) * (DM_j * X * PF)$$

The equation contains the cost of cabotage (CC); ingredient % in hog formulation (HF); total consumption per unit per cycle in metric tonnes (K $\tau$ ); domestic imports per ingredient per year (DM<sub>j</sub>); over-cost's coefficient in domestic (X) in USD; per farm (PF); and j = ingredient.

## Poultry

To estimate the total volume (MT) per ingredient imported, a formulation of 65% maize was considered. The average consumption per step in a production cycle (starter – 14 days; growing – 21 days; finishing – 7 days) of 42 days was estimated. Additionally, non-official field data were provided by the professionals of the Agricultural Extension Service to update the number of poultry farmers in PR. Their current number is 58 with 30,000 units per production cycle and 4 others with cycles of 100,000 units.

$$CC_{(jz)} = (FF_j * K\tau) * (DM_j * X * PF)$$

The equation contains the cost of cabotage (CC); ingredient % in flock formulation (FF); total flock consumption per cycle in metric tonnes (K $\tau$ ); domestic imports per ingredient per year (DM<sub>j</sub>); overcost's coefficient in domestic (X) in USD; number of flocks served per farm per year (PF); j = ingredient; and z= farmer.



### **5.7.0 Anticipated challenges**

Although this topic may have profound political connotations in Puerto Rico (Santiago, 2012), many of the participants were openly explicit about their opinion. They showed a genuine interest in clarifying misconceptions of the phenomenon, and only a few were not available to participate in the research. Limitations to the access to non-biased information were expected. Furthermore, the literature comments that one weakness noticed in applying interviews for data collection is that they produce outcomes that are affected by what the participant considers to be required or what the participant thinks the interviewer wants to hear (Silverman, 2011). This motivated an interview design with a focus on activities, aimed at gathering feasible strategic concepts from participants instead of the desired outcomes from the supply chain strategy. Based on this, the combination of research methods was advantageous in the appreciation of the population's perspective (Hall, 2013). Although triangulation added complexity to the analysis, this exploratory research was challenging and involved the risk of overcoming partial views as a complete scenario (Silverman, 2011).

Some restrictions to access to quality official data were expected. Similarly, the corporate strategies for competitiveness could be a particularly confidential topic due to the limited group of grain importers on the island. Access to the dockyards was restricted in 90% of the cases; thus, it is possible that there were more infrastructure limitations than reported.

Frankel (2002) argues that comparing freight rates between similar trades in the Caribbean and the US is difficult if not impossible. He posits that the volume of trade on these routes is not comparable to Puerto Rico's level, because it is at least four times larger than all the other Caribbean countries combined. Furthermore, trade in the region only operates between PR and a limited number of US mainland ports; thus, the freight rates and other costs are significantly higher than for any other country.

Perishable raw material trade requires particular technical considerations and its management could imply extra costs. In addition, the freight rates are affected by the

capacity balance (demand/supply ratio), besides southbound rates being dramatically different from northbound rates; therefore, a very specific analysis has to be executed.

Prior to December 2014, only four companies in PR were involved in the whole domestic maritime goods trade. However, during our fieldwork the number of maritime providers was reduced. The oligopolistic structures in the maritime sector restrict the access to information, but also the oligopolistic structures in the grain sector limiting our analysis too. Although the filing of contract terms was introduced by the US Federal Maritime Commission in 1993, establishing that subscribers (to the service) can gain access to file rates, currently the data filed do not provide enough information about negotiated rates to allow a real cost analysis. In addition, the confidential relationship between providers and clients may limit our study.

Finally, the amount of time required to generate and analyse data was a limitation for the understanding of the whole phenomenon. In addition, the distance between the UK and PR affected the time spent on fieldwork. Ultimately, the tight budget, limited sample available and lack of updated official data in publications about the maritime logistics for the food supply chain in the Commonwealth may have compromised our research.

#### **5.8.0 Ethical issues**

Although this project is fundamentally sustained by the analysis of secondary data and harmlessness was anticipated, the interview phase required informed consent from the participants. Due to the political connotations of the topic as well as the level of corporate confidentiality, the study may provoke concerns. During the process the participants were constantly informed about our neutrality with the intention to collect valuable data to demonstrate the issues relating to the topic with the highest possible level of confidentiality (Appendix E). Furthermore, the researcher informed

the interviewees of his address and availability for clarification, research purpose, methods and intended possible uses of the information collected<sup>94</sup>.

Companies were invited and informed about our research interest. The participants received a brief explaining the research aims, objectives and methods by regular mail. The receipt of the letter was confirmed and the interviews were coordinated by phone and email. After the first introductory meeting with the official manager(s) and their agreement to be part of the research, they selected the participants for the interview. The meetings were held no less than three days after the phone confirmation to give the interviewees enough time to reflect before making a decision to join the study. A written informed consent form was developed. Before signing the form, the participants received sufficient information about the study to facilitate the process of informed decision making on whether or not to participate in the research.

During the interview the participants' informed consent was reconfirmed from the beginning. Our neutrality and intentions were constantly reaffirmed. Similarly, the participants were informed verbally of their ethical rights, the risks and the benefits involved. The data previously collected for the literature review gave us the opportunity to enter into a dialogue that may represent positive information that was not previously planned between the interviewer and the interviewees. The researcher highlighted the reasons for selecting the interviewees for the research and provided details about what will happen to the data collected. Prior to the interview, the same procedure was followed to obtain informed consent from the NGO staff.

As part of the induction and informed consent process the participants were reassured that they may withdraw from the interview at any moment with no penalties. They were free from any harm and coercion, as all possible measures were taken to retain a sense of dignity and worth for everyone involved in the research (Economy and Social Research Council, 2012; Oliver, 2010). All the interviewees were informed that participation was voluntary and their decision on whether or not to take part in the project was totally free.

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<sup>94</sup> Previously reviewed and authorised by the University of Bradford Research Ethics Board, file #EC1819

The semi-structured interviews were tape recorded, using the same language and protocol with everyone. To minimise the potential intimidation that tape recording may invoke for a few people, we adopted a relaxed ambiance to ensure an easy interview. The respondents could freely decide to decline to answer any question or discuss any topic. To ensure that the interviewees had absolute control over the process, they were able to pause or stop the recording machine at any time during the session. Finally, the interviews were transcribed.

The anonymity of the respondents was respected. No participant was named or otherwise identified in publications or any publicly disseminated material. The participants were informed about the reasons for deciding to tape record the interview, the mechanism to be used to preserve the recording and how long the recordings would be stored. Similarly, the procedure for the destruction of the tapes was related. Once all the data have been transcribed and analysed and the thesis has been approved, the tapes and backup copies will be destroyed within six months.

### **5.9.0 Conclusion**

The research was designed to study the effects of an external non-tariff measure on the agribusiness sector of a small island developing state. Secondary data were collected from multiple sources to present a multidimensional profile of the phenomenon's impact on the supply chain activities in the context of the sector under study.

The research was designed with the aim of exploring the relationship between the business supply chain strategies and the effects of cabotage on the interviewees' firms. The study applied qualitative methods through content analysis of case study research as well as quantitative methods through comparison cost analysis in feedstuff formulations. Primary data were generated, coded and analysed through semi-structured questions using the method of grounded theory. This research was a harmless project and indubitably no one suffered from the methods implemented. The procedure of data collection and its contribution is unique in the study of this phenomenon so far. In the following chapter the data is analysed and discussed.

## CHAPTER VI

### DATA ANALYSIS AND DISCUSSION

#### 6.0.0 Introduction

The increase in population, average income, the urbanisation (densification) process, the increasing demand for animal products as a result of policies to improve nutrition and technical and scientific developments seem to be challenging but also promising for the agricultural sector. On the other hand, the reduction in the availability of land and the increase consumer demands<sup>95</sup> will be determinant factors of the food industry's development during the next decades. Qualitative and nutritional criteria are used for their purchase and segregation in feed mills by the use of more complex technological and data analysis to allow immediate reports for decision making. Therefore, the cost of grain and produce will be affected.

A supply chain analysis is the result of the evolution of innovation and coordination affected by internal and external factors of the firm in relation to efficiency (Saad et al, 2002). Therefore to identify those factors that contribute to or limit competitiveness, it is useful to decompose the supply chain to study its interactions (Ferrantino, 2012a). The aggregated data applied to formulate our theoretical view were collected from primary and secondary sources. A supply chain analysis is formulated to explore how the US Cabotage Act – as an external NTM – is affecting the participant business in the study.

Through applying content and discourse analysis to the primary data collected and linking them with other secondary data, the interrelated factors affecting the supply chain of the traditional agribusiness importers are explored (Appendix F). As a result, the following pages present a description of three business structures linked to maritime transportation: PR's port infrastructure, the grain mill importing sector and the fresh-produce importing sector.

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<sup>95</sup> In this case we are referred to more food safety challenges, a lower environmental impact, fair trade products and better animal welfare conditions (Penz & Bruno, 2011).

This descriptive analysis considers different dimensions (sectoral, systemic and non-economic) associated (directly or indirectly) with the US Cabotage Act. Other determinants of competitiveness influenced by the firms and beyond them are included. Building on the context of this study in Chapter 2, the cases analyses presented in Chapter 3 and the theoretical framework in Chapter 4, this study derives a new approach to investigating the effect of the maritime cabotage policy as an external NTM on the supply chain in PR's agrifood sector.

### **6.1.0 Outlining PR's national ports system, infrastructure and trade**

Puerto Rico has eleven official ports<sup>96</sup> (Table 23) registered under the PR Ports Authority (PRPA), which is governed by a board of directors headed by an executive director. Theoretically, the PRPA owns, operates and manages all the sea and air facilities for cargo and cruises (passengers) in the PR's archipelago. Regarding its maritime facilities, the majority are in the port of San Juan. Other public ports across the nation of PR, although under its jurisdiction, were delegated to public—private partnership (Ponce) and/or municipalised (Mayaguez).

For more than a decade, PRPA has acted more like a real-estate corporation than a port-planning manager (C<sub>1</sub>P2). Various agencies of the US Federal Government are related to PRPA, such as the US Environmental Protection Agency, the US Army Corp of Engineers and particularly the US Coast Guard. As a result, the PRPA's planning programmes and some decisions have a direct relationship with them (C<sub>1</sub>P1). Some grants and technical assistance are provided annually by them and other agencies of the US Federal Government. PRPA investments have commonly been focused on the airport infrastructure rather than the maritime ports, but the agency is facing serious financial problems and currently is undergoing a debt restructuring process. Nevertheless, in total PRPA has around 7 kilometres of berthing, including 34 dockyards and over 40 berths. PRPA owns 10 hectares of storage and 14 hectares of open space, but in the Port of San Juan only 5 hectares of space for loading/unloading cargo are available. Although currently not in service, it has dry-dock facility located between Pier 15 and Pier 16. A variety of services to the shipping industry, such as

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<sup>96</sup> Two of these ports, Arecibo and Yabucoa, are not included in the table of references. So far, their use has been limited to oil imports.

tugs, pilotage, fuel delivery, water supply, provisions, customs, water supply and vessel maintenance are available, but they are provided by private companies. Since the 'Navieras de Puerto Rico' was sold in 1995 due to considerable losses (estimated at \$350 million), the Government of PR does not have a cargo fleet. It is believed that many of the Navieras' old fleet and containers are still in use by maritime firms that serve PR's market (ACo9).

Table 23: PR's ports and their general yield in 2013

Ports	By: Metric Tons					
	Exports	Imports	Total	Exp. Yield	Imp. Yield	Total Yield
San Juan	836.2	5486.3	6322.5	13.2%	87%	48.61%
Guayanilla	15.6	3600.3	3615.9	0.4%	100%	27.80%
Humacao	8.1	1311.6	1319.7	0.6%	99%	10.15%
Jobos	0	1390.1	1390.1	0.0%	100%	10.69%
Ponce*	72.2	140.1	212.3	34.0%	66%	1.63%
Mayaguez	25.3	94.3	119.6	21.2%	79%	0.92%
Fajardo	0	14.2	14.2	0.0%	100%	0.11%
Guánica	0	2.5	2.5	0.0%	100%	0.02%
Aguadilla*	9.3	0.2	9.5	97.9%	2%	0.07%
<b>Total (MT)</b>	966.7	12,039.6	13,006.3			

Extracted from: US Department of Commerce (2014). Notes: 1. Ponce and Mayaguez are delegated ports. 2. Port's Yield is referring to the percentage of the MT total that is transported through a particular port.

San Juan is the main port of PR, but Ponce (in the south) has the deepest draught (15 m in 3 dockyards and a road) and is the most recently redesigned. The cargo port of San Juan has a relatively tight entrance, and exiting might require a harbour pilot. During the hurricane season, although in a certain sense protected, its entrance demands some attention from the US Coast Guard.

The port of San Juan is the only port in the north of the main island that is naturally protected from the strength of the Atlantic Sea. It is believed to have been in service since the sixteenth century. The San Juan Bay was created by a geological formation in a horseshoe form. It is the biggest area of the San Juan Port divided into 26 piers (dockyards). In the cargo section (Pto. Nuevo) the majority of them are rented by PRPA to private companies and a few others are private. In the other section of the port (Old San Juan and Isla Grande) PRPR has a few other dockyards for mixed purposes. Around 10 have passenger facilities and 5 are fitted to receive big cruises (over 3,000 tourists per ship) (Fig.34). In total the port has 6 'roads' (navigation lanes

or channels) but only 2 in the cargo section of the horseshoe bay. The draught of the roads is between 8 and 13 metres, but for the Puerto Nuevo Canal the road from the entrance is around 13 metres constantly. Of the cargo terminals of the port of San Juan, 5 are located in the Puerto Nuevo district and 3 are located between the municipalities of Guaynabo and Cataño.

Figure 34: Top view of San Juan Bay



Source: Google Earth (2015).

The port of San Juan offers a total of 4.6 hectares of space for loading/unloading cargo. All of these facilities are rented to private companies (C<sub>1</sub>P<sub>2</sub>). Between 1999 and 2009 the Port of San Juan appears to be the most efficient of all Latin American ports in container management (Fig.35). Various maritime companies offer the main services in the area and all of the domestic companies operate under Jones Act. Currently the biggest coastal areas are rented by Crowley and Sea Star Lines. It is understood that overall around 16 maritime (domestic and foreign) service providers<sup>97</sup> operate in PR (Anaya-Oviedo, 2012). However, the vast majority of the infrastructure and terminal operations are carried out by domestic firms.

For more than a century, the US maritime firm Crowley has been one of the biggest in the US, serving the domestic market of PR (approximately 38%<sup>98</sup>) for more than 50 years and having over 200 employees. In the US it is a huge maritime firm providing services from the most basic logistics to naval design and building. Currently its operation in PR (in 31 ha) is based on roll-on/roll-off (RO-RO) vessels, but in 2014 it reported the acquisition of new ships for 2016 and 2017. Crowley also manages 53–

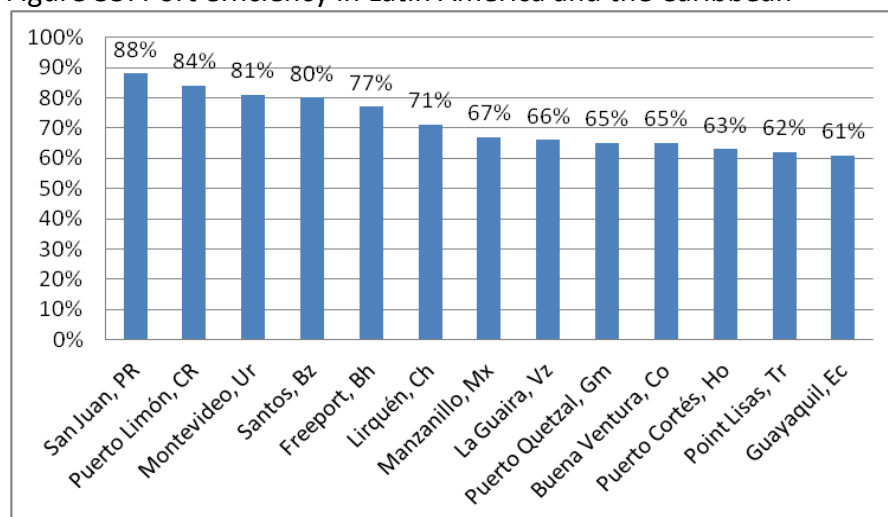
<sup>97</sup> Private firms dedicated to any activity related to the shipping process of importing and exporting, such as terminal operators, maritime lines, docking or vessel repairs or mechanics, stevedoring, port logistics distribution, docking support and so on.

<sup>98</sup> The percentages were mentioned during the interviews. No quantitative data to sustain them were provided or analysed. However, similar approximations are presented in Szakonyi (2014) and Comas (2009).



foot containers in which shippers can load more cargo allowing carriers to reduce their total container moves by about one-third (Szakonyi, 2014). Two brand-new LNG ships with capacity for 900 containers will be part of its fleet to serve PR's market. Additionally, Crowley will invest approximately \$45 million in a new maritime cargo terminal (Isla Grande) as part of a long-term contract lent agreement with the PRPA (Sin Comillas, 2015a). Since the claims for cabotage liberalisation in PR have become stonger, the firm started an aggressive investment plan and terminal modernisation. In 2015 it conducted a total renovation and draught of the dockyard and acquired three new cranes for containers, power stations for refrigerated containers, new generation of designed containers and ISO tanks, and equipment to manage containers on the ground. In addition, a new logistics yard design for easy trucking access is planned to start in 2016.

Figure 35: Port efficiency in Latin America and the Caribbean



Extracted from: Morales-Sarriera et al (2013).

Sea Star is a domestic line operated by TOTE Maritime since 1975. Operations for PR are based in Jacksonville, Florida, and carry approximately between 25% and 32% of all PR's domestic cargoes (as of 2014). Whilst Sea Star has previously concentrated on domestic cargoes, they recently acquired the firm Tropical Shipping exclusively dedicated to international trade (TOTE Service, 2014). In addition, between late 2015 and mid-2016, two new LNG high-tech ships will be added to its fleet. So far, Sea Star Lines is the only paperless terminal operator company in PR. Many of its procedures to track, trace and pick up containers are digitalised or performed by a scanning system. As part of its transformation, it is expected that in 2017 they will invest

between \$10 and \$20 million in its terminal to become more modern with a full containers tracking system (CTS), chassis, drivers, buyers and other security devices (C<sub>1</sub>P2).

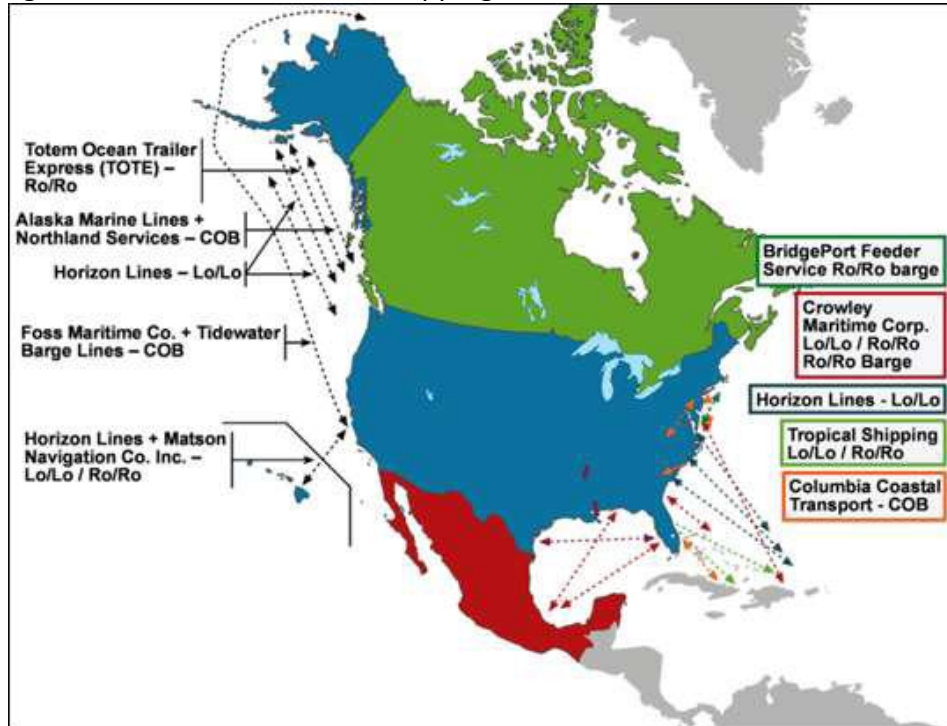
The third-biggest area of (30 ha), was administered by Horizon, but, during this research, the firm decided to close operations and PRPA was undergoing the process of selecting a new operator. Horizon was a mixed company, attending to approximately 35% of the international and 30% of the domestic carriers to/from PR (C<sub>1</sub>P2). All of the fresh-produce importing companies' interviewees had contracts with them (ACo9; BCo10; BCo11). For Szakonyi (2014), the exit of Horizon Lines from this trade route would give the Jones Act carriers some much-needed stability, allowing the remaining carriers to raise the rates at their will. As presented in the previous chapter, three of its former executives were declared guilty in a US Justice Department antitrust investigation (US Department of Justice, 2014). Additionally, over the last several years, Horizon has been facing massive debts and was badly affected by launching a trans-Pacific service (Szakonyi, 2014).

Another domestic company that operates in PR is Trailer Bridge, based in Jacksonville, but, in comparison with the companies mentioned earlier, it has limited space, managing around 15% of all PR's domestic trade (C<sub>1</sub>P2). It is more focused on lift-on/lift-off (LO–LO) and RO–RO vessels but also manages highly diversified containers (20', 40', 45' and 53' long) (Szakonyi, 2014). Trailer Bridge is not a contractor of the PRPA, but it is in partnership with the maritime firm International Shipping (Inter-Ship), which is a native company that is more dedicated to international trade and stevedoring but has a long-term contract with the PRPA. Therefore, it provides an example of a partnership between two relatively small maritime service providers, one based in Jacksonville and the other based in San Juan, offering global access to PR.

Unlike PR, Alaska and Hawaii have only two main operators, TOTE (Sea Star in PR) and Matson, and Matson and Pasha, respectively. The recent shutting down of Horizon not only affected PR's business but also caused it to sell their Alaska and Hawaii services to other Jones Act carriers. The new configuration in these markets reduced competition and strengthened the players (Fig.36). For instance, Matson bought

Horizon’s Alaska service and competes with TOTE. In Hawaii the firm Pasha, which operates RO–RO tonnage in this market, acquired Horizon’s Hawaii operation to compete with Matson (Szakonyi, 2014).

Figure 36: Current US coastal shipping routes



Source: Alameda and Valentín (2012:p.51).

These ‘terminal (ports) operators’, which are also maritime transportation companies, principally manage US-flagged vessels and provide different services to them and some other lines in partnership. These companies are highly specialised in container management. The list of the domestic fleet available contains the only vessels allowed to provide services between mainland US ports and the offshore territories (Table 24).

Table 24: Jones Act, US-flag privately owned merchants domestic fleet (2006—2014)

Years	Containers			Dry Bulk			General Cargo		
	No.	Grt	Dwt	No.	Grt	Dwt	No.	Grt	Dwt
2014	24	667	715	3	73	107	7	14	11
2013	26	706	758	3	73	107	7	14	11
2012	26	706	758	3	73	107	7	14	11
2011	26	706	758	4	91	137	7	14	11
2010	26	706	758	4	91	137	7	14	11
2009	27	725	779	4	91	137	9	53	73
2008	28	743	796	4	91	137	9	67	94
2007	27	731	783	4	91	137	8	66	93
2006	28	764	825	4	91	137	8	66	93

Note: The number of tankers at the same time has decreased from 56 to 44 but with a similar dwt. Extracted from: HIS (2015). Grt=gross tonne; dwt=dead weight in tonne.

Focusing on international cargoes, the firm Luis Ayala-Colón SCs. is an experimented local operator but limited in space (C<sub>1</sub>P2). It also provides stevedoring services to international carriers as well as some domestic ones.

Although all of these companies are recruiters of local talent, only Horizon and Ayala-Colón boards were/are in the majority local investors. The maritime firm Island Stevedoring is a small, local company dedicated to carrying construction materials, such as wood and pipes, paper, less than a container's load (LCL) and cars (C<sub>1</sub>P2). Many international lines of transport, such as Maersk, Norton Lilly International, Oceanic General Agency, Henríquez & Assoc and Pérez & Cia use PR's ports (Noticel, 2015; B<sub>1</sub>Co9); however, the majority of them have service agreements with the maritime service providers mentioned above (C<sub>1</sub>P1). Therefore, international companies have no similar infrastructure or investment in PR's ports. Among other reasons, the majority of imports to PR are domestic and the costs of initiation in this business are very high. As a result, partnerships with the operators mentioned above seem to be an acceptable business model for them (C<sub>1</sub>P2).

Fresh produce are transported, regularly using container ships and once in the yard other equipment is required. Although limited, it can also be carried in general design vessels, but this is a challenge: in addition to the limited space and good balance for containers' stackability, there is the power connection for reefers. Consequently, the use of ships (RO-RO) is more common to transport fresh produce containers (ACo9). Grain traded in domestic journeys is commonly transported in dry-bulk vessels or barge carriers due to its capability to travel inland (across rivers). In PR these cargoes are directly managed by the importing grain company rather than some of the 'port service providers' or 'terminal operators' (ACo3).

Since 2006 PR's positive trade balance with the US has been between \$25.3 and \$28.2 billion per year (PRPB, 2015). In 2012 the port of San Juan, PR was ranked 79 in container traffic in the list of the top 100 world ports. The cargo facilities allow for more than 50,000 m<sup>2</sup> of space for loading and unloading cargo. At the US level it is currently classified by the US MarAd as 13th of the 38 US ports in total volume (MT)

transported. In the value of goods imported from the US, the port of San Juan is classified 17th of 38 (\$11.7 billion in 2012) and 19th of 38 in the value of goods exported to the US (\$4.4 billion in 2012). The majority of goods (food and grains) imported to PR are carried by San Juan, which, in contrast to the rest of the Caribbean nations, shows the highest total values of goods from the US, followed by the Dominican Republic and Trinidad and Tobago (Table 25).

Table 25: Contrasting the US trades in the Caribbean (2013)

Country	Metric Tons (MT)			Million USD		
	Exp. to US	Imp. from US	Total	Exp. to US	Imp. from US	Total
<b>Trinidad and Tobago</b>	907.3	15116.3	16023.6	\$ 1,795.80	\$ 6,420.40	\$ 8,216.30
<b>Puerto Rico</b>	966.7	12039.6	13006.3	4325.20	11678.60	16003.80
<b>Jamaica</b>	2274.5	5773.7	8048.1	1762.40	356.00	2118.40
<b>Dominican Rep.</b>	5163.1	849.5	6012.6	6379.00	3424.70	9803.70
<b>Bahamas</b>	2719.8	2829.6	5549.4	3223.00	538.50	3761.50
<b>Dominica</b>	4934.3	0.3	4934.6	65.60	0.90	66.50
<b>Haiti</b>	911.3	108.5	1019.8	1121.40	831.50	1952.90

Extracted from: US Department of Commerce Census Bureau; US Merchandise Trade, 2013.

According to the US Department of Commerce, in the years from 2011 to 2013, the goods imported to PR by food manufacturers from the US were worth between \$160.2 and \$203.4 million. Furthermore, for agriculture and livestock, the value of imports to PR was between \$69.2 and \$107 million. On the other hand, PR's Planning Board estimates the value of the entire food and agricultural goods imported to PR in 2012 to be \$3.92 billion, which represents around 4% of all of PR's importations (Table 26). Approximately 95% of the agriculture (livestock and food) goods imported to PR is produced by 15 countries, but the vast majority is from NAFTA members. However, a higher percentage is carried in domestic trade from the US, which is estimated to have been worth \$3.09 billion in 2012.

Having accessed the bay of San Juan, its first section in the municipality of Guaynabo is dedicated to the national mills. The biggest one in this section is Molinos de Puerto Rico, then Pan American Grain, and the smallest is Nutrimix (ADM-Caribe). They import grains and store and process them for humans and animals. All of them have contracts with multinational grain exporters or some partnerships with US exporters transporting grains to San Juan (ACo1; BCo2; ACo3; ACo6).

Table 26: Value in port of agriculture, livestock and food imported to Puerto Rico

<b>Total imported</b>	\$ 3,915,613,976.00
<b>Total imported from the US only</b>	\$ 3,085,298,073.00
% of the agriculture and food value in respect of whole PR's imports	4.34%
% of agriculture and food imported from the US	79%
% of the agriculture and food value from the US in respect of while US goods imported by PR	10.40%
From the <b>NAFTA countries</b>	84%
From the <b>CAFTA-RD countries</b>	5.50%

Source: Data 2012, extracted from PRPB (2015).

Next to the national mill section in the Port of San Juan but in the municipality of Cataño a section is dedicated to molasses to serve Bacardí and in Puerto Nuevo the pipe for fructose cargoes to supply Able Sales and a few other food manufacturing companies. Finally, the rest of this area is for container operations, particularly managing full container loads (FCLs) and some less than a container load (LCL) (C<sub>1</sub>P2). In the Isla Grande section, the PRPA has agreements with some companies with a low volume of cargo. For instance, piers 13 to 16 are the communal cargo section, which is basically fully maintained by the PRPA. It could be said that it is dedicated to '*los goleteros*',<sup>99</sup> which are between six and nine firms dedicated to trade and exports from PR to the US and the UK Virgin Islands. They trade particularly some agricultural and food produce and construction materials, but in general they are operations for LCL and pallets.

The Port of America in Ponce is situated in a region with greater access to crop farmers and is highly prepared for trans-shipment with a relatively new (less than decade old) design, but so far its facilities have not been suitable for transporting grain and fresh produce. It is believed that after its conceptualisation this Port was aborted because of a lack of population density rather than space or facilities (ACo6). It should be highlighted that almost one-third of PR's population lives in the metropolitan area of San Juan; hence, the shorter the distance between the port and the importers' businesses, the lower the cost of logistics. For instance, the distance between the Port of Ponce and the Río Piedras metropolitan region of San Juan is almost 120 km (1.5

<sup>99</sup> It is also named '*gondoleros*'.

hours) whereas the distance between the Port of San Juan and the same region is 18 km (24 min).

The PRPA has a very limited dockyard operation in Arecibo in the northern region. Due to the sea climatic conditions, lack of maintenance, a limited draught of 6 metres and restricted operations from 6:00 to 18:00, it is planned to close permanently (C<sub>1</sub>P2). On the west coast, some raw materials for agribusinesses and pharmaceuticals are received at Guánica and Mayaguez. However, in both municipalities the cargo dockyards used for agribusiness importers are private, which means that they are totally administered by their owners. Guánica's bay is operationally limited by its natural draught (9 m at the entrance and 6.5 m at the dockyards). In the past two agribusiness importers, Pro-Granos and Ochoa Fertilizer, had operations there.

Since Star Kits (tuna can) shut down its factory in Mayaguez, the regional port has had a comparatively insignificant operation, but now its activity is basically nil. A recent report states that the Holland Group, the private terminal operator that managed the port, has filed for bankruptcy. The president of this firm is also the owner of Pan American Grain (Sin Comillas, 2015b). As a result, the firm Caribbean Ferries with bases in the Mayaguez Port, operating (RO-RO) journeys between PR and the Dominican Republic decided to move its operations to San Juan, which is further in distance from Mayaguez. Currently, it is carrying not only passengers but also more than 100 containers per trip, many of which are LCLs and FCLs of food products (C<sub>1</sub>P2). However, due to the fact that it is a multiuse vessel, it is relatively limited in transporting produce specifically due to its logistics requirements for discharging (B<sub>1</sub>Co9).

In the main port of San Juan (in the north), the relationship is mixed, because one of the three agribusiness grain importers has its own dockyard. Regarding the docking places of the other two grain firms, although the PRPA is the landlord, these are lent to them in a (very) long-term contract. It is estimated that PR may have more than 30 private cargo dockyards, none of which pays fees to the PRPA and the majority of which are linked to an industrial business, but the data to validate this was not

available (C<sub>1</sub>P2). In these cases, the ports' (dockyards and piers) owners have all the responsibility to provide the public authorities with their related '*facility plan*'.

Due to the limitations in public investment funds, PRPA's investment plan is currently based on a kind of public-private partnership. Allegedly, PRPA is promoting the terminals' modernisation by its current operators using some formulas, fixing rent fees in the long term but according to the investment. However, the draughts represent a limitation.

PR's bays are federalised; thus, the US Federal Government controls them. As a result, investments in this direction should be authorised by the US Army Corps of Engineers and various other federal agencies. Its main lane in the port of San Juan is limited to 12.2 m (40') in depth. Authorisation of maintenance extraction procedures in the bay is relatively easy to undertake, but authorisation for major dredging extractions (almost 7.5 metres) is very unlikely if not impossible to obtain (C<sub>1</sub>P2). Additionally, the cost for the extraction procedures would imply a huge expense for the ELA. The cost of renovating every pier and dockyard in the port should also be included because the majority of them were designed in the 1940s for different conditions and requirements. In comparison with South America, according to Wilmsmeier and Sánchez (2015), between 2012 and 2014, the average draught on the west coast (WCSA) is 13 m (43'), on the east coast (ECSA) it is 13.2 m (43.3') and on the north coast (NCSA) it is 11.5 m (37.7'). The maximum draught in these regions in 2014 is on the WCSA, with 15.2 m (50'), followed by the ECSA with 14.5 m (47.6'), and the NCSA is the last with 13.5 m (44.3').

Another weakness of PR's port system is that its maritime infrastructure is basically owned by domestic (US) firms; thus, foreign direct investment in the maritime infrastructure is practically non-existent. The lack of services to repair vessels is another disadvantage. So far, the majority of the tugboats, barges, ferries, ships and other commercial and public vessels are repaired abroad. The Dominican Republic and a few small islands in the Caribbean or the south of the US are the most common places, but for Jones Act vessels, their repairs are limited to US territories. For decades PR's market has had no interest in provide this kind of services (C<sub>1</sub>P1), but vessel



maintenance programmes are lucrative, reduce the number calling for services and promote other ramifications for logistics (Burns, 2015).

Contrasting PR's ports with two new ports in development, the Mariel Port in Cuba and the port of Haina in the Dominican Republic, the interviewees believed that, whilst these two seem to be deeper, their basic infrastructure is still outdated in comparison with that of PR. It was also suggested that, for contrasting the local complexities with these maritime services, high-volume management of containers is required, which is not currently available in Cuba or in the Dominican Republic. So far, both markets have not had the volume of imports to justify it and their number of local service providers is very limited. In addition, it was highlighted that achieving more volume in a relatively short time will require a very large amount of capital investment and innovation in their terminals as well as access (roads), technology for fast communication and a stable power and fuel supply. Therefore, according to the participants, Cuba, Jamaica and in some factors the Dominican Republic seem not to be competitors of PR for at least one more decade (C<sub>1</sub>P1; C<sub>1</sub>P2; ACo3; ACo6).

The lack of stability in the PRPA's direction is an internal (PR) issue that was presented as one of the causes of the loss of regional competitiveness. Between 2008 and 2015, the PRPA had six executive directors (C<sub>1</sub>P2). Certainly, the high turnover of managers may affect negatively long-term planning actions, investments and clear direction to improve logistics, optimise facilities and establish a culture of efficiency.

In summary, unlike many port authorities in the world, the PRPA is a landlord but demonstrates a realtor's behaviour. Port managers' firms signed long-term agreements (over 10 years) according to the direct investments proposed by them. The rate of rent will depend on the area of interest, from very exclusive areas to low-cost preferential areas. Maintenance is provided by PRPA but in exclusive areas it is provided by private firms. In both scenarios equipment and cranes should be provided by the renter. Buildings, yards and roads will depend on the area but are regularly provided by the renters too. Whilst so far in the Caribbean region PR seems to have

the most advanced port infrastructure, its ports are principally limited by draught<sup>100</sup> and thus not prepared for third-generation vessels (Post-Panamax).

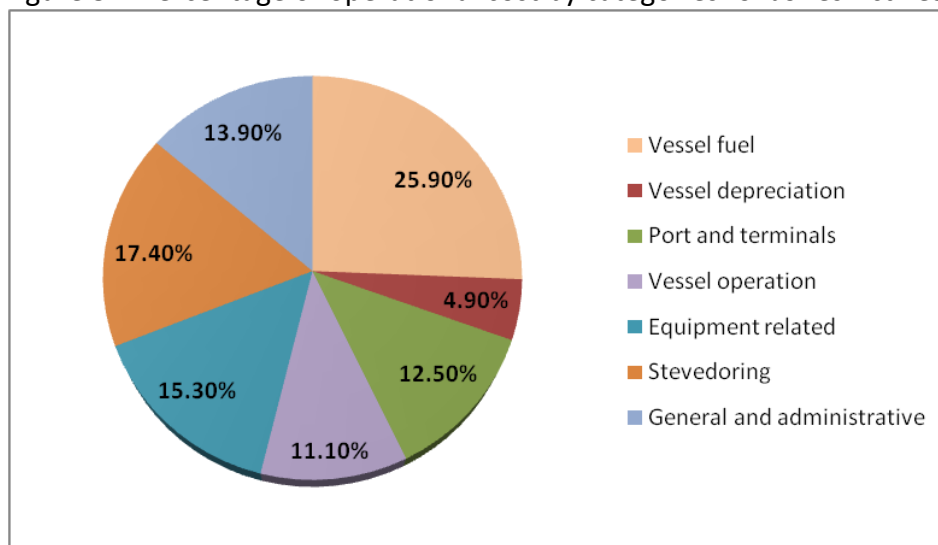
Most of these maritime firms offer an ‘all-inclusive service’ mainly through subcontractors. The majority of them gather in their terminal specialised service providers such as stevedoring, fuel, chassis and road transporting to handle a variety of products.

A Caribbean regional ports relationship has not been officially promoted or sustained by PRPA, but on a private level some Puerto Ricans have been participating in regional maritime organisations, such as Caribbean Shipping. In general, the port services in PR could be considered fully privatised and the public port activities are focused on collecting rent and port fees, gathering and sharing data with other agencies and some basic maintenance of facilities (C<sub>1</sub>P1; C<sub>1</sub>P2).

### 6.1.1 PR’s basic cost of shipping

According to the Maritime Alliance of Puerto Rico (Estudios Técnicos, 2013), 25% of the operational cost of a vessel under the Jones Act is the cost of fuel (Fig.37). However, terminal and port fees, stevedoring cost and extra equipment requirements represent 45% of the cost of the transportation services.

Figure 37: Percentage of operational cost by categories for Jones Act vessels in PR



Source: Maritime Alliance (2013, in Estudios Técnicos, 2013).

<sup>100</sup> Except for the Port of Ponce.

The terminal and port charges structure is similar to that of other ports in the US Atlantic and Caribbean. They include 'wharfage' fee (associated with the cargo), the 'docked' fee, which is the charge for docking, and the 'harbour dues', which confer the right to use PR's public bay ports. In addition, after docking, the late charges imposed by PRPA regularly start at 48 hours for domestic vessels but 48–72 hours later for international ones. All these charges are imposed by PRPA and the PR's Department of Treasury in PRPA ports. In terms of cost, the heaviest fee is the 'wharfages', then 'docking' and finally 'harbour dues' (C<sub>1</sub>P2). After the September 11 attacks, new frameworks to strengthened entry regulations were required by the Home Land Security. As a result, checkpoint protocols were established, increasing the number of containers to check. Due to the lack of personnel in PRPA was hired a company to scan containers and to carry out the process. Since then, the security fee (security enhance) has been imposed. This fee relates to the weight of cargo, but whilst the cost starts at \$4.00 per MT, the whole fee will never be more than \$69.00 per container. However, the terminal and port fees are higher in San Juan than in the other municipalities.

The 'tugboat'<sup>101</sup> cost is one of the highest that is not specifically described in the list. Costs are between \$2,000 and \$2,500 per hour of service. Cruise ships are not particularly dependent on this service, but this is not the case for cargo vessels. Some cargo ships require two tugboats. Although various interviewees said that the number of these service providers in PR is sufficient and quality is comparable to US standards, the costs are not competitive in comparison with the Caribbean region operators (ACo5; C<sub>1</sub>P2). However, no evidence was provided to sustain this argument.

Managing containers demands the use of agents that in some cases are the same maritime service providers, a conglomerate or independent agents. The majority of them are in partnership with PRPA, but their service rates are established in the open market (C<sub>1</sub>P1; C<sub>1</sub>P2). Some of them determine rates based on the volume of containers, a long-term business relationship and the complexity of goods being imported (hazard class and number). It should be noted that this service is not properly part of the cabotage cost. However, the majority of the firms' participants in

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<sup>101</sup> A small and powerful boat used for towing larger boats and ships, especially in harbours.

this research include it as part of their maritime service costs. Commonly, they justified this by saying that the cost for that service is relatively insignificant in contrast to the value of goods imported. It is similar with the inspection fees and the cargo insurances. For instance, the range of costs of broker services may vary by the volume or number of containers and complexity, but it could be between \$150 and \$1,000 per unit of commodities (BCo5; B<sub>1</sub>Co9; BCo11).

According to Szakonyi (2014), the southbound rates of transport from Jacksonville to San Juan are between \$2,600 and \$3,400 per twenty-foot equivalent unit (TEU), with dry-box prices on the lower side and reefers priced higher. Although not specifically clear, these TEU rates probably imply a higher cost to trade forty-foot equivalent unit (FEU) containers. Furthermore, he affirms that northbound rates on the same route are between \$500 and \$700 per TEU. He suggests that the export cost per dry container from PR to Jacksonville is basically non-existent, due to the fact that the vessel’s operational costs and drayage to Florida might be equivalent. As a result, maritime transportation providers should develop a logistic to guarantee the full return of containers and the worst-case scenario is with no less than 25% FCL; otherwise, operational costs will become more expensive or unsustainable (C<sub>1</sub>P2; Burns, 2015). It is believed that currently the costs on PR northbound domestic routes are lower than that percentage. Szakonyi (2014), although recognising that PR’s market is far more crowded than that of Alaska and Hawaii, highlights that a reduction in containers has occurred in the domestic imports (Fig.38).

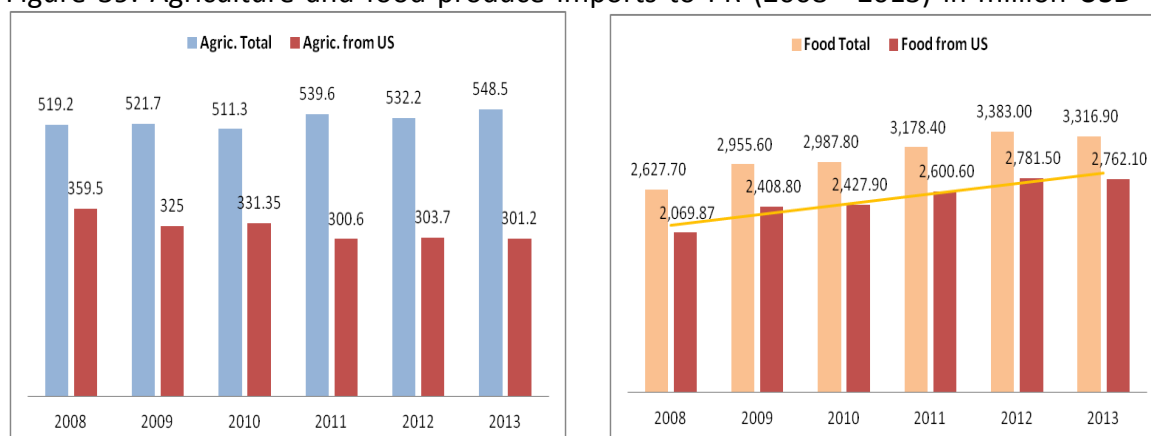
Figure 38: Percentage of change in the US container trade with PR (2008—2013)



Extracted from: Szakonyi (2014).

The data provided by Szakonyi (2014) support a reduction in container volumes between 2008 and 2013. According to him, a reduction of almost 12% could be estimated in the total number of domestic containers imported to PR. As presented in chapter two, this could be associated with PR's economic depression. Nevertheless, the data on the value of imports, particularly for agriculture and food produce from the US, show a clear pattern of increase in foods and some reduction in the group of agriculture (Fig.39). On the other hand, PR in comparison with other SIDSs shows the second-lowest value by imports per capita, with Jamaica at the bottom of the list and Hong Kong at the top (Table 27).

Figure 39: Agriculture and food produce imports to PR (2008–2013) in million USD



Source: PRPB (2015).

Table 27: Agriculture and food product imports between 2011 and 2013 by population

Data in Million \$USD	2011		2012		2013		Total Average M \$USD	Population 2012	Ratio Import/pc/pY
	Agri. Prod	Food	Agri. Prod	Food	Agri. Prod	Food			
Singapore	13,756.2	12,937.4	13,952.7	12,558.2	14,305.2	12,937.4	26,815.7	5,200,000	\$ 5,156.87
Hong Kong	24,230.8	21,299.3	25,003	22,087.3	29,830.9	24,374.0	48,941.8	7,500,000	\$ 6,525.57
Jamaica	1,128.3	1,076.6	1,132.1	1,091.8	1,060.9	1,031.9	2,173.9	2,700,000	\$ 805.14
Ireland	8,938.9	8,480.8	9,075.1	8,625.9	9,901.7	9,449.5	18,157.3	4,500,000	\$ 4,034.96
Puerto Rico*	539.6	<b>3,178.4</b>	532.2	<b>3,383.4</b>	548.5	<b>3,316.9</b>	3,833.0	3,600,000	\$ 1,064.72
Mauritius	1,250.6	1,096.2	1,355.0	1,240.0	1,306.3	1,189.2	2,479.1	1,300,000	\$ 1,907.00
Bahrain	1,129.5	1,058.4	1,138.3	1,066.7	1,274.1	1,193.9	2,287.0	1,400,000	\$ 1,633.55
Cyprus	1,391.5	1,326.7	1,293.8	1,239.1	1,291.5	1,243.9	2,595.5	1,172,000	\$ 2,214.59

Data extracted from: WTO (2013) and \*PRPB (2015) data 2013.

Notes: 1. Hong Kong and Singapore are food manufacturing exporters. 2. Although the data from the WTO and the PRPB could be collected using different methodologies, the data of PR highlights that food imports are greater than agricultural produce in comparison with the rest of the SIDSs. 3. The data value of the columns 2011, 2012, 2013 and Total Average is expressed in million (M) USD.

Horizon was highly associated with fresh-produce importers in PR and its closing apparently involved various factors. The reduction in the general number of containers transported would have been a major consideration in their business decision. As a result of Horizon's crisis the other two strong firms (Sea Star and Crowley) and the limited one (Trailer Bridge) made adjustments, increasing their fleet to serve PR's market. During that period of crisis<sup>102</sup>, the number of containers without transport to PR was estimated to be 400 units per week. It should be considered that this uncommon event occurred in the high season (Christmas); thus, it is expected that in a regular season the number of stranded containers would be less than half (C<sub>1</sub>P<sub>2</sub>).

It should be noted that, after Horizon's closing announcement, other maritime firms, such as Trailer Bridge and Sea Star, added one new vessel each to their PR's fleet. Nonetheless, the domestic routes available lacked transport, particularly from the northeast coast of the US. In addition, the transport added was not suitable for reefers, affecting the fresh-produce importers more (ACo9). Crowley and Sea Star announced new ships to serve PR's market will not be active until late 2016 and 2017, more than a year after the crisis.

### **6.1.2 Time and basic procedures for docking**

Twenty-four hours before its departure from the last port before arriving in PR, the vessel captain should send a report to its agent in PR. Once the cargo is posted to arrive, which means it is in the territorial area of PR, the agent coordinate the whole process through the US and PR agencies. At this time the protocols of US Control and Border Protection (CBP) and US Customs are activated.

Having conceded the authorisation to dock and prior to its arrival in the bay, the captain sends the information on the cargoes onboard to the agent in PR by email. Once that report is received by the PR and US agencies, the manifesto and the vessel information are verified to assign the dockyard and estimate the number of days required for unloading. Then the agent completes the legal documentation and detailed information on the goods (container rates, tariff, inspections, etc.), and

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<sup>102</sup> Between November 2014 and March 2015.

simultaneously coordinates the inspections, registrations and other protocols according to the goods imported.

For international cargoes the intervention of a broker will be required. Around 22 brokers are recognised and authorised by the US federal agencies to provide services in PR (Anaya-Oviedo, 2012). Unlike domestics, for foreign vessels are required the authorisations of the US Customs, CBP, USDA and in some cases Home Land Security and a few other agencies (Health Department). In the majority of these processes, the Government of PR has no jurisdiction (C<sub>1</sub>P1; C<sub>1</sub>P2; ACCo14).

Once they are in the dockyard, the agent<sup>103</sup> in charge hires a stevedoring service provider and tracks the containers, the inspection process and fees until the containers arrive with their importing owner. When a container (domestic or foreign) is theoretically approved to be received, it is scanned in an automatic process. Many containers' importers in PR have agreements with the maritime firms (previously mentioned) with a package in which the service providers carry out all the tasks and the importing business saves time on these procedures.<sup>104</sup>

For domestic cargoes these protocols are relatively fast or unnecessary, because they are considered to have been inspected or to be from a safe place; therefore, once the containers have been unloaded, the importers may receive the cargo in as little as two hours (BCo10). To contrast this average time with other SIDSs' similar processes, PR's protocols seem to take longer than those of the Mauritius Islands, according to their official data, the average time being between 30 and 60 minutes (World Bank, 2015).

Normally, for international cargoes these processes may take between 24 and 48 labour hours after the docking (C<sub>1</sub>P2, ACo13, BCo10). It is believed that the ratio of containers' volume per year, domestic: international, in PR is 70:30; hence, it is clearly a predominantly domestic (US) market.

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<sup>103</sup> In PR this service could be offered by a private registered person, a conglomerate, third-party container contractors or the maritime service provider (terminal operator).

<sup>104</sup> Anaya-Oviedo (2012) reports that 35% of the brokers in PR consider the protocols and procedures required by the US federal agencies at ports to be between regular and inefficient. Furthermore, 60% of them consider the local (PR) import procedures and fees to be oppressive.

A digital process to identify, track and trace containers during the stevedoring process, as well as assigning chassis, tracking and measuring the whole process until the container is exported from its origin to its arrival, is not widely used in PR.<sup>105</sup> Although the process could be considered to be quite dynamic, the process of digitalisation is apparently limited in comparison with other SIDSs markets, such as Singapore and Hong Kong. However, it should be highlighted that, unlike airports, it seems that seaports have the disadvantage of relatively low traffic of people and thus fewer funds to improve areas, logistics and efficiency in processes. Seaports lack priority unless a union declares a lockout and/or during a climatic phenomenon or a humanitarian crisis (C<sub>1</sub>P2).

### **6.1.3 Environmental issues in PR's ports**

Whilst SIDSs may have a minimum responsibility for the global warming effects, they are affected disproportionately (Briguglio et al, 2006). The climate change effects seem to be one issue that was poorly recognised or at least considered by the participants in this research. The participants said little about the environmental effects caused by ports or how they might be affected by global warming. Only the Secretary of Agriculture highlighted the importance of the topic.

Due to the very nature of their locations, ports are naturally highly vulnerable to climate effects. Some of the climate change impacts are the rise of the sea level and the intensive hurricanes. Both can cause heavy flooding of ports and disruption of their operations. In 2000 Hurricane George caused serious damage and destruction to practically all the basic port facilities and terminals, also blocking the main entrance of the port of San Juan, devastating PR's economy for months.

Many of the current port terminals in PR are outdated, and the best ones have not been modernised in decades. This is particularly obvious in the private terminals of the grain-importing firms. For instance, the majority of dockyards and terminals in the ports of San Juan<sup>106</sup> and Mayaguez are not far from the sea level. Raising the sea level

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<sup>105</sup> Anaya-Oviedo (2012) reports that 36% of the brokers in PR consider the use of the technology in this process to be below the regular level (4/7).

<sup>106</sup> Puerto Nuevo section.



by more than a metre would be enough to affect the ordinary activities of some operations (C<sub>1</sub>P3).

Although the information was not provided, we assume that, due to the fact that the majority of the port activities in PR are privatised, some of the climatic initiatives associated with clean air programmes and emission controls imposed on them by some other local and federal agencies are not necessarily related to the PRPA. For instance, the control of air pollutants, such as sulphur and nitrogen oxides, produced by the fuel (bunker C) combustion, the risk of oil discharge, particulate matter produced by the vessels and/or fugitive dust during the grain-unloading process are issues that are highly associated with the environmental control. Besides, the sanitary discharges and objectionable odours usually associated with ports' activities also have impacts on the environmental conditions. Nonetheless, apparently little effort has been made to adapt PR's cargo ports and its infrastructure to the impacts of global warming.

During the spring season in the north of PR, the Atlantic Ocean is well known for its strong tides. Although the San Juan Bay provides natural protection for the port of San Juan, this natural factor might reduce its traffic dramatically. To reduce the risk of stranding in the bay entrance, the US Coast Guard might limit its access or close it for 24 to 72 hours (C<sub>1</sub>P3).

An increase in the annual rainfall or at least in the precipitation rates may have effects on the logistics to manage containers and grain cargoes. For example, grains are unloaded under an open sky; thus, an increase in the frequency of heavy rain periods would bring more delays in the process and with it the demurrage fees. On the container side, the area and its electrical devices in the case of refrigeration should be considered for protection from stormwater effects.

The ports of both San Juan and Mayaguez are substantially limited in space to grow and in storage areas. Areas for storing containers are practically non-existent in Mayaguez. San Juan is a highly populated port city where urban growth takes priority

and has a great influence on the limited space available.<sup>107</sup> This will represent more challenges to adapting the facilities near to the population and working with the local contexts, which will probably affect the insurance cost. Ponce's port, on the other hand, is spacious and ready for containers and investments, but, having been designed for trans-shipment operations, it is a 'white elephant' and has been underdeveloped since inauguration (C<sub>1</sub>P3; C<sub>1</sub>P1).

#### **6.1.4 Cabotage: PR's public ministries and NGOs**

The opinions of the public ministers and NGOs' leaders about the US Cabotage Act's effects on the Puerto Rican economy, whilst contradictory, are interesting and should be taken into account. At the time of this research, the topic was not new to them, because it has been under discussion for a while, particularly since mid-2012. For some participants, it was clearly associated with the topic of a 'permanent union' between PR and the US. For others, it is a demonstration of considerable discrimination against PR's development from the US Federal Government, limiting PR's right to develop and trade (López-León, 2015; Collazo, 2012).

The public servants interviewed in this research were not totally convinced of the negative effects of the US Cabotage Act on PR's market. However, all of them identified some factors that might be considered important in the case of a future amendment of the Act.

In the case of the NGOs participants, they said that its organisations have approved manifestos against cabotage. One of the leaders said that 'the Cabotage Act is an abusive restriction to the rights of nation's development' (C<sub>2</sub>N1). It was also suggested that a reduction in the maritime transportation firms will be more inconvenient for the SME importers than for the high-volume importers, because the latter can negotiate other rates. The following example of costs was used by one of the participants. He said that a 40% reduction in the current cost of the domestic transportation would reduce the basic cost of farming.

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<sup>107</sup> Anaya-Oviedo (2012) reports that 80% of the maritime service providers consider that the inland access to the terminals and port facilities in San Juan is poorly maintained and/or underdeveloped, and 40% of them believe that the sea roads of the San Juan Port are underdeveloped. Similarly, 50% of them have the same opinion about the lack of cranes and equipment in terminals.

A 100 pound (45.4 kg) bag of fertiliser in the US is around \$3.50, but in PR due to the freight cost it is between \$0.10 and \$0.14 per 50 pounds (22.7 kg) over the original cost. As a result, the importer is paying around \$0.22 extra just for bringing the produce from the US. It means that the basic price of 100 pounds (45.4 kg) of this fertiliser will start at \$3.72. However, the importer should add its expenses and profit, almost 9% of the cost (\$0.37); therefore, the consumer will be paying easily \$4.10. Certainly, this is not a big deal for a casual consumer, but the \$0.60 means money for a regular farmer.<sup>108</sup> (C<sub>2</sub>N1)

Another leader said that his predecessor commissioned a formal study in 2013 to participate in the US GAO interviews held that year in PR (C<sub>2</sub>N2). However, the mentioned study or evidence of the participation in that event was not included in the official report of the US GAO. Additionally, the commissioned study was not published in any official journal in PR, it was not in the organisational archives and the author was not available to talk about its findings or methods.

One participant (C<sub>1</sub>P1) said that, once a restricted market has been liberalised, commonly it promotes competition and an eventual reduction in prices. Consequently, a relaxation in cabotage could potentiate more openness in PR's domestic trade. However, the interviewee exposed these concerns: 'how helpful it would be for PR's economy? Or, what criteria PR should have for it to be beneficial for all? Or in what ways does the current framework fails in promoting competitiveness? These are questions that no one has answered so far'. In addition, due to the fact that PR could be considered a mature and highly demanding market, the issues of quality standards and precision in deliveries are factors that need more study (C<sub>1</sub>P1).

In the current government administration, it is a common belief that the Jones Act has been a limitation to the success of the Port of Ponce. In anecdotal evidence the minister reported that one concern presented by some foreign investors interested in producing value-added goods for the US market was precisely the restriction in shipping. Other participants also said that the local labour framework, the unions and

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<sup>108</sup> Although fertilisation is a relatively routine practice and its volume depends on the soil conditions and crop requirements, in tropical soils the use of 2,800 kg per acre is considered to be a very basic measure. The extra cost only in transport will represent \$616 (USD) per acre over the cost of the product.

its collective agreements protected by law have created layers of hidden costs affecting business environment.

It was said that 'the official public policy of ELA is doing the best efforts to make a simple exemption for tankers of LNG carriers' (C<sub>1</sub>P1). It is believed that in this niche the number of tankers available in the US is below 10 for the whole nation. Besides, currently it is not affected by unions and/or special labour agreements. Additionally, a reduction in the transportation rates of fuel is seen by PR's authorities as a 'win-win' situation. More LNG transporters in the market may reduce the current rates, benefiting PR's economy. For the LNG providers in the US, this would be positive too, because this fuel is regularly imported from Trinidad and Tobago at higher prices. So far, the higher costs of conducting business in PR are more associated with fuel (electricity power and transportation) than with labour costs. Therefore, some cost reductions in fuel and a focus on optimising the logistics would be positive for businesses and PR's economy (C<sub>1</sub>P1).

Another factor that might be considered to be mixed – external and internal – is the self-limitation of the native businesses to look abroad to domestic markets. Greater international exposure could be beneficial for the local business. In this sense, all the public ministry participants considered that the cultural exposure to the US market affects PR's consumers' behaviour and what they want from the market (C<sub>1</sub>P1; C<sub>2</sub>P1; C<sub>3</sub>P1). It might push the national businesses to sell products based on the demand rather than searching for market diversity or uniqueness. Thus, 'if is trendy in the US it should be in PR too' (C<sub>1</sub>P1).

Some cultural factors associated with the topic should be taken into account. For instance, the legal and fiscal framework shared by the US and PR brings some kind of confidence to business (C<sub>1</sub>P1; C<sub>2</sub>P1; C<sub>3</sub>P1). 'It in some sense minimises some of the uncertainties commonly associated with the risk of commerce with less frequent markets' (C<sub>1</sub>P1). This aspect might be significant for SME firms. A trade partnership with a multinational company or between two transnational firms is not the same as between two SME local corporations. For instance, their volumes of trade might be

not enough to persuade and/or to obtain preferential treatment on the side of their international suppliers (C<sub>1</sub>P1).

Other elements associated with the Cabotage Act's effects on PR's agribusiness were proposed by some participants. Although not directly associated with costs, in the sense of competitive or anti-competitive advantages they are also important because they might represent some indirect expenses (C<sub>3</sub>P1). The Cabotage Act's elimination could affect indirectly some of these elements (punctuality, infrastructure and corruption issues in maritime services) that so far have not been taken into account. For example, regarding punctuality, all of the public ministry participants agreed that 'terminal domestic operators' in PR have a very high score. However, according to one of them, this may not be the case with the international maritime services (C<sub>3</sub>P1).

Certainly, liberalisation should bring some changes to competition and the cost of trade might be lower. It is likely that the cost of importing raw materials would be lower, as well as the rates for transporting manufactured food. The latter scenario may need more analysis, particularly from the perspective of the current limited national food production. Currently, the native food manufacturing in PR is practically non-existent, and around 65% of products are imported from the US. The remaining percentage is imported from countries to which the US Cabotage Act does not apply. Therefore, a reduction in the cost of the domestic transportation should also reduce the cost of domestic imports made under a similar SPS framework to PR.

The negative effects of this would be on the local producers. They would have to reduce their prices to compete with the domestic imports in unfair conditions and lack of volume. In that sense, a relaxation in the Cabotage Act on the manufactured goods would be beneficial for the importers and supermarkets, but it might be a hard punch for the native agriculture rather than a benefit. However, if it is about price competition, currently the native producers are highly affected by the produce from the Dominican Republic that has a similar productive season and lower cost to produce than PR. (C<sub>3</sub>P1)

One of the participants was of the opinion that the US Cabotage Act in general terms is not a problem for PR's market. He said that 'considering that in the last 30 years no

foreign company has proposed a serious direct investment for PR's maritime terminals or had a real interest in developing one; hence, protecting those who are investing locally should be justified'. However, also said that in some areas it might be necessary some changes. For instance, the following activities should be liberalised for the local benefit (C<sub>1</sub>P2):

1. Port bay maintenance, such as dredging and researching;
2. The requirement of US tankers to carry fuel (oil and LNG);
3. Specific activities such as the building and maintenance of floating wind turbines for power generation.

Regarding a general consideration of what should be liberalised in the Act to the benefit of all its participants, the shipbuilding restriction was highlighted. According to various interviewees, the decision to build a vessel should be a corporate and not a government decision when it is well known that a very limited number of vessels is built in the US due to the high cost of production. Logically, this over-cost of shipbuilding has an impact on the cost of trade and it will be paid for by the consumers eventually.

As an anecdotal experience, early in the 2000s we were looking for a firm to do dredging to improve the 'road' and do maintenance. The domestic firms quoted around \$5.00 per cubic yard, but a Belgium firm quoted \$3.00 with a very high standard of references. However, we cannot contract them because of the flagging limitations. As a result, the cost of that task resulted in several million dollars over what it would have been with the Belgians. (C<sub>1</sub>P2)

### **6.2.0 Fresh produce importers**

PR's fresh-produce wholesalers' imports supply vegetables, fruits and roots to processors, supermarkets, hotels, local businesses and some exports to the small islands abroad. Their imports are highly perishable and their purchasing orders, whilst forecasted, should be accurate to avoid overstocking products. In this sector 'safety stock' levels are not a regular practice. They are highly regulated businesses, particularly affected by the SPS frameworks. In their case the local (PR), domestic (US) and some foreign regulations to trade may apply. These agribusinesses are over 95%

dependent on maritime services provided by external corporations. Besides, factors such as inland transportation and seasonality are influential in their logistics and its costs. All of the firms are situated relatively near to the port of San Juan. Although geographically gathered, they do not act as an integrated cluster, no cooperation being reported among them, and their rivalry is considered to be high.

Generally, their businesses are based on meticulous management of refrigerated containers, as well as produce carried in regular tanks, such as roots, coconuts and other less perishable produce. They purchase and import according to certain specifications. Having arrived in the port, they may collect, reinspect, sort, package or repackage and distribute the produce to their retailers. Their competition is based more on price per unit than on uniqueness. Their products are not branded or well known by the people but for their clients. Only one local firm (Co11) is completely diversified (produce, beverages and personal care) and recently started an innovation programme and food manufacturing.

The key for success and permanency in this agribusiness is based on freshness, but its biggest challenge is its perishability. The other skills or challenges are similar to the rest of businesses. (ACo9)

As mentioned in Chapter 5, seven firms are recognised as fresh produce importers. It is estimated that together they represent around \$230 million in sales per year, but around 80% of it is sold by three of them (Table 28).

Table 28: Participant firms of the PR's fresh produce sector

Company	Localisation	Annual Income	Business Diversification			Containers	Containers Annual Vol.	Produce from US	Type of Deal	Produce Main Origins	In Operation	Family Co.
	N/C/W/E/S	(MM/USD)	Produce	Other fresh produce	Manufactured Products	(D)(F)	Units FEU	%**		Most Popular Countries	Years	
10	North	\$102	X	X		(D)(F)	2,600	70%	MC & 3PC	US/Costa Rica/ Dom. Rep./Peru	55	X
9	North	\$55	X			(D)(F)	1,100	90%	MC	US/Dom. Rep./ Nicaragua/Colombia	53	X
11	North	\$500*	X	X	X	(D)(F)	4,000	95%	MC & 3PC	US/Costa Rica/ Dom. Rep./Panama/ Europe	3	

\* Approximately \$40 MM is in fresh produce sales. \*\* Estimated.

(D)=domestic; (F)=foreign; MC=maritime contractor; 3PC=third-party contractor.

### 6.2.1 Outlining the logistics and sea transportation cost dimension

In this sector the purchasing process is relatively dynamic. It is highly dependent on the products' availability (production) and seasonality. For these PR agribusinesses, Jacksonville (Florida, US) is their most important port, from which they receive more than 60% of their entire goods. All of the participants admitted that is not uncommon for them to buy produce, particularly green leaves<sup>109</sup>, in California (US). These goods are transported inland (by truck between 4 and 6 days) to be consolidated (if necessary) in Florida and then moved in a new container to the port of Jacksonville, from which they will be exported to PR. It is estimated that this trip is around 2,600 miles or in time it is between 36 and 48 hours. Certainly, this involves higher costs and logistic challenges associated with the road risks. Journeys from farm products from Florida, Georgia and North Carolina although shorter, the time is between 8 and 36 hours. This brings certain flexibility, particularly to managing tomatoes, citric fruits, peaches, sweet potatoes and others. Commonly for PR's importers, their port's cut-off time is Friday at 15:00 to be received in San Juan after three to five days of sea transit. The days required for loading and transit will depend on the company, type of vessel and space availability.

In comparison with domestic produce, the transit time of Latin American produce, particularly from Central and South America, is less accurate, especially regarding its port arrivals. These vessels regularly arrive on Thursday (B<sub>2</sub>Co9; BCo10). In the case of products from the Dominican Republic, in comparison with others, the transit time is relatively short.

It should be clarified that in both services (domestic and foreign), factors beyond the control of the maritime lines may occur. For instance, variables associated with the season (e.g. high tide or hurricanes) could affect one route more than the other, but a similar situation could occur if the conditions were reversed. However, it should be highlighted that, differently from the domestic produce, for the foreign imports a specific inspection protocol of the USDA has to be followed, which implies delays on delivery (BCo10). Generally, the delays are due to the high-traffic containers that

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<sup>109</sup> Such as lettuce (spp.), broccoli, spinach, cabbage, kale, celery, carrots, some vegetables and strawberries.



should be checked by the federal (US) and local (PR) inspectors and not during unloading.

### **Contracting maritime services**

A contract between the importing firms and the domestic maritime service provider is negotiated annually. The process estimates the cost of both sides, analysing the previous experience of trade by routes. Consequently, the importing firm guarantees a number of containers to be transported by the selected service provider at a fixed rate. According to all of the participants, the fuel charge factor is variable and very notable when the costs of fuel are rising. However, few or no changes per container rate are granted by the domestic firm when the fuel price is low or below the estimation (ACo10; BCo11).

The maritime service providers distribute their volume to carry according to the number of contractors but with a year ahead. The number of containers is the basis of negotiation: the higher the number of containers estimated to be imported in a year, the lower the fixed rate to negotiate will be. The participants stated that they distribute their containers among the maritime providers available in the market to guarantee access at any time in the worst-case scenario (ACo9; BCo10; BCo11). Apparently, these contracts are not a 'straightjacket' for the importers, because they regularly fix an easily manageable number of containers (BCo10). However, those without a contract would face the risk of space availability and pay the rate on the market, which will easily be hundreds of dollars per container over a fixed agreement. Similarly, the maritime providers every year could require higher volumes and/or changes in rates, but it is part of a very dynamic process of negotiation.

In the case of the foreign maritime service providers, the process is quite different. Regularly, foreign producers have their own agreements with the maritime transporters, and for this reason the importers purchase the goods in the form of CIFs.<sup>110</sup> Under that kind of contract, sellers perform the product collection, packaging, consolidation, booking of the vessel, inspection at the exporting port, shipment and

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<sup>110</sup> The acronym means cost, insurance and freight. It is a trade term requiring the seller to arrange for the carriage of goods by sea to a port of destination and provide the buyer with the documents necessary to obtain the goods from the carrier.

travel until it arrives at the importers' port (San Juan). Practically, the whole process is undertaken by the sellers, and they send to the buyers a tracking schedule and the expected time of arrival (ETA) in PR's territorial waters by email (BCo10). Although this is the most common process for foreign imports, one of the participants posits that it is not much different than for the domestic maritime providers. It will depend on the volume, which in PR's market is relatively low from outside the US (B<sub>1</sub>Co9). One particular service that foreign maritime providers include in their rates is the delivery type 'door to port: port to door', which is not commonly accessible with domestic imports (BCo10). Contrasting the two processes, all of the participants agreed that the foreign services are relatively less complex for them but involve some timing inaccuracies (ACo9; BCo10; BCo11).

### **Secondary services**

Consolidation service providers are another echelon, particularly for LCL shipments. Certainly, LCL shipping can cost considerably more than FCL shipping, but for perishable materials such as fruits and vegetables it is not uncommon to fill containers with one type of produce but from different cooperatives of producers and/or regions (counties or states). Similarly, some products could be transported together in pallets by segmenting the containers (mixed containers). It is believed that LCL cargo shipments have increased because companies are skittish about buying some products in volume or because their capacity is limited.

Smaller shipments can sometimes be the most cost-effective choice for certain combinations of goods, order size and market needs. Some maritime service providers may offer this option to reduce costs, such as consolidation close to the sourcing points. Other consolidation companies in partnership with different maritime lines are strategically situated in areas in which their goods are picked up from multiple suppliers along a corridor to create a consolidated container. The distances to the nearest port<sup>111</sup> and the volume of products to manage might result in a lower cost than transporting the goods inland all the way to the port area than paying subsequently for consolidation services and the same at the destination. However, it

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<sup>111</sup> The distance could be varied but in minutes is generally between 10 and 25 minutes from their port terminals.

will add more procedures and risks, such as extra handling (damaging produce and robbery), more SPS protocols to follow, extra care with inspections (mixing deliveries) and shipping documentation, besides the extra time provoked by stops before arrival at the destination port. These pre-shipping services are additional costs.

For the participants these consolidation services, associated with the maritime providers, are highly recognised by the domestic lines but rarely by the Latin American lines (ACo9; B<sub>2</sub>Co9; BCo10; BCo11). They consider that, due to the high volume of products shipped through Jacksonville,<sup>112</sup> the possibility of mixing containers is higher than that in foreign lines. Nevertheless, one of the interviewees said that the number of consolidators in Jacksonville has significantly reduced over the last decade. Thus, the consolidation process there is not as easy as it was before, and in the future it is likely to be under the control of the maritime providers too. It is believed that the majority of these companies in Jacksonville were family businesses that decided to close their operations due to the lack of a succession line and the competition with the services provided by some maritime firms (BCo10).

The participants recognised that this consolidation service could be considered as a benefit associated with the domestic rather than the international trade (Latin American services). However, once asked, all of them expressed curiosity to know why this kind of service has not been identified by their firms and/or their contractors. The limitations in logistics' sophistication and greater integration in the process would probably be an opportunity for the Latin American suppliers.

A service like this could be very useful in ports highly associated with multiple agricultural products, such as 'Limon Port' in Costa Rica. (BCo10)

### **Third-party container contractors (3PCs)**

Another echelon in the supply chain is the third-party container services (3PCs). Only two of the participant firms have this service and both expressed satisfaction with it.

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<sup>112</sup> Port of Jacksonville, Florida, US. According to MIDA (2015), around 93% of the food imported to PR is exported from this port.

Similar comments were made by another participant who was not linked to this sector of fresh produce (ACo13). In PR this kind of service is provided by various companies.

These intermediaries, commonly in domestic but also in foreign providers, offer different services associated with containers' consolidation. For instance, produce and processed food from places abroad are imported in very high volumes for the US market. Some consolidators in partnership with local importers have added the needs of PR to the US market list. As a result, the domestic imports to PR could have their real origins in some foreign place and by trans-shipment in the US were consolidated for the market of PR (C<sub>1</sub>P3).

Well, we have been importing clementines from South Africa and garlic from Spain, but normally they are coming via Jacksonville. (BCo10)

Perhaps the most interesting service provided by the 3PCs is the space on a cargo vessel. They are in partnership with the maritime companies, contracting a high volume of containers per month. The 3PCs, having negotiated their rates, include their particular services and offer an all-inclusive service but at an equal or slightly higher rate in comparison with the rates that the maritime transporter firms offer in the market. Sometimes the 3PCs' rates are very attractive, even below the rates of the maritime firms and perhaps the basis previously negotiated and contracted between an importer and its maritime providers. In addition, a pre-agreement annual contract is not necessarily required with them, which allows flexibility. They also offer other consolidation services, such as container management and receiving, and other inspection fees are included.

Probably all of these services might add \$150 per container over the basic costs, but their services represent saving in the cost of management that otherwise the importer should handle and manage in-house. (BCo10)

### **6.2.2 Domestic vs. foreign**

All of the participants affirmed that the best rates per distance are offered by the foreign maritime service providers. One of them highlighted that, evaluating their

cost-effectiveness, these firms offer much more competitive prices per MT transported. Perhaps ‘prima facie’ their prices would seem higher, but taking into account the factors of distance and the services included as part of their quote, the differences in rates are in favour of the foreign firms (ACo9; BCo10). On the contrary, domestic services, such as inland carriers, consolidation and management, vessel booking and so on, are charged in addition to the maritime cargo services. Generally, these services are offered by different suppliers. Eventually, all of these elements associated with transport will have an effect on the price of the product.

To contrast the maritime services, various factors were presented to the participants to identify the differences between domestic and foreign companies. These factors were punctuality, intercommunication, product or container management and cultural issues (Table 29).

Table 29: Importers’ perception of the Latin American exporters

Firm	Quality			Insecurity				Intercommunication		
	Packaging	Product	Handling	On Trade (Distrust)	Technical	SPS Regulations	Political Stability	Language Issues	Phone/Fax	Online
10	HQ	HQ	HQ	Low	Medium	High	Low	Low	Low	Very High
9	HQ	Good	Good	Low	Medium	Very High	Low	Low	High	Medium
11	Medium	Good	Medium	Low	Medium	High	Low	Low	Medium	High
13	Medium	Low	Good	Medium	Very High	Very High	Low	Low	Medium	Medium

Note: SPS=Sanitary and phytosanitary policies; HQ= high quality.

Regarding delays or inaccuracies in the delivery schedules or ETA, the participants affirmed that it would depend on the maritime firms. Some lines are much more punctual than others, but interviewees categorised the foreign maritime firms as the group with the most frequent occurrence of unpunctuality. However, since Horizon’s closure the domestic transport is showing more problems.

Since Horizon’s closing the delays in the domestics increased substantially. Horizon’s was well known for its faster ships, challenging the other two firms. Now, I suspect that without that challenge and being only two firms, ‘slow-steaming practices’<sup>113</sup> and the lay-up<sup>114</sup> are adding more difficulties to our logistics. (ACo9)

<sup>113</sup> Intentional reduction of speed to save money on fuel.

<sup>114</sup> Practice of mooring until its cargo capacity is full, highly affected by supply and demand.

Nevertheless, various participants recognised that, considering distance, the environmental factors and the number of port deliveries between the origin and the port of San Juan are elements that should be taken into account, because generally they are beyond the control of the transporters. Besides, it was said that, except for mechanical issues, once a ship has announced a delay, many other vessels are delayed too, generally due to the same inconvenience or a result of it (BCo10).

Well ... to me Evergreen is not like Dole. Dole is like a Swiss clock; its failures are a few. But to me, Maersk is the worst of all. Moreover, if they have an inspection in Panamá, its delay could easily be for more than five days, losing its trans-shipment connection to San Juan. Honestly, according to my experience with Latin American [Center and South America] imports, to me the best from there are APL (American Presidents Line), Hapag-Lloyd and Dole. In that order and no more. (B<sub>2</sub>Co9)

Concerning the intercommunication issues, which are those associated with identifying problems in shipping or tracking containers, all of the participants said that the domestic firms are more diligent or at least it is easier to obtain information from their website or by email. Apparently, domestic firms are more client oriented about informing issues on board that may cause delays or other problems that would be managed in advance if the importer was informed. One of the participants said that a reason to hire a 3PC was precisely to reduce logistical uncertainties due to the lack of communication of the foreign maritime firm contracted by its produce supplier in Latin America (BCo11). Undeniably, decades of business relationship between the US container system and PR's importers are the basis for this. Traditional local agribusiness importers are more familiar with the online service for tracking containers from the domestic maritime firms than with any other (new) system from abroad.

Having more than a decade in this business, I should say that in around 10% to 12% of the foreign shipping (with different lines) I have intercommunication issues related to container tracking or problems on board. In the domestic firms this could be around 2% of their services to me. (BCo10)

In general, the fresh-produce importers' participants have higher expectations of the foreign products imported. They said that basically their Latin American providers accomplish or exceed their requirements for produce packaging and other qualitative elements.

The local producer and our Latin American suppliers learned how to work according to our market requirements; hence, their products are similar to or better than those from the US. Contrasting product by product, packaging, appearance and management, I should say that currently their differences are insignificant. (ACo9)

This sector is also affected by many other NTMs, such as SPS restrictions, labelling and packaging, that sometimes limit the ratio of action. However, cultural or business traditions may create self-restrictions with a large operational effect or an impact on competitiveness.

Currently, many of the traditionally US produce types are now harvested by Latin America's (Central and South) providers, carrots for example. Although we buy them from Latin America, particularly when the prices are preposterously high in the US, I should admit that it is more for the climate conditions than for the prices. (B<sub>2</sub>Co9)

Since 1997 containers have faced some management restrictions in the US by the Safe Container Act. The gross cargo weight (gcw) is one of them and it varies according to the container size. This regulation is relatively common in many developed countries and in some LDCs too. For instance, in the US the limits are lower (40' max gcw 20 MT) than in Mexico (40' max gcw 21 MT), Canada (40' max gcw 21.8 MT), the UK (40' max gcw 26 MT) and Japan (40' max gcw 30 MT). However, currently the gcw factor is less strict for shipping containers from the Dominican Republic, and it seems that they are managing heavier containers than those from the US.

Sometimes the shipping containers received from the Dominican Republic are outdated, corroded, ugly and heavily maltreated. Many of the products that we import from them are wrapped in pallets; thus, some products are on the [containers'] floor. Their weight restrictions

are relaxed, which is positive to me once the product arrives well and according to my quality requirements. (B<sub>2</sub>Co9)

Clearly, PR's importers are not restricted to importing products only from the US market; thus, the market could be considered to be an open market. However, for importing food and agricultural products, other NTMs have to be taken into account. Consequently, the application of all the US regulations to food, labelling, canning and so forth on PR's market reduces the number of places to trade. Furthermore, whilst for the domestic imports the inspection protocols at the port are practically non-existent, for the foreign imports they are complex. The delay in trucking a container will depend on the arrival time of the ship and the number of containers queuing. It is not unusual for foreign arrivals between 15:00 and 17:00 to schedule an inspection time 24 hours later. For instance, once the containers have been discharged from the ship and the process of container recognition begun, consisting of inspection, fumigation and other red-tape procedures, they are normally completed in 12 to 72 labour hours.<sup>115</sup>

In my professional experience dealing with the elements of quality, produce management and packaging, I have not noticed big differences between foreign and domestic produce. However, the SPS inspections and port complexities on imports from abroad are the major obstacle to looking more to Central and South American suppliers. (B<sub>1</sub>Co9)

### **6.2.3 Firms' strategies to deal with the cost of sea transport**

To deal with an increase in their costs, businesses commonly transfer these costs to their buyer. In open food markets, this is a more complex process due to strong competition. To deal with the change in costs, companies should develop strategies to survive the rivalry, especially if their options to trade are limited.

One of the respondents said that the firm had decided to apply some ideas from Toyota's 'lean manufacturing theory' (BCo10). It forecasted negative effects on consumers' purchasing power but also the risk of their firm losing market positioning. Implementing some ideas to apply the theory, they made some cuts to optimise

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<sup>115</sup> The working hours of the port inspectors of the USDA and the PRDA differ by season and are fewer than those of the private service providers.



procedures as well as its protocols for purchasing food (ACo10). According to the firm's participants, these changes are helping them to reduce its internal costs. However, little was said about a wider search for providers.

One dimension that is not directly associated with the Cabotage Act but that influences the cost of trade is the years of business partnerships between importers and suppliers. Purchasing teams are focused in the same companies that traditionally were trading without seeking competitors. Certainly, this is not negative point at all when it is part of a dynamic market analysis but it might be when purchasing decisions are taken without an ample analysis of providers. The firms interviewed are based on 'high reliability' of their suppliers; thus, searching for new providers is undertaken sporadically. Therefore, although the rates for transporting inland are higher than the sea freight rates,<sup>116</sup> a business partnership extending over years has a higher probability of trade than searching for options abroad and in better conditions.

You are making me reflect hard about it. I have to admit that with some frequency we begin the searching process to eventually supply a client, but at the end of the day my purchasing team selects the same provider that traditionally supplies us. We are always doing the same. Although it is 'better the devil you know', we are in a comfort zone. Lack of doing different things and trying to search for options at least to identify other possible providers. (BCo10)

Negotiating the maritime cost in advance is one of the most frequent recommendations mentioned by the participants. In this market having a tight and frequent business relationship with these service providers seems to be vital to achieve fair deals. Whilst it seems to be relatively easy for those with high volumes, this is not necessarily the case for the smaller firms. The lack of competitiveness in the maritime service providers affects their costs, more dramatically after Horizon dropped out of PR's market. Currently, all of the importers are limited to two domestic maritime service providers, and logically the most profitable importers for the maritime firms would be their first natural choice.

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<sup>116</sup> An anecdotal example was the case of purchasing green leaves from California and transporting them to Jacksonville. The inland rate is over \$6,000 and the sea rate from Jacksonville to San Juan (PR) is around \$4,000. Consequently, a container of 900 cartons of lettuce is almost \$10 per box over the produce price as a result of the cost of transport (BCo10).

The maritime market needs more service providers because currently the fresh-produce importers are choosing between a single, faster, limited-space company (Sea Star) and a firm with space in a slow vessel (Crowley). Both scenarios limit our businesses. I am of the belief that having more ways for transporting imports or having faster ships to trade, the local businesses would be much better and our consumers too. (B<sub>2</sub>Co9)

#### **6.2.4 Cabotage: What did the fresh produce importers say about it?**

All of the participant firms in this category expressed their disagreement with the application of the US Cabotage Act to PR's market. Their most common argument was based on the over-cost added to their imports. A few of them argued that the lack of competition of maritime transporters in PR is the most problematic issue, but a bigger problem is the lack of vessels that are properly prepared for reefers. According to them, both scenarios are having serious effects on their businesses, increasing the cost for the consumers.

The US Cabotage Act is a straightjacket that limits my business, restricting my logistics and resources and affecting my wishes of produce to import or what I cannot due to its cost. Liberalising these transporting resources that are not currently allowed in this market, I would have more flexibility to do more in my business and for my clients. (ACo9)

An example of how this cabotage may restrict the supply chain logistics in this economic sector is some produce from New York. One of the most frequent suppliers of potatoes in PR has its origins in the port of Halifax in Canada, which also carries other supplies to some of the British Caribbean Islands. Consequently, to optimise the shipping and reduce the inefficiencies and time, one possible option could be to stop in NY to collect some products for PR. However, this is not allowed by the US Cabotage Act; as a result, the importer should schedule a US-flagged vessel to obtain these products or transport them by inland trucking to the Jacksonville Port, which has more frequent trips to San Juan.

The cabotage limitation for the use of foreign vessels affects my logistic optimisation and as a result the price to do business and my produce on the shelf. (BCo11)

Due to the complexities provoked by Horizon's shutdown, one of the firms' participants was focused on finding space on a ship to carry imported products from Jacksonville. The firm has an annual sales volume of over \$50 million, but its volume of containers is the smallest in comparison with the other two participants. In this case the firm was informed that, due to the lack of shipping spaces, its schedule for importing and receiving logistics should be booked no less than two and a half weeks in advance. Clearly, for non-perishable materials such as furniture or equipments, this is not necessarily a problem, but it is a complex issue for fresh products and some processed food.

Although relatively insignificant in comparison with the current scenario in Jacksonville's port, various agribusinesses spoke about a distortion of imports two years ago with a foreign maritime provider. They said that at that time DOLE decided to cancel its weekly route between San Juan (PR) and Guayaquil (Ecuador). That decision affected the supplies of several produce very popular in the traditional cuisine of PR. The biggest impact of the distortion was experienced more in the countryside, particularly by rural families, traditional cafeterias or restaurants. Fortunately, months later another foreign maritime line adopted the route twice a month. However, the process was slow, the trips were limited and the prices were higher due to the reduction of the market volume.

The factor of dependency that PR has on other markets to sustain its more basic needs for food is certainly more dramatic when the service of transportation is totally privatised and the market is relatively limited in its ability to adopt counterbalance measures. On the other hand, the forms of purchasing in this importing sector of PR followed the US season of production, which means that when the US market lacks some produce, its importers look abroad<sup>117</sup>. As a result, except for some roots or tanners (so far not produced in the US), the fresh-produce importers have their

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<sup>117</sup> Particularly to the Latin American markets but it is fundamentally lead by seasonality.

itinerary of purchasing starting and ending with the US production. For instance, for green leaves, their main suppliers are the west coast of the US, then in mid-autumn Mexico, then in the spring the southeast coast of Canada and then California until the next cycle. For fruits, the cycle begins on the (US) west coast then moves to the south coast until winter, when Peru and eventually Chile become the suppliers until late spring, when they return to California. These systematic forms of trading follow the US market due to the fact that, from the perspective of volume, they can buy at lower prices in comparison with PR. As a result, the US purchasers and consolidation firms, in partnership with PR's importers, may supply foreign products in accordance with the restrictions of SPS measures applicable at relatively competitive prices for their standards. Inevitably, the domestic maritime service providers have to be contracted to carry these supplies by the mainland to PR.

Due to the fact that perfect substitution is not always possible in this business, the Cabotage Act is a given constraint on this market. We have to deal with it, hence reducing the time and many of our efficiencies. (ACo10)

The markets of produce have small margins for profit, but on the contrary fruits and vegetables are not subsidised as grains are in the US system. To ship them, although dry-bulk vessels require high volumes, the grain systems of transport are simpler and more diversified than those for transporting produce. Many additional variables over the price of the commodity affect produces' cost, such as the cost of its management, refrigerated containers, transportation (inland and ocean), logistics and regulatory frameworks. Additionally, the elements of relatively low volume, little competition in the market (lack of production) and low availability of domestic maritime transporters cause the price of the affected goods, such as fruits and vegetables, to rise disproportionately.

It is like a tax to preserve inefficiency but in a category of products that, according to the international health organisations, should be more consumed by the people. (ACo10)

Another dimension was presented by the expected new ships with higher capacities that in a year will be incorporated into PR's market. Undeniably, new and efficient

vessels to transport reefers are highly necessary. The pace of the international maritime providers in the last decade was moving in a similar direction to become more efficient (Burns, 2015). However, sustainability patterns in PR's businesses are not well known; thus, business decision making tends to consider limited scenarios of almost five years without much analysis of the underlying elements. Therefore, if the PR's economy situation are taken into account – a reduction in population and exportation; the relatively high cost of energy; and the reduction in the annual family expenses at the supermarket level<sup>118</sup> – how will the (four) new ships exclusively for PR's route be cost-effective for the current domestic<sup>119</sup> maritime providers?

### **6.2.5 Differences in container costs**

The cost of trade (exports and imports) has a significant relationship with nations' competitiveness (Sardy & Fetscherin, 2009). SIDSs regularly show a cost of their shipping trade that is 2% over the average global cost (Penello-Rial, 2014). As a result, a cost comparison of containers should consider various elements in addition to the distance between the points of origin and delivery.

The number of containers or the volume of trade is an influential variable on rate negotiations, but differences in maritime service providers and the market season are also factors to consider. Regarding the last two variables (providers and seasons), few data was generated from our interviews, but it was suggested that PR's market has low- and high-seasonal transit. During November and January (high-season), the risk of stranding due to the lack of space in a vessel is elevated for those without contract agreements.

The data concerning the domestic maritime transportation rates were relatively limited. It was generated through interviews and presented below (Table 30). It should be mentioned that the majority of the participating firms were reluctant to show their official annual contracts fixing the prices of containers. Nevertheless, the differences in price are noticeable among importing companies (Co), more specifically in trade from Jacksonville.

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<sup>118</sup> MIDA (2014) estimates a reduction of 14% less than in 2013.

<sup>119</sup> The price of Crowley and Sea Star new LNG ships (two each) for PR' was estimated to be over \$200 million per ship.

Table 30: Price (USD) per FEU<sup>120</sup> refrigerated containers and distance (n.m.) from the port of origin to the port of San Juan, PR

Origin	Distance (n.m.)	Days	Co 9	Co 10	Co 11	Other
Jacksonville, US	1333	4	5,350	4,500	4,000	6,300***
California, US	*	9	N/P	9,000	10,500	
Miami, US	1057	3.5	N/P	N/P	N/P	6,688
Philadelphia, US	*	8	7,000	N/P	N/P	
Sto. Domingo, DR	300	0.7	2,200	2,300	2,250	1,057—1,250**
Pto. Limón, CR	1342	3.5	2,800—3,300	N/P	2,500	
Nicaragua	1500	3.5 — 5.5	2,400—3,300	N/P	2,300	
Colombia			3,450			

Note: 12th of December - 10th of February.

\* Inland to Jacksonville.

\*\* 45 foot NOT refrigerated container from Haina Port. The rate varies by volume; the first is 7 containers vs. 1 container, respectively.

\*\*\* The price for 45-foot containers is \$300 higher.

The differences are highly associated with the number of containers imported annually by the firm from this particular place. For instance, Co 11 reports 4,000 containers per year; on the contrary, the column 'Other' shows the prices of 2 companies with fewer than 12 containers (FEU reefer). Furthermore, the differences between Latin American containers and US ones are notable, as well as the differences in the costs of transport between non-refrigerated containers and reefers. These variables are not considered in various publications (Alameda & Valentín, 2014; Cruz et al, 2014; Herrero et al, 2001), particularly the differences in the sizes (45' and 52'), usage and costs of containers that are available in the domestic market but not commonly abroad.

The Transpacific Stabilization Agreement's (TSA) official website<sup>121</sup> was consulted as a comparison exercise of FEU prices in relation to distances (Table 31). Since 1989 its activities have included recommending minimum voluntary contract rates for containers between the North or Southeast Asian ports and the West or East and the Gulf Coast of the US. Although the prices available are for regular FEUs (not reefers) and regular deliveries (not-intermodal), they could be considered useful for highlighting the differences in cost per nautical mile (n.m.). However, as it was previously mentioned, lower volumes of trade, trade imbalances, cargo vessel unit

<sup>120</sup> Forty-foot equivalent unit.

<sup>121</sup> <http://www.tsacarriers.org>.

inefficiencies, outdated infrastructures and the lack of competition among the maritime service providers are elements that will empirically lead to higher freight costs (Penello-Rial, 2014).

Table 31: Comparative suggested (sj) prices per regular FEU from Asia to the US

Ports of Origin	Delivery Ports	Distance (n.m.)	Days	Min. (USD) Price(sj)
North Asia	US West Coast	> 4,500	>11	\$ 2,000
	US East Coast	> 11,000	>30	\$ 3,800
	US Gulf Coast	> 9,500	>25	\$ 3,800
Southeast Asia	US West Coast	> 6,000	>14	\$ 2,150
	US East Coast	> 11,000	>32	\$ 3,950
	US Gulf Coast	> 10,000	>28	\$ 3,950

Extracted from: Transpacific Stabilization Agreement (2015), for January 2015.

The comparative cost exercise for containers, although not in similar conditions, certainly shows substantial differences by distances, days of shipping and management. These variation factors are not always clear. Korinek and Sourdin (2009b) report that the rates of shipping between Dubai and Singapore (approx. 3,900 n.m., 17 days at 10 knots) are around \$300.00. In contrast, from Brazil (Port Termisa) to the US (Jacksonville) (approx. 4,200 n.m., 18 days at 10 knots), the rate reported is \$2,849. Castro-González et al (2013), using a quantitative competitiveness analysis, state that PR's cost per container (\$1,250) transported is higher than that of Costa Rica (\$1,190) and much higher than that of Singapore (\$456). Although the type of container used in their analysis is not mentioned, we suspect that the data are for regular TEUs, commonly used for non-perishable goods. Considering Szakonyi's (2014) rate (\$2,600) for a non-reefer TEU from Jacksonville to San Juan (1,333 n.m.) it is clear that it is cheaper to move a similar container from the Port of Busan in South Korea to the Port of San Francisco, California in the US (almost 4,500 n.m.).

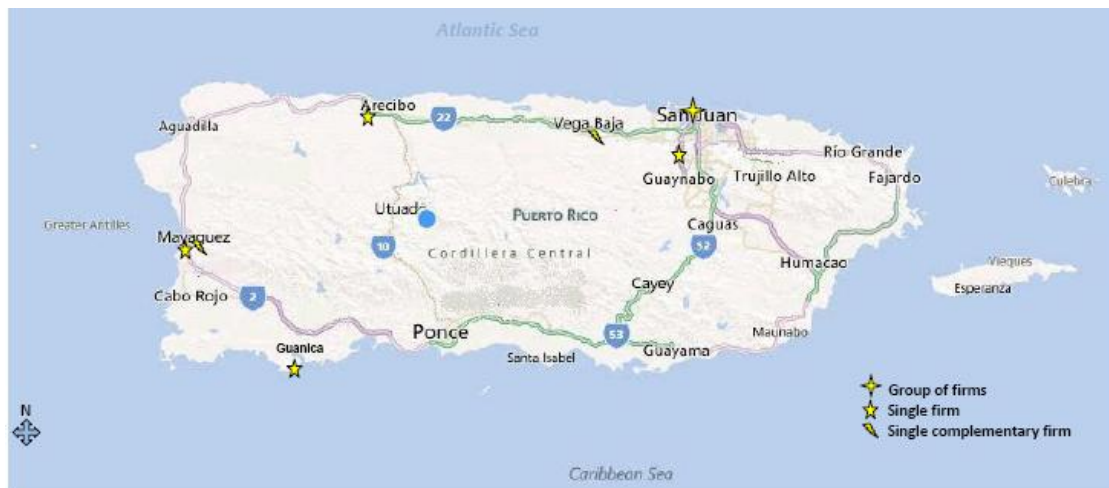
### 6.3.0 Grain sector

Some aspects of the grain market are relatively predictable, particularly the need for large amounts of grain for feeding in livestock production markets. However, many other aspects of this market are extremely volatile and complex (King, 2014).

### 6.3.1 Outlining the logistics and sea transportation cost dimension

PR's animal feed mill sector currently consists of eight firms (Fig.40), but three of them were recently consolidated. Altogether they represent around \$250 million in sales per year. Their domestic and foreign imports could be estimated to be approximately \$130 million and \$35 million, respectively, per year.<sup>122</sup> None of the grain firms of PR have a logistics division or internal personnel dedicated to or specialised in optimising the freight cost. In all of them the grain-importing process is led and authorised by the manager or CEO. The sea transportation is supplied by external providers. None of the firms have vessels as part of their inventory, but one has a long-term agreement with a domestic maritime firm, providing a barge for use twice or more per month.

Figure 40: Geographical distribution of the animal feed mill firms in PR



Transportation services are not provided by the maritime terminal operators previously mentioned with based in San Juan Port. Transporting dry-bulk materials require different management from transporting containers. Grain imports in PR are carried in barges and charter ships, all of them directly contracted by the grain importers. All of the firms have external (outside PR) agreements with grain exporters and/or business advisory services based in the US. The descriptions of all of the importing firms, sea infrastructures, storage capacities and basic activities are gathered in Table 32.

<sup>122</sup> The data available about PR's external trade as an animal feed data segment show lower values due to the fact that they consider as cereals some particular grains that are frequently used in animal feed mills; hence, they are not classified in their section.



Table 32: Grain importers sector in Puerto Rico

Company	Mill Localisation	Employees	Annual Income (MM/USD)	Business Diversification			Storage Capacity (approx.)	Maritime Infrastructure				Containers	Main Grains Origins	Partnerships	
				Animal feed	Grain or mills for human	Other human products		Other farm products	MT (approx.)	Own Pier	Public Pier				Draught (m)
1†	South-West	0	N/A	X			X	N/A	X		6.7	80		US	
2	North	100	10		X	X	X	140,000		X	7.9	200–500	X	US/ Argentina /Brazil	(US)
3	North	47	34	X			X	26,000		X	8.5	400		PR importers/ Argentina/ Brazil	(G)
4	North		38	X			X							PR importers	(G)
5	West	73	40	X			X	28,000	X		7.3	350		US/Africa	(L)(G)
6	North and West	89	117	X	X	X	X	105,000	X		11.6	700–1,000		Global	
7	North-Central	27		X			X	10,000						PR importers and US	
8*	West		2	X			X		X		7.3	200**		Global	
4b <sup>Δ</sup>	North						X	N/A						D & F	(G)

†. This company is not in operation, since 2006. Actually, it is in a bankruptcy/litigation process.

\*. This company is not a grain importer but liquid for animal feed enrichments. Highly valuable for grain importers and livestock supplements.

Δ. Chemist company to produce animal feed premix of vitamins and minerals.

\*\* Rate is 13,541 gal/hrs but was converted into MT (approx).

Three of the participant firms have no access to the sea; thus, they are totally dependent on other importers to operate their animal feed mill. Three of the firms are established in the port of San Juan and two others in Mayaguez Port. Guanica's mill, which is currently closed, was administered by two different firms; therefore, the experiences and opinions of one participant per company were included in this research project.

Two firms are not factually grain importers but raw material importers for animal feed production. In this research these two importers are considered to be 'complementary companies'. One of them imports liquids and the other vitamins and minerals. Both are vital echelons in the elaboration process of the feedstuff. Certainly, these two firms are not directly affected by the volatile international cost of grain, but they are importers and are also affected by the cost of maritime transport.

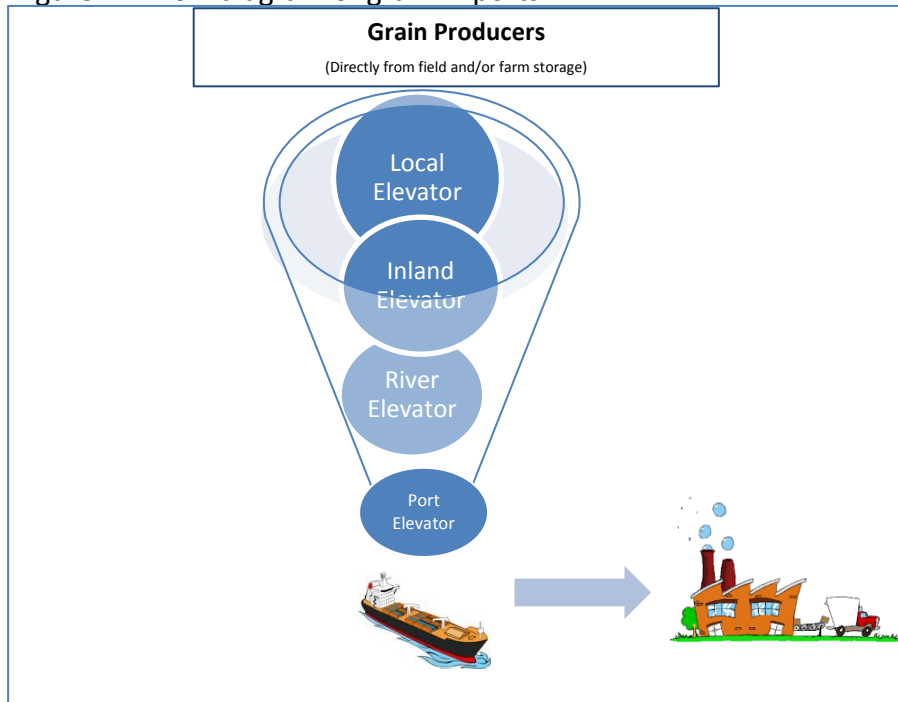
The process begins once the grain has been harvested and farmers transport it to on-farm storage, end-users or commercial grain facilities. The majority of the producers in the US move their product to other end-users (feed mills or processors) or commercial grain-handling facilities, such as local grain elevators, inland sub-terminal or river elevators, and port elevators. The Mississippi River is an inland transportation gateway in the US; hence, the production in the 'Corn Belt' is carried to the Gulf of Louisiana (NOLA), which is common for PR's importers (ACo3; ACo5). Whilst grain is considered to be a storable commodity that is produced every year, the futures prices for several delivery months may represent challenges affected by many variables. Due to the tropical condition of PR's weather, the capacity to store grain is regularly limited to a period of three to four months once received (BCo2; ACo3).

### **6.3.2 Basic supply chain of grains imported by PR's animal feed mills**

Inland elevators or river sub-terminals collect grains in quantities suitable for loading onto unit trains and/or barge tows for further transport. These elevators act more as collectors, usually receiving the majority of their corn from producers and smaller elevators. They are strategically located to transport bulk grain by unit trains or barges. They provide some services, such as drying, cleaning, blending, storing and merchandising grain; thus, an extra fee should be added by the echelon. River

elevators and the larger inland sub-terminals supply most of the corn destined for export markets (US Grain Council, 2013) (Fig.41).

Figure 41: Flow diagram of grain imports in PR



In addition to the cost of grain, the barge has its rates for this journey. They are very dynamic and may change weekly. The rates could vary by the origin city of the grain, the number of stops of the carrier, fuel, volume, weather conditions, storage costs, local conditions, supply and demand and a few other factors. These factors are named the '*basis*', because they are the difference between the current local cash price and the futures price of the contract with the closest delivery month (Hofstrand, 2009). Additionally, it is believed that elevators that handle feed grains on the Atlantic US south coast have some kind of draught or vessel size restriction (US Grain Council, 2013).

The local and Chicago World Trade (CWT) cash price differs by transportation costs, so the *basis patterns* may vary by geographical factors from one area to another. For instance, in the first week of November (2015), the southbound basis rates are estimated to be between \$205 and \$430 (Table 33). The surcharge fees by tonne carried are between \$6 and \$26, and the fuel charge should be included (USDA-AMS, 2015). Additionally, once into the ocean, the vessel will impose a rate per day of the

journey. Upon receiving the vessel, the charterer becomes the *de facto* party responsible for giving the ship orders, providing fuel and livelihood and paying any fees to unload the material, including port and canal fees, local taxes, wharfage and dockage charges, and employees.

Table 33: Barge rates for major grain shipping points in the US that supply PR's market  
**Weekly barge freight rates: southbound only**

		Twin Cities	Mid-Mississippi	Lower Illinois River	St. Louis	Cincinnati	Lower Ohio	Cairo-Memphis
<b>Rate*</b>	11/10/2015	388	328	313	230	300	300	205
	11/3/2015	417	365	362	265	350	350	222
<b>\$/tonne</b>								
	11/10/2015	24.02	17.45	14.52	9.18	14.07	12.12	6.44
	11/3/2015	25.81	19.42	16.80	10.57	16.42	14.14	6.97
<b>Current week % change form the same week:</b>								
	Last year	-40	-55	-59	-66	-59	-59	-62
	3-year avg.**	-38	-51	-54	-63	-56	-56	-64
<b>Rate*</b>								
	December	-	-	330	235	295	295	198
	February	-	-	340	235	270	270	198

\* Rate-percentage of 1976 tariff benchmark index (1976=100%).

\*\* 4 week moving average; tonne=2,000 pounds; missing data due to winter closure.

Source: USDA-AMS (2015).

The maritime transport cost makes up a substantial share of the value of trade goods. Korinek and Sourdin (2009b) estimate that on average the cost of shipping is around 5% of the imported value in manufactured goods, 11% in agricultural goods and 24% in industrial raw materials (OECD, 2014). The International Grain Council's Grain Freight Index (GFI) was hovering near 4,800 in mid-November, a rise from around 4,000 points a year earlier, reflected in the prices on key routes (King, 2014). For instance, in November 2012, the average cost of shipping heavy grain from the US Gulf to the EU was approximately \$18 per MT. A year later the price had risen to \$24 per MT. From the US Gulf to Japan, the cost for transporting a similar commodity was \$51 per MT, which, in comparison with the year before, represented an increase of \$4 per MT (King, 2014).

Corn's quality changes during transport in much the same manner as it changes during storage. The causes of these changes include moisture variability, moisture migration due to temperature differences, high humidity, air temperatures variation, and biotic contamination. However, there are some factors that affect grain transportation that

make quality control during transport more difficult than in fixed storage facilities. First, there are a few modes of transport equipped with aeration, and, as a result, corrective actions for heating and moisture migration cannot be taken during transportation. Another factor is the accumulation of fine material (spout lines) near the centre when loading barges and ocean vessels. The third factor is seawater dropping into the hatch or wet containers (US Grain Council, 2013).

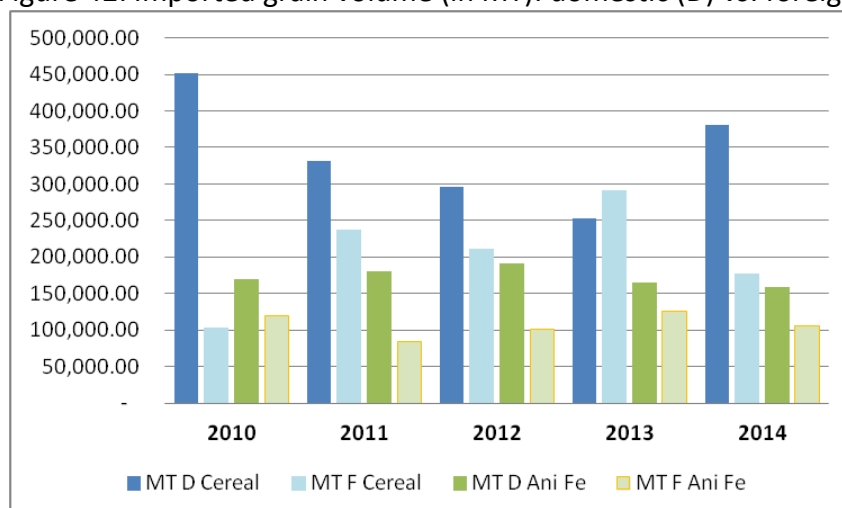
The lack of a dockyard infrastructure and draught may limit PR's grain importers' firms to vessels no more than 7 metres in depth. For instance, grain cargo ships with 25,000 tonnes or more (7.50 m) will be problematic in their facilities. However, this is not a problem for the river barges commonly used by the grain producers in the US, but they are limited in capacity (between 12,000 and 18,000 tonnes) (C<sub>3</sub>Co3).

### **6.3.3 Market**

The total storage capacity of all animal feed grain-importing PR's firms is around 2 million MT per year. It is believed that the current market is consuming around a quarter of that volume (ACo3). As a result, the firms are technically working below their capacity.

The data shows a reduction in the domestic raw material imported, which is substituted by foreign commodities. In 2013 the volume (MT) of foreign raw material (cereals) imported to PR exceeded that of domestic cereal by 40,000 MT (Fig.42). The data on PR's external trade do not show a clear pattern between a low price – on average – per volume and an increase in the frequency of foreign imports. For instance, for the years 2011, 2012 and 2013, the frequency of domestic imports of grain (maize) was reduced by more than 20% in comparison with 2010 and 2014 (Table 34), but the average price per MT of foreign grain was not necessarily lower in comparison with the domestic price. Why then did the importers select the foreign grain at a higher price per MT than the domestic grain?

Figure 42: Imported grain volume (in MT): domestic (D) vs. foreign (F)



Extracted from: PRPB (2015); segmented by cereals and feedstuff raw materials.

Table 34: Comparative analysis by cost (USD) and volume of maize imports to PR: domestic vs. foreign

Yr	Frequency D vs. F	Value D	Vol. (MT) D	Value F	Vol. (MT) F	Av. \$/MT D*	Av. \$/MT F	Av \$/Yr CWT*
2010	72%	\$ 25,557,532.00	140,979.0	\$ 17,154,219.00	70,955.8	\$ 181.29	\$ 241.76	\$ 186.01
2011	57%	\$ 29,928,008.00	100,613.0	\$ 40,176,055.00	125,428.7	\$ 297.46	\$ 320.31	\$ 291.78
2012	48%	\$ 15,665,837.00	56,684.0	\$ 44,189,881.00	133,699.9	\$ 276.37	\$ 330.52	\$ 298.41
2013	36%	\$ 5,855,835.00	21,808.0	\$ 46,591,539.00	189,918.6	\$ 268.52	\$ 254.71	\$ 258.96
2014p	75%	\$ 21,643,912.00	99,027.0	\$ 6,959,029.00	31,832.1	\$ 218.57	\$ 218.62	\$ 212.04

Extracted from: PR's External Trade, IndexMundi and USDA.

\* A few basis costs are not included as in the foreign costs.

MT=metric tonne; D=domestic; F=foreign; Av=average; CWT=Chicago World Trade, USD.

Plenty of factors, internal or external to the importer firm, could be considered, particularly those related to the quality of grain as well as issues concerning the transportation cost. Allegedly, the cost of the domestic product versus the foreign one should not include other expenses associated with shipping. Although it could be logical to think that the value of the commodity would not take the transportation cost into consideration, two of the participants categorically affirmed that, on the contrary, this is the case for foreign imports (ACo3; ACo6). They posited that the price per MT reported by the foreign exporters include all the transportation services until delivery, and that is not the case for the domestic suppliers. Following their experience, they estimated that overall, although varying monthly, the domestic transportation cost is between \$8 and \$30 per MT higher than the foreign cost. In the

low-cost scenario, their decision to import is based more on quality than on price (ACo3). Quantitative data to support their argument was not provided. However, considering the mentioned over-cost (\$8.00) for domestic sea transport of maize (only), the cost for agribusinesses was estimated per year per sector. The analysis below is only theoretical, because the percentage of maize may change by formulation and phase of production. The same applies to the volume of consumption per animal per day used. Therefore, the exercise below is based on theoretical estimations to show the impact of cabotage.<sup>123</sup>

The suggested over-cost was considered to estimate the effects on the cost by unit of production. Variables such as the average volume of feedstuff consumed by a dairy cow (9 kg per day), the proportion of maize (70%) in a basic formulation in PR and the percentage of domestic imports of maize per year were considered (Table 35).

Table 35: Over-cost of transportation (\$8.00) per maize (MT) for PR's dairy farmers

Year	% Domestic origin/yr	Cost per unit/yr	Fixed No. units 2012	Total cost for the sector	Farms		
					100—199 units	200—299 units	300—350 units
2010	72%	\$ 15.12	90000	\$ 1,360,800.00	\$ 2,260.44	\$ 3,764.88	\$ 4,914.00
2011	57%	\$ 11.97	90000	\$ 1,077,300.00	\$ 1,789.52	\$ 2,980.53	\$ 3,890.25
2012	48%	\$ 10.08	90000	\$ 907,200.00	\$ 1,506.96	\$ 2,509.92	\$ 3,276.00
2013	36%	\$ 7.56	90000	\$ 680,400.00	\$ 1,130.22	\$ 1,882.44	\$ 2,457.00
2014	75%	\$ 15.75	90000	\$ 1,417,500.00	\$ 2,354.63	\$ 3,921.75	\$ 5,118.75

\* The formula used is basically 70% of maize. Unit is a cow in production.

A similar analysis was developed for the poultry sector (Table 36). It considered the average volume of feedstuff consumed by day per flock (9 MT), the mode in the number of annual flocks per farm (4) and the average proportion of maize (65%) in the feed formulation for poultry most commonly used in PR. For the swine producers, the analysis considered the consumption (1.2 kg) per day over 6.5 months and the percentage (65%) of maize in a basic formulation (Table 37).

<sup>123</sup> In 2015 the Dairy Farmers' Association commissioned a technical report to validate the nutritional facts in the commercial feedstuff produced by PR's animal feed mills. The report shows serious inconsistencies in the commercial formulations that were provided by them and were bought by farmers.

Table 36: Over-cost of transportation (\$8.00) per maize (MT) for PR's poultry farmers

Year	% domestic origin/yr	Units per farm cycle	Cost per farm/yr	Total cost for the sector
2010	72%	30,000	\$ 2,801.87	\$ 196,131.14
2011	57%	30,000	\$ 2,218.15	\$ 155,270.49
2012	48%	30,000	\$ 1,867.92	\$ 130,754.09
2013	36%	30,000	\$ 1,400.94	\$ 98,065.57
2014*	75%	30,000	\$ 3,648.27	\$ 255,379.09

\* Five flocks per year.

Table 37: Over-cost of transportation (\$8.00) per maize (MT) for PR's hog farmers

Year	% domestic origin/yr	Cost per unit/C	Fixed No. units 2013	Total cost for the sector	Units per farm			
					100–199	200–299	300–350	400–499
2010	72%	\$ 0.77	55,000	\$ 42,588.00	\$ 255.53	\$ 425.88	\$ 596.23	\$ 766.58
2011	57%	\$ 0.61	55,000	\$ 33,715.50	\$ 202.29	\$ 337.16	\$ 472.02	\$ 606.88
2012	48%	\$ 0.52	55,000	\$ 28,392.00	\$ 170.35	\$ 283.92	\$ 397.49	\$ 511.06
2013	36%	\$ 0.39	55,000	\$ 21,294.00	\$ 127.76	\$ 212.94	\$ 298.12	\$ 383.29
2014	75%	\$ 0.81	55,000	\$ 44,362.50	\$ 266.18	\$ 443.63	\$ 621.08	\$ 798.53

C= cycle of production. In PR is between 125-200 days.

These analyses only considered the over-cost of maize as a heavy grain. Soy meal, corn gluten, fishmeal and wheatmeal are also common ingredients used in feedstuff formulations in PR, and many of them are imported. However, the data available on these other ingredients are mixed with data on other products, not accurately classified or, in the case of corn gluten, the percentages in the formulations are relatively smaller. In addition, some of the ingredients or by-products used in formulations<sup>124</sup> are produced in PR and the data are not available. These limits the theoretical estimation of cabotage's cost in a feed formulation analysis.

The USDA-NASS (2015) estimates that PR's dairy sector farmers spend around \$80 million on animal feed annually. For the poultry sector, the cost estimation for feedstuff is \$11.2 million. The last number includes the egg sector. In the hog sector, the annual expenses for feedstuff are estimated to be \$4.1 million. Based on the participants' estimation of the domestic over-cost (\$8.00 MT) for transport, it is estimated that in 2010 PR's dairy farmers paid around \$1.36 million for that over-cost in the domestic transportation of maize. For the sectors of poultry and pig farmers, that cost is estimated to be \$196,131 and \$42,588 respectively.

<sup>124</sup> This is the case of wheat mesh and the premixed micronutrients' formulation.



#### **6.3.4 Domestic vs. foreign vessels**

Due to the frequent trading (8 to 15 journeys/year/firm) between PR's grain importers and US grain producers (exporters), the crews and technicians know the protocols and infrastructure challenges of PR well. For the participants these are routine processes. For example, the firm Moran from Louisiana has years of experience sailing to PR; as a result, it accesses San Juan Bay almost without any help.

The barges Caroline and Virginia regularly arrive in our dockyard without any issues. For us it is a very easy process, but that is not the case with the foreign. (C<sub>3</sub>Co3)

Foreign grain cargo ships received in PR from South America, Canada or Europe, for example, need much more assistance because it is not a frequent route for them. Unlike the containers' terminal, the private infrastructure of the grain-importing firms seems to be outdated. Furthermore, the process to unload grain in PR regularly requires the lifting of two bobcats on the ship hatch, and this is something that is commonly an issue for foreign cargoes. Additionally, brokers as intermediaries are required throughout the whole process. Sometimes the broker leads the process of docking, but in other cases the importer should impose its will to facilitate labour and logistics, particularly for shared cargoes. Apparently the communication between parties seems to be more straightforward with the domestic than with the foreign crews.

Due to the limits of PR's animal feed market, grain importers share vessels and commodities to reduce their cost of transportation or to take advantage of bigger volumes in the commodity for a better price (ACo1; BCo2; ACo3). Although negotiations and accords between the local grain importers seem not to be complex, the logistics and shipping coordination require precision and operational agreements (C<sub>3</sub>Co3).

The grain-importing firms have a direct relationship with equipment, ships and their crew and many other processes related to their goods. To learn more about their experiences with mariners' professionalism and ship maintenance, various questions

were formulated. Both elements are regularly presented by supporters of the US Cabotage Act as one of the limitations for foreign providers.

None of the interviewees identified problems or negative experiences with the crew of a foreign maritime provider. On the contrary, the majority of the participants highlighted their professionalism, particularly that of the ship leaders. Regarding the ship maintenance, various participants said that the foreign ships that generally arrive in PR show a level of maintenance and sophistication that is higher than that of the domestic fleet (BCo2; ACCo16). The conditions of the domestic fleet were seriously criticised by many of the interviewees.

The foreign ships arriving seem new: very well maintained. I suppose that rules for them are different from for the domestic fleet, because many of those foreign ships are the latest thing. (ACo6)

My experience with foreign crews is that they are very skilled, they are people with ... Just as an example, in the last foreign ship arrival that I had the captain was a veteran, an ex-commander of a Russian nuclear submarine. What if both vessels would require the most highly trained personnel? We were talking frankly for a while. (ACCo15)

For contrasting services, other factors were presented and described to the participants to particularise the differences between domestic and foreign maritime services. These factors were punctuality, intercommunication, product management and cultural issues (Table 38).

Table 38: Grain importers' perception of the Latin American exports

Firm	Quality			Insecurity				Intercommunication		
	Packaging	Product	Handling	On Trade (Distrust)	Technical	SPS Regulations	Political Stability	Language Issues	Phone/Fax	Online
1	N/A	Medium		Very High		Very High		High	High	Low
2	N/A	HQ	Good	Low	Medium	Very High	Low	Very High	Very High	Medium
3	N/A	HQ	Good	Very High	Very High	Very High	Medium	Very High	High	High
5	N/A	Medium		Very High	Very High	Very High	Very High	High	Very High	
8	N/A		Good	Very High	High	Low	Very High	High	High	High

SPS= sanitary and phytosanitary regulations; HQ= high quality.

The element of punctuality is relatively less important for the importers due to the fact that they are in charge of their own logistics. The protocols of importing are executed by a broker. However, it is precisely in the logistics that purchases from Latin America require more time than from the US. The distance is an important element to consider, but the volume required for cost-effective exporting is also influential. It is not unusual for ships travelling from South America to PR to share with other countries; therefore, the number of port stops could be an inconvenience if the importers' inventory levels are low (BCo2). Additionally, the ships' hatches could be opened on the way or shared with other firms abroad, affecting the grain humidity level or the volume of grain that should be received by subsequent importers (ACo3).

Regarding the product quality and its management, the importing firms highlighted differences in relation to the grains' nutritional energy content, which in foreign grains is normally lower than in domestic grains, but these patterns are changing. A particular situation occurs for the soymeal by-product, which apparently also affects its palatability (ACo1). However, concerning the variables of grain cleanness in bulk, dust content, heat damage and the ratio of alien elements in the dry bulk carried in the ship's hold, it seems that the domestic firms are at a disadvantage, with almost 10% over the average in the Latin American 'flip-corn' grain (ACo5).

On the topic of cultural issues, the interviewees showed some aversion to negotiating with Latin American grain providers versus from the US. One element that was notably and frequently mentioned by the participants was distrust in the Latin American carriers and providers. Many of them said that dry-bulk cargoes from South America are less accurate in their weight management, affecting the importers (ACo3; BCo5; BCo7). Although the use of surveyors is an extended practice in this business, some of the participants suggested that the process is corrupt. It is in that play of conversions and weights that the importers should pay more attention to the details.

When I was working in the Philippines, soymeal cargoes from South America were automatically undervalued by \$15.00 per MT in comparison with the rate of the US soymeal. The difference was

purely the dry-bulk yield in the ship. They knew that the South American soymeal weights were lower. (ACo1)

Tariffs are another issue associated with cultural or market differences. In this case the toll imposed by the US on some Latin American products, grain for instance, has been variable and complex to manage for decades. Although the tariff protocols are currently much more stable than a decade ago, some of the interviewees' previous negative business experiences have made them reluctant to purchase in the region again.

Curiously, language seems to be another challenging factor for more than one, particularly during the purchasing process with some Latin American suppliers. Although the majority of the countries in the region are Spanish speakers, such as PR, the use of regionalism and descriptions appears not to be as expected (BCo2). As a result of inconveniences during the negotiations provoked by those differences, two firms had personnel dedicated only to trading with the Latin American grain providers.

### **6.3.5 Variables that affect the cost of shipping grain**

#### **Procedures**

The importing procedures for grains are relatively simpler than those for containers, but a failure in them could be extremely costly for the importer. Once the vessel is in territorial waters and the vessel inspection of the US Coast Guard has been completed, some other documents are sent to the broker digitally. In the dockyards the documentation process is relatively simple but not yet paperless. For 50% of the participant firms, part of the receiving process is still dependent on handwritten copies.

Before the grain-unloading process, the USDA inspection is a standard procedure. However, this specific step might be the most risky and most expensive one if it fails (ACo3). Once the grain is in the firm dockyard and the inspection has failed or the product has not been approved by the US agencies, the importer cannot unload the grain; if it has been unloaded, it should be collected in a separate silo and eventually disposed of by incineration. As anecdotal evidence, one firm experienced this with

some grain from Argentina. The cost of shipping was over a million dollars. To mitigate the economic loss, the grain was accepted for sale in the Dominican Republic but at a very low price (ACo3). In addition, the firm's grain inventory was below its safety stock level; thus, it had to buy grain from the local importers at a higher price than on the international market.

### **Infrastructure**

Only one of the participant firms (ACo6) showed a relatively new infrastructure. In the last five years, this firm was the only one to have invested in new machinery, renovating its dockyard, adding new equipment and removing sediment to gain a deeper draught. Practically, it had developed a new terminal with highly efficient equipment to discharge quickly and receive bigger ships (C<sub>2</sub>Co3; ACo6; BCo6). In contrast with the other participating companies, this native grain-importing firm seems to be highly diversified.

The port terminals of the other three native grain importers were considered to be outdated by the interviewees. Their 'breasting dolphins' are wood and some dockyards are fragile and poorly designed. Their elevators and/or mechanic belts have a capacity under 400 MT/hr; thus, it takes almost 72 hours to discharge less than 8,000 MT of maize. Others, although using a different system for discharging, require almost 5 days to unload volumes below 16,000 MT (BCo5) and have limited draught and highly sedimented dockyards. We were told that some of the firms had planned renovations to increase their terminal, but, in the soil test prior to dredging, heavy metals were found, so the terminal modernisation was postponed until other options could be considered (ACo6). In general, all the grain firm participants recognised the needs to dredge and modernise their terminals to reduce their inefficiencies. However, a few of them said that, due to the cost and current situation of the sector, they are not focusing on these tasks. Besides, 'we have always done it this way' (ACo1; BCo2; C<sub>3</sub>Co3; ACo3; BCo5).

## **Technology**

The automation process and technology investment to promote efficiency in handling dry-bulk products enables logistic agility, reducing the costs. The discharge stations, mobile cranes and conveyor systems should be designed and upgraded considering the benefits of the reduction in the cost of demurrage and many other labour restrictions with a cost impact (Burns, 2015). Some of the participants were of the opinion that, although they can improve more, in the last fifteen years the native grain importers have become more efficient. They recognised the importance of technology to achieve efficiency savings particularly in this process. Furthermore, they admitted that the increasing demurrage fees imposed by the transportation providers pushed them to react and look for options. Asking for advice and seeing how others in the sector are dealing with the issue were factors that finally led them to execute the investment (ACo3; ACo5). However, due to the relatively low frequency<sup>125</sup> of grain imports the discharging equipment may risk being underutilised, causing a higher cost of maintenance for its operation but also minimising its corrosion due to climatic conditions.

## **Demurrage**

Late fees will apply after the grace period in the agreement. After this the demurrage fees may be applied per hour (ACo3). We were informed that currently late fees are less common than they were 5 years ago due to the investments made in equipment. However, demurrage fees may increase the cost of grain for the echelons until it is served by the port terminal on the sea vessel that will carry it to the importer(s) (US Grain Council, 2013).

Freight rates are also affected by the time of unloading. The faster the receiving processes, the lower the rates (ACo1). For efficient unloading of grain, some continuous ship-unloading systems, such as a vertical chain, pneumatics and belt conveyer, are globally employed. They are complex, sophisticated technology and highly energy dependent, costly and specific to the area of application. Unloading a ship with 9,000 MT takes more than 3 days for several of the grain importers in PR. However, maritime companies estimate the average time of unloading according to

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<sup>125</sup> Between 6 and 12 days per month/firm.

their own experiences and needs. As a result, the mooring time is considered in their shipping rates but also in their demurrage (ACo1). Ship demurrage could be by day or by hour (\$2,000/hr or more). It is believed that the penalty fees are higher in the domestic shipping companies than in the foreign ones.

The mechanism of demurrage could certainly be a way to promote efficiency, but to achieve it investments in equipment are required. Besides, the effectiveness in the unloading management should be constantly reviewed and adjustments made.

### **The ISO tanks rule**

One of the participant firms told us that the US Cabotage Act affects it dramatically. Its imports are in a liquid form highly used in the grain-mixing process and as supplementary meals by large animal producers. Annually, it manages approximately 6,500 MT of foreign products and 975 MT of domestic products. Five years ago the small domestic tanker that serves PR was transferred to another more lucrative route in the US.

Since 1989 it has been in business in a kind of exclusive relationship because of the particularities of its operations. Originally, the small domestic tanker carried products imported from the US as well as PR's sugar cane by-products exported to the US. Once the PR's sugar cane production seized the exports of its derivatives too, hence the vessel was arriving full from southbound but was limited northbound. Since then no other small domestic tankers have been available for this route.

In addition, since 2007 the US regulations on transporting liquids without a sea tanker require the use of ISO tank containers (ACo8). The volume capacity transported by containers is dramatically inferior to that of the small sea tanker, but the firm has no alternatives because so far the product has not been formulated by other companies abroad. The cost impact on this agribusiness is significant, from \$50.00 to \$135.00 (per short tonne), which is an increase of almost 270%. Besides, the ISO tanks arrive in the San Juan Port; thus, they should be transported 200 km (2.5 hrs) inland to the factory, adding more costs.

When we were using small sea tankers simultaneously we were importing domestic by-products and those from abroad. The domestic freight rate by volume was always \$15.00 per MT over the foreign rate, even though in the last the distances were regularly higher. (ACo8)

#### **6.4.0 Competitiveness**

As mentioned in a previous chapter, competitiveness as a system refers to the analysis of productivity as a phenomenon with impacts on different levels: meta, macro, meso and micro (Rojas & Sepúlveda, 1999). Many variables associated with the US Cabotage Act's effects on PR's agribusiness competitiveness have been discussed through these chapters. Some external and other internal elements have been presented to demonstrate the intrinsic complexities of that external NTM as well as some of its costs transferred through the agribusinesses' supply chain.

Competitiveness, for both groups explored, is based on lower prices rather than uniqueness. However, only one firm per studied sector shows diversification, innovation programmes and investment in technology. In the grain sector, two of the firms have the highest storage capacity and only one has a barge in an exclusive maritime contract. These actions may not be considered to be the most economical, but they show a high volume of imports to be very useful in negotiating rates (BCo11) however just one of them is investing in equipment to save time in the unloading process (ACo6). Regarding their infrastructure, the same two (one per sector) more diverse firms have the newest facilities, one with very efficient and ample refrigerated storage and the other with a modern dockyard and highly efficient mechanical equipment for very fast grain discharge.

#### **6.4.1 Agribusiness cluster**

Unlike the fresh produce importers, PR's grain sector might be considered as a low-price cluster, which is distributor-oriented. In general this sector has low levels of innovation and consists of medium agribusinesses with more than 30 employees each. The cluster of grain-importing firms is practically dominated by two firms but three firms have the market control specifically in the animal feed mill sector.



All of the firms in the grain-importing sector show certain levels of cooperation, particularly sharing raw material. The two complementary firms associated with the sector have a kind of symbiotic partnership with all of the five animal feed mill producers.

With some frequency the grain importers share grains (ACo1), shipping and freight costs (ACo3). The major reasons for this are based on the sea transportation challenges, reducing the logistics cost and accessing greater volumes (ACo5; ACo3; BCo2). It was said that their level of cooperation is focused on finding the best price for a bushel of grain in the market, but to achieve this a high volume to import is required (BCo1). Individually, due to their market limitations, they could not accomplish it without compromising the firm's cash flow. In addition, the tropical weather and other climatic conditions have effects on the grain storage increasing the risk of loss.

Another example of clustering behaviour among the grain importers was observed in those with an operational station in San Juan Port. Occasionally sharing a ship of grains, they organise the discharging logistics simultaneously or at least minimise the mooring distance to reduce some expenses (C<sub>3</sub>Co3). The animal feed producers outside this geographical section are unable to manage this kind of optimisation. It was said that very open communication exists among them.

A particular example of partnership was identified between two grain importers, one of which is an animal feed mill and the other is not. Their relationship is founded on a mid-term partnership in which one acts as a wholesaler heavy grains supplier to the other one (BCo2). According to them the cost of grain per MT is not significantly higher than it would be if they had to carry out all the procedures and risks directly in the US market of NOLA (ACo5).

The two animal feed mill firms without port access are totally dependent on the three main importers of heavy grain, and for some kinds of grains a fourth importing firm is involved (BCo7). Nevertheless, it is clear that these two totally dependent operations

have the primary objective of providing feedstuff in bulk to farms in regions that are relatively distanced from the main firms (ACo4).

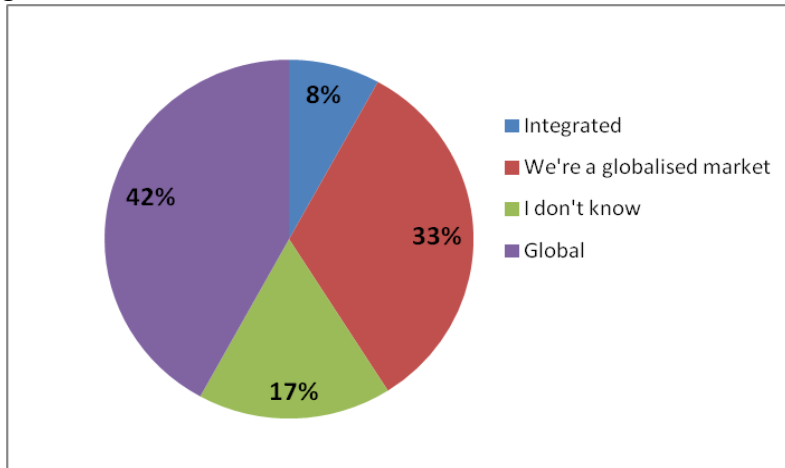
The production of all of these companies, although they have their brand identity, is limited in differentiation, image and development. Their uniqueness is based on their formulations and their level of optimisation to produce at a lower cost. The long-term alliances with farmers, in some cases lasting for more than a decade, were recognised. However, those alliances should not necessarily be associated with the product quality or its price per volume but with other marginal benefits that are not considered in this exploratory research.

#### **6.4.2 Agribusinesses' interconnectivity**

One of the arguments associated with cabotage presented was the limitation of PR to negotiate abroad and how this NTM restricts PR's globalisation (Fig.43). An important variable associated with competitiveness is the capacity for interconnection between markets. Due to the fact that PR is represented by the US internationally and is not politically recognised as a sovereign country, this factor of interconnection in relation to cabotage needs some analysis.

Interconnectivity in competitiveness refers to how well connected with other businesses or partners abroad a particular market or company is. The concept of self-sufficiency in food is no longer synonymous with food security but is also associated with a high level of market interconnections. Through a better interconnectivity of markets and more distribution channels for trade, the access to food has been potentiated (Slone et al, 2010). As previously mentioned, market proximity, infrastructure and new technology raise more opportunities to trade. Some interviewees also believed that this capacity is related to the number of transporter service providers and their openness to receiving products or services from a variety of origins.

Figure 43: Should PR's economy be more integrated with the US economy or more globalised?



According to the External Trade Report (PRPB, 2015), the number of origin countries (68) from which PR's market imports food products (2012) valued more than \$10,000 (year/each) is considerably diverse. Furthermore, the access of PR to the US market could be considered so far to be one of PR's competitive advantages (Estudios Técnicos, 2013). However, as was revealed in this research, the variety of origins does not imply shipping directly from those regions but from Jacksonville. The variety of products that otherwise would be very difficult to import, due to the size limitations of PR's market, could be attributed to its access to the huge US importer market.

All of the participant firms have agreements with foreign suppliers and almost a fifth of their annual imports originate from abroad. The available public data do not report the consolidation port before PR's arrival; as a result, it could be speculative to categorise PR's market as highly interconnected. The volumes of foreign goods unloaded in US ports to be fractionated and consolidated for exporting, versus those that are trans-shipped and completely exported to PR, are uncertain. Nevertheless, the limited number of maritime providers under the Jones Act in PR, the non-existence of a national service to counterbalance that limitation in private services and the lack of foreign investments in this sector are factors that may affect PR's interconnectivity. Consequently, the capacity of the local firms to reduce their costs by optimising their logistics with their US suppliers is compromised.

### **6.4.3 Rivalry, oligopolistic structures and collusion**

The work of regulators should be to promote access and restrict the ability of incumbent firms to exercise market power to the detriment of rivals and ultimately consumers (Banda et al, 2015). Consequently, their actions should be based on supporting sustainable firm competitiveness.

The legislative historical records since the mid-1990s show that PR's Government has not been an active promoter of rivalry in the maritime sector. Instead, through legislation and administrative agreements, it has empowered some private interests to obtain or retain artificial advantages over their rivals or future investors (Abbott & Singham, 2013). Admittedly, improving the attractiveness of a limited market in which the companies are required to make large investments is a hard and challenging task.

Potential entrance seems not to be in the panorama. More efforts are needed in searching for options, innovation in rules, public management stability and the execution of long-term investments according to a real planning programme. To achieve these, transparency and the availability of data (Ferrantino, 2012b), are vitals to promote interest in participating and competing among international firms (Venturini & Boccaletti, 1998). On the contrary, a small group of suppliers in an oligopolistic structure could provoke an increase in trading costs and eventually in products and high levels of inefficiencies and reduce the purchasing power of consumers. Monopolistic or oligopolistic structures could emerge with impacts on some dimensions of firms' or the nation's competitiveness.

Arguably, the two agribusiness sectors under study could also be considered as oligopolistic structures, particularly the group of grain importers. As mentioned, only two of the group have the best market position, diversification and infrastructure, but regarding animal feed mills there is only one firm with it. In the fresh-produce sector, although a lack of cooperation among them, three firms have the control of over 80% of the market, but only two are better positioned.

PR's access to the domestic market by sea is controlled by two big maritime firms that transport more than 60% of the food imported to PR. They have high fixed costs, competing by a small margin income in a recessionary economy with a decreasing population, but they are investing in new equipment with capacity that is twice the current needs (ACo10). The 'lazy monopoly' of PR's electric power company should be added to the equation cost. Consequently, the challenges provoked by these two natural oligopolistic structures as external costs should be summed with the basic price of commodities and the internal cost of the agribusiness sectors. Clearly those structural limitations in collusion may affect the firm's, market's and/or nation's competitiveness.

#### **6.4.4 What are the climate warming effects on the agribusiness supply chain?**

The climate change, market openness and domestic efficiency are factors to be considered in the analysis of the agrifood supply chain competitiveness (Gorton et al, 2013). The global warming effects are showing impacts on America's agricultural production. While in 2015 the cost of food showed reductions in Europe, the effects of several natural disasters in Latin America reduced<sup>126</sup> its production, causing food imports and the price of food to rocket. Additionally, the particular geographical location and topological features of SIDSs make them susceptible to the impacts of natural hazards and climate change (Penello-Rial, 2014). Similarly, as previously mentioned, one of the infrastructures that is most threatened by the global warming effects is port infrastructures (Burns, 2015). All of these expected scenarios may increase countries' level of vulnerability and food scarcity, particularly in SIDSs (Mimura et al, 2007). Therefore, increases in the cost of food, the risk of insurance appraisals on maritime transportation are important considerations in their importing supply chain and business competitiveness.

The group of fresh-produce importers is more conscious of it due to the relative frequency of trucking issues, inland rates and delays during their processes of purchasing. Similarly, the lack of space in the domestic cargo ship is pushing them hard to evaluate their supply chain dynamically. For the grain importers, the climate change effects on their logistics seem to be less complex than those of the prior

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<sup>126</sup> The export reduction is estimated to be \$1,000 million but \$11 billion for the region's total loss in agricultural crops (FAO, 2015).

sector. We are of the opinion that this could be due to the storage capacity and less perishability in comparison with fresh produce.

#### **6.4.5 Experiences with the unions**

By law Puerto Ricans have the right to unionise, and, despite their particularities, this applies to the public and the private sector (C<sub>1</sub>P1). As a result, in the maritime sector for instance, the unions established 'closed shops', situations in which employers can only employ members of the union. Besides, the payment rates per hour according to work shifts and the number of people required to accomplish a task are determined by the union or at least in agreement with it (C<sub>1</sub>P2; ACCo15). The combination of these requirements established by protocols imposed by the international, federal or state agencies and those associated with the Jones Act make this a more complex issue. For instance, crew safety and occupational inspections, besides the union demands, are factors that may result in more costs. These costs, whilst covered by maritime firms, logically will be part of the price for service that consumers will pay.

In PR, similarly to the US, three types of unions associated with the maritime sector could be identified. Although they have different names, they are often in agreement with others in the US or local authorised representative chapters of them. The 'Unión de Tronquistas' (Local 901) is traditionally associated with the domestic maritime firm Crowley in PR and the US. Other unions in PR are the International Longshoremen Association (ILA), which has two local chapters, the 1575 and the 1375. The union chapter 1575 in PR was traditionally associated with Horizon and the 1375 was more related to stevedoring, chassis and crane workers (C<sub>1</sub>P2). However, their efficiency depends on the region and municipalities. For instance, it is a common belief among maritime firms that, although the union workers in San Juan have the highest rates of all, in comparison with Ponce's union workers, they are more efficient by far (C<sub>1</sub>P2; ACCo16; ACo6).

The union ILA 1740 is the most common in PR's San Juan port grain mill section (BCo2; ACo6). According to the data generated, the unions establish the number of labourers per job. For instance, to download a barge of grain, the minimum number of labourers will vary by the stage. Initially, four union members are the minimum required. They

are the machinery operators, two on the bobcats inside the hatch and the other two as assistants at the top outside the hatch, switching every hour. This number of players in the team might be considered reasonable and very appropriate for the working conditions and risks (ACCo15). However, once at the bottom of the hatch, the cleaning crew should be increased to seven, consisting of six assistants and the foreman, and that team could be considered to be excessive and inefficient (ACo3). Regarding the employment cost<sup>127</sup> per union member, in the third work shift (night) of eight hours, the foreman, for instance, may cost his contractors around \$400 and the others around \$200 each. The union also receives a piece of this for its services to its members. On the other hand, the first work shift (morning at 7 a.m.) of eight hours is the cheapest of all because the union requires a team of five. The major difference in the cost per work shift is that during the day one hour is paid double but at night two, based on eight hours. The union established that payments have to be made at the end of the job, only in cash – never by check or transfers – and with the foreman as a witness (ACCo15; ACCo16).

On the contrary, the employment cost of similar skilled labour from the countryside, at \$18 per hour<sup>128</sup> and \$28 for the foreman, represents savings of \$7 and \$12 per hour/person, respectively, to the unions' rates (C<sub>3</sub>Co3). Furthermore, various interviewees said that, over the costs of the union's labourers, it is common to hire a supervisor of the union foreman, because otherwise the level of efficiency would be lower (ACCo15; ACCo16). Interestingly, it was said that some of those supervisors are also members of the union but working independently, outside the union's working restrictions (C<sub>3</sub>Co3).

On the container side, not only the maritime unions but also the trucking unions may influence the cost of trade. Whilst not related to the definition of cabotage used in this research, its effects seem to be included by the importing firms as part of their costs of transportation. Since 2005 trucking unions in PR have had relatively frequent effects on delays of the normal flow of imports. Changes in their tariff or distance rates for carrying containers have an impact on the cost of goods.

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<sup>127</sup> Wages and legal benefits.

<sup>128</sup> This may represent a wage of \$80 (USD) per person per day (8 hrs), which is \$24 over the minimum wage. The other \$8 (USD) is to cover benefits and employment costs.

It is said that in PR the majority of the importing companies agree to the union rates and their particularities. However, the hidden reasons for this are firstly to avoid delays in loading goods and secondly the sense of threat of the possibility that members of the union may affect their business negatively. As a result, not much is known about illegalities or extortion in these processes (C<sub>1</sub>P1; ACCo15). Two anecdotic experiences of the interviewees might be supportive of these arguments.<sup>129</sup>

1. Years ago, a union employee unloading an expensive speed car irresponsibly drove it as if it was in a competition in the car yard. He crashed the car into a container, so hard that it was a total loss. Looking at the security cameras, the maritime terminal operator and the importing firm claimed for the damage and destitution of the employee. However, the union assumed his legal representation and damages but also denied any disciplinary actions against him until the case was presented in court (C<sub>3</sub>Co3).

2. The experience was during the process of negotiation of competitive rates with PR's seafarers' union. Due to the negative response of the union leaders, the (private) firm decided to enforce changes, bringing workers from the countryside at rates lower than the union but higher than the national basic salary (ACo3). The result of the experiment was much positive than the firm's expectations and significantly more profitable for both sides. However, the union started demonstrations in the firm buildings and at the manager's house. Actions to delay the arrivals were executed through sabotaging equipment and other damage to the property. Besides, members of the union threatened the firm director, a few of the business employees, the personnel of the third party subcontracted for loading and later on the firm's business partners. Consequently, scared by all this, the firm's General Manager relented and agreed to the union's demands (C<sub>3</sub>Co3). Since then an external contractor hired by the firm is charged with dealing with the unions (ACo3).

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<sup>129</sup> Previous experiences of aggression were historically associated with these unions, Jimmy Hoffa being one of its most notorious leaders in the US. Press reporters in PR show some similar situations. One is a tragic case in 1967 in which an important leader of the Union de Tronquistas was murdered and tortured by one of its members. In the mid-1980s another union leader died in a strange accident during an inspection of one of the maritime firms. In the late 1980s three members of that union were accused and convicted of one of the biggest fire catastrophes in modern PR's history – Du Pont Plaza (Torres-Gotay, 2001). In 2011 the current president of the Union de Tronquistas in PR was accused of attempted murder, violations of the arms law and criminal property damage during a demonstration against the food-importing company B. Fernandez, CO (Primera Hora, 2011).



### 6.5.0 Is this external NTM a threat to PR's food vulnerability?

The majority of the participants in both sectors agreed on classifying the US Cabotage Act as a threat to PR's agribusinesses supply chain (Table 39). The main reasons concerned the high cost, lack of ships and lack of competition among sea firms. However, a threat to food security may arise through higher prices – making food unaffordable for many – or through food scarcity at any price – as a result of political, economic and mechanical issues (Hubbard & Hubbard, 2013:p.142). Bearing in mind that this research was founded on the sustainable development theory, this penultimate section aims to summarise the effects of cabotage segmented into the main concepts of availability and accessibility that may define food vulnerability.

Table 39: Is the US Cabotage Act detrimental to PR's agribusinesses?

FIRMS	YES	NO	NOT SURE	WHY?						
				High cost	Lack of compet. among sea firms	High salaries	Maritime unions	Logistic restriction	Limit us to trade globally	Lack of ships
10	X		X	X	X			X		
9	X			X	X			X		X
11	X			X	X			X		
1	X			X	X	X	X			X
7			X	X						
2		X		X						
4			X	X	X					
3	X			X		X	X	X		
5	X			X	X			X		X
6	X			X	X		X	X		X
8	X			X	X		X	X		X
13	X			X	X	X	X	X		
N1	X			X	X			X		
N2	X			X	X				X	X
N3	X			X	X		X	X		X
P3		X		X						
P1			X	X	X	X	X			
P2		X								
P4	X			X	X		X	X		X
15			X	X	X	X	X			X
16	X			X		X	X			X

P4 and N3 were not interviewees but their opinion was obtained from secondary data.

Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life. (FAO, 2010)

## **Affordability**

1. Risk costs by distance. The variables of distance between ports, flagging and the number of incidents and calls are considered in their rates. The insurance costs should be added to the cost of trade. Short sea routes may limit price increases, even with high import dependence (Vivideconomics, 2010:p.49).

2. The Horizon shutdown reduced the number of routes available between PR and the US by 30%. The lack of volume to sustain their operations was one of the limitations to attracting more sea providers.

3. Unexpected charges and higher costs due to unanticipated changes in logistics and/or fuel volatility. Countries with grain import shares above 60% experience price increases above 0.3% for every 10% of increase in the cost of fuel (Korinek & Sourdin, 2009b). Nevertheless, an inverse correlation exists between the size of vessels and the cost impact of fuel. Container freight rates are considerably less linked to bunker prices than for the grain dry-bulk ships (Vivideconomics, 2010:p.49). However, these data for grain are based on vessels of Panamax size and not barges.

4. Once Horizon closed, PR's public opinion targeted the two main sea providers, accusing them of affecting PR's market. Unexpectedly, both firms announced an increase in their fleet number to serve PR's domestic routes for containers (Noticel, 2015). Were those vessels planned before the tragedies that affected PR's market? Is the deprived market of PR able to pay for them?

5. The supply and demand cost because of agricultural products' scarcity. The importing of maize from Brazil was initiated in 2013; the initial cost seemed to be high, but after a few changes in logistics it became viable. However, due to the 2014 drought, the US maize production was highly affected; consequently, the Brazilian markets doubled the price of the commodity that was previously bought.

6. The labour cost imposed by union rates. The maritime unions may influence the cost of trade in the process, at the port and in trucking levels. Whilst not related to the definition of cabotage used in this research, the importing firms considered this cost as part of their costs of transportation.

7. Technology and port automated systems may increase efficiency (De Pillis, 2015).

### **Accessibility**

1. It is estimated that over 85% of the food required to sustain PR's market is imported (Comas, 2009).

2. Climatic conditions: the drought and production scarcity affect the suppliers of the traditional markets from which PR purchased. Consequently, PR's buyers' logistics were reformulated to suit new providers, but a month later the drought effects appeared there too (C<sub>1</sub>P3). A similar scenario would occur with unexpected freezing temperatures or hail.

3. Between 20 and 25 cargo vessels arrive in PR's ports weekly. Although many are from abroad, the most frequent arrivals are domestic. In the case of grain imports, the infrastructure is suitable for US barges but limited for ships from abroad.

4. Cargo ships can lose containers falling overboard into the sea. Before it sank 'El Faro' transported 391 containers to PR, 27 of them fresh fruits and vegetables, 20 poultry, 2 cheese and 9 fresh beverages. Other food containers were carried but they were not considered perishable. The market of PR showed some scarcity in products for almost a week (MIDA, 2015).

5. After the tragedy of the 'El Faro' sinking, it was reported that 8 vessels are dedicated to PR's market weekly. Only one of them is a ship; the other seven are a general vessel type but very limited for transporting reefers. The base of them is Jacksonville, Florida (Noticel, 2015).

6. The design of vessels is usually wide but not so deep; thus, in the open sea, their speed is under 18 knots. As a result, their arrivals are later than those of regular ships, with serious effects on perishable materials (ACo10).

7. Disputes between unions and maritime providers have provoked serious interruptions to the economy of the coastal states in the US (DePillis, 2015).

8. Theoretically, during a war, the US Department of Defence may take any of the vessels under the Jones Act agreement for its exclusive use. Invoking the national security, the fleet available to serve PR's market would be reduced to serve those purposes.

#### **6.6.0 Conclusion**

All of these elements associated with the domestic importing of produce will have effects on the price of goods. In Appendix H a SWOT analysis summarise the findings. Certainly not all of them are directly related to the US Cabotage Act, but they are the price of the market association between PR and the US. Furthermore, the sea transportation restrictions and their complex structures and layers of service costs developed through the years make it difficult to estimate the real cost of that NTM to the agribusiness sector. A general analysis could underestimate the implications of the Act in some areas but overestimate them in others. As previously presented, the inland cost could have a dramatic effect on the cost of imports and this is a decision that the importer has to taking into account in its logistics costs.

The following chapter summarises the findings from this thesis and includes a section on contributions. Additionally, limitations and future research avenues are presented.

## CHAPTER VII

### CONCLUSIONS AND FURTHER WORK

#### **7.0.0 Introduction**

As presented, the development of PR was immersed in a historical structure of dependency, in which the government intervention produced inefficiencies and a large economy (the US but previously Spain) had control over PR's growth. To guarantee this, customs control, cabotage and other regulatory frameworks in favour of the US corporations were established without promoting a real sustainable economy.

Many US interventions were made in different forms but to benefit the US corporations, rather than promote PR's native capital. Eventually, its economic (dependent, modernised, neo-liberal) model collapsed. Now, the 'US Jewel of the Caribbean' seems to be an inefficient, uncompetitive and expensive place, highly controlled by US multinationals and experiencing a high level of brain drain (out-migrants to the US). Its depressed economy over almost a decade and over 12% sustained unemployment in a restricted trade framework limits the possibilities of participating actively in the global economy and other forms of production in a world that is changing significantly in favour of those more flexible markets. Real sustainable investments have not occurred in PR, and it is possible that the most important reasons for this are the costs of shipping and energy.

This study has explored the effects of an external non-tariff measure on the agrifood supply chain in a small island developing nation. The research stance, and different variables associated to the study were defined (Chapter 1). Puerto Rico's scenario, as a small island, was contextualised and the maritime cabotage identified as the phenomenon under our study (Chapter 2). Through a literature review the dimensions of the phenomenon were exposed. Various international scenarios were contrasted with the domestic experience and the findings were formulated into some business structures affected by the regulation (Chapter 3). Using competitiveness as a theoretical framework (Chapter 4), the objectives of the thesis (1.5) were explored, particularised and discussed. The process involved investigating a group of

agribusinesses, public servants and non-government organisations to determine their experiences and opinions about the US Cabotage Act's effects on the competitiveness of agribusinesses (Chapter 5). Finally analyses of cost per distance (n.m) of imports by containers (FEU), a theoretical cost analysis exercise of livestock formulation and an analysis of the factors that affect agribusinesses' competitiveness indirectly associated with the Cabotage Act were presented (Chapter 6).

To achieve the objectives, the literature was critically reviewed to highlight the supply chain criteria and factors that are more significant for agribusinesses in PR. Factors that affect competitiveness such as: internal and external, inter-organisational and cooperative behaviours, rivalry and oligopolistic structures among the sample were discussed.

This chapter presents the final conclusions and remarks of the research. It begins by reviewing the theoretical purpose and the implications of the theoretical framework used. In addition, the thesis research questions are answered in the following sections and it was incorporated the methodology proposed for the OECD to evaluate anticompetitive measures. Finally, the contribution of this research is exposed and its strengths and limitations discussed. The chapter finalises the thesis with recommendations for future research and some concluding comments.

### **7.1.0 Key findings and contribution to theory about the research problem**

The aim of this thesis was to explore the effects of an external non-tariff measure in maritime transportation on PR's agribusiness competitiveness. Furthermore, it aimed to clarify and quantify if possible how the factors associated with the US Cabotage Act could affect the food supply chain in a small island developing nation such as PR. Consequently, areas of opportunity in the supply chain competitiveness of the sectors under exploration were identified and various dimensions of the phenomenon were highlighted.

The research explored two importing sectors of native agribusiness (grain and fresh produce) composed of 12 firms. They were selected on the basis of the

representativeness of the agribusinesses under analysis and the practical feasibility of accessing the companies. The only step in common in their supply chains is their dependence on maritime transportation for trade. Consequently, the cabotage requirements have direct and indirect effects early on in their agribusiness supply chain activities.

To understand the views of the agribusiness groups related to their supply chain strategy, data generated from primary information was collected through interviews. The analysis in this study was supported by empirical data collected through the research and was based on contributions of knowledge and academic advancement. The research methodology was grounded in the literature and represents a process of reconceptualising and field testing findings from methods used by other authors related to competitiveness and supply chain studies. The following sections (7.1.1 & 7.1.2), summarise the assessments and angles previously mentioned in Chapter 4 and in 5, the research questions are answered.

#### **7.1.1 What are the effects of US Cabotage for the PR's agribusinesses supply chain?**

This exploratory research identifies and reflects into different elements that reveal and categorize the US Cabotage Act as an anti-competitive measure for PR's agribusinesses. In order to follow a systematic form to answer the question, the OECD's (2011) qualitative analysis to identify and classify NTM effects on competitiveness was applied:

1. Could the non-tariff measure limit the number or range of suppliers?

Although the NTM named the Cabotage Act is not unique to the US, its multidimensional effects make it the one with the highest level of restrictiveness. It prohibits the use of foreign vessels to engage in commerce between ports of the US. It is covered in section no. 27 of the Merchant Marine Act of 1920 (46 USC 883) and is commonly referred to as the 'Jones Act'. The Act was also initially related to the offshore US territories. The law requires all domestic maritime cargoes transported by water between two domestic ports to be carried by a crew with no fewer than 75% of US citizens. This applies to owners, operators, builders and repairers. Rare exceptions

to the Cabotage Act have been identified in recent history. In addition, there are several federal regulations of the domestic marine activities that are linked to cabotage. There is also the US Safe Container Act (46 USC 80501-80509) and its amendments. Clearly, the main objective is the complete regulation of the maritime transportation in all the US (mainland and territories) ports. Consequently, 85% of the total dwt of the US market is foreign flagged. A very limited number of domestic flagged vessels to carry grain, containers (regular and reefers) and tankers are available in the US to supply its own market. Principally, this is a consequence of the cost of building and operation, which is estimated to be almost twice the cost at the international level.

The current number of domestic maritime service providers in PR is limited to three firms, but two of them carry more than 85% of the market trade. Since January 2015, eight domestic vessels have been available to supply PR's market. Two of them were suited to reefers, but due to the sinking of 'El Faro' only one is currently available. Since Horizon's closure, the distortion in the container management has been seriously aggravated. Hundreds of containers for PR's market are stranded weekly in the US ports. Jacksonville (US) is the main point of departure to supply PR's market with more than 90% of the food produce imported from the US. The inland costs for trucking from California (West Coast) or New York (East Coast) to Jacksonville Port are excessive, but available options are scarce. In the grain sector, only one domestic barge is available to service the importers, whilst there is a limit to the volume suitable for the current infrastructure.

In summary, the US Cabotage Act limits the range of suppliers and affects the supply chain of PR's agribusinesses based on imports from the US.

## 2. Is this limitation reducing the ability of suppliers to compete?

The US Cabotage Act itself reduces the number of domestic maritime service providers in the US and its offshore territories of Hawaii, Alaska, Guam and Puerto Rico. The investment costs in this particular business are considerably high. Due to their operational fixed costs, profit margins are significantly dependent on the



volume; hence, firms will be more interested in markets with a greater potential for making profits.

In the case of PR, due to its dependency on imports from the US market and with a market pattern relatively similar to that of the US, a limitation on its forms of transport affects its logistics costs. For instance, the purchasing system to buy fresh produce adopted from the US and the lack of ample promotion of international business led the market to look first to the US then abroad. Consequently, a restriction on the main transportation to supply a market without any inland connection among suppliers affects the importers' capacity. In addition, this restriction is stronger when an oligopolistic form of business reduces the number of service providers as a result of the administrative structures created by the cabotage regulation (NTM). However, PR's agribusiness importers, despite having options to import from abroad, are limited because in addition to cabotage they have to comply with other factors that affect their decisional process to purchase, for instance the US sanitary and phytosanitary restrictions, the US weight limits on containers, the lack of volume in their market and the lack of consolidation services from abroad.

3. Is there a limitation on customers' choices and the information available to them?

The collection of data on cargoes in metric tonnes and their value of purchase is generally a combined activity between several agencies and state servants posted in domestic ports. However, the rates of freight and the costs of trade are in the open market and thus are not under the control of or gathered by any agency. By law they are considered to be protected as the right of a business relationship between the importer and the service provider. Industrial importers may consider the negotiation of rates as part of their competitive advantage, thus sensitive or a corporate privilege. Consequently, the freight agreements are protected by the level of confidentiality between the transporter and the importer. Therefore, the data on the costs associated with freight are not published but are under the control of the private maritime transportation service providers. This information allows the shippers to allocate specific routes among themselves at predetermined rates.

In PR these data are highly segmented through different agencies (municipal, state and federal) affecting the data gathering for analysis. Additionally, none of the agencies associated with commerce in PR have route analysts to reduce imbalances in trade and/or optimise options to engage in business abroad. As a result, the customers (importers) are limited to options and information to negotiate better rates to their benefit.

4. How does the Cabotage Act affect PR's food affordability, availability and quality?

The most frequent journeys are made by domestic vessels. Currently, only one ship of the fleet is suitable for fresh food containers and/or reefers, but it has very limited space. The vulnerability of PR's market was highlighted by the closure of Horizon in December 2015.

It is estimated that over 85% of PR's food is imported, over 65% of it from the US. More than 90% of the food imported from the US comes from the port of Jacksonville. This port is greatly affected by similar climatic phenomena to PR, during the same seasons. Occasionally, similar climatic phenomena with effects on PR have impacts on the Jacksonville region. Therefore, PR experiences a double-jeopardy scenario, because its imports come from a place with similar seasonality risks.

'The greater the distances, the higher the risks of trade'. Perishable goods lose their freshness and reduce their nutritional value. Inland long-distance trucking increases the cost and the risks of transport. An example of how this cabotage restricts the supply chain logistics is that the prohibition of a Canadian ship carrying supplies from New York to some of the Caribbean British Islands cannot be optimised to supplies PR.

### **7.1.2 What challenges and opportunities does the Cabotage policy present for the competitiveness of the Puerto Rico's agricultural sector?**

Liberalisation should produce more providers. This would result in some changes in competition and the cost of trade might be lower. The cost of importing raw materials would be lower because of the reduction in the rates of transport. A reduction in the grain freight rates would be beneficial for the livestock producers due to the fact that animal feed is their main operational cost.

The Cabotage Act **itself** is not currently a serious limitation for the agribusinesses' importer sector and on the contrary could be considered as an opportunity for them. Due to the fact that the US market is a huge producer of manufactured food and grains, the extra cost and limitations imposed by the Cabotage Act increase the cost of products imported from the US, which could be seen as a benefit for PR's agrifood producers. It is said that currently the most dramatic and unfair competition for the local farmers is the high level of imports from abroad produced under a low-cost regulatory framework. However, in this exploratory research, it was revealed that some food produce from these markets are imported to PR but via the US.

For the side of livestock farmers grains at low cost is clearly beneficial, but for the side of the majority of the grain importers would be problematic to produce and compete with the cost of the US imports without the cost of cabotage. Under the current infrastructure of its terminals, the high cost of energy in PR in comparison with the US is an important variable to compete by price (Allen & Peñalosa, 2015; Gutiérrez & Ruiz, 2015). Dangerously, a reduction in the number of grain importers in PR could induce greater dependency on the US market. However, major investments in the port terminals' infrastructure, greater efficiency through technology, automating the unloading process and manufacturers' product diversification would be the key to competitiveness.

Ports have been experimenting with automated systems that allow them to stack containers higher and wider, increasing the volume that can flow through to ground transportation. According to a study by the Port of Los Angeles, those systems can

also reduce manpower between 40% and 50% (DePillis, 2015). However, the challenges to this are the unions.

According to Gorton and colleagues (2013:p.39), two major groups of determinants of competitiveness, identified as endogenous (internal) and external (external), may affect the supply chain structures. In general, both are considered extensively by agricultural studies, but the interactions between them have received relatively little attention, particularly in the agrifood sector. Indeed, several factors that are directly or indirectly associated with the external NTM were identified as elements that may affect the competitiveness of the participating firms:

**External factors:**

1. The lack of foreign maritime terminal operators. Although it is understandable that the majority of the maritime firms are domestic, the annual foreign trade volume of PR's market should be attractive enough to allow foreign investments in ports. It is estimated that around 10 foreign vessels arrive in PR's ports weekly. However, several of these transporting lines have agreements with the domestic terminal operators.

2. The trade imbalance affecting the volume northbound then increasing the southbound rates. As a result of the elimination of the 936 Act, many manufacturing companies ceased their operations in PR; thus, the volume of exports is falling. To manage the differences in cost, the sea transporter firms considered their cost basis in the volume of trade. A low northbound cost should promote exports to the USA, but the cost of shipping from the US to PR is practically twice the cost paid for shipping from PR to the US.

3. Foreign imports are affected by SPS regulations, relatively long protocols for the containers' inspection and a lack of accurate services. However, the lack of digitalisation in the process and the complexities involved in tracking containers are variables that were frequently mentioned to describe the foreign as well as the domestic services. Besides, some other inefficiencies in docking, unloading and stevedoring are noticeable, in contrast to Mauritius, Singapore and Hong Kong.

4. For the last decade PR's population has been falling, but it has had an increasing proportion of pensioners. Furthermore, the economy recession is affecting the purchasing power of the residents. The general number of domestic containers is declining but not in the food sector and to compensate for this reduction, maritime firms might increase their current rates of transport.

5. The age (over 30) of the fleet that the maritime sector has to supply the market of PR adds more inefficiency due to the cost of fuel, lower speed rates and a high level of carbon emissions.

6. Regarding the emissions and environmental controls associated with maritime transportation the US administrative agencies plays an important role that it would be hard to enforced by PR's government. While the United Nations (IMO) is taking more actions on the maritime service providers to enforce maritime regulatory structures at the international level, a network of administrative structures for each country is necessary. The PRPA is not economically strong, technically prepared or designed to act in that direction. In addition, the economic power and influences of the shipping sector are well known. Therefore, a liberalised cabotage framework should not imply a relaxation of the rules for the emissions' controls or the environmental responsibilities for sea business.

**Internal factors:**

1. Ports' (terminals') infrastructure limits the commerce of raw material. Draught limitations, a relatively low number of cranes, relatively inefficient equipment for grain unloading and outdated dockyards, especially in private grain importers, are more suited to US vessels and barges than to international ships. This may not be the case for containers terminal operators in PR.

2. PR's fresh food importers and grain importers are highly focused on the US market rather than the Caribbean and Central and South American suppliers with rates for transport and produce that are more attractive than those in the US. In addition, although the inland rates for trucking in the US might be significantly higher

than the sea rates, in general, fresh produce importers prefer to pay the price than to search for other options.

3. Cultural self-restriction was noticed, and particularly the grain sector shows a high level of mistrust in foreign commodities. Besides, the lack of qualified and experienced technicians in grain commodities at the international level and the lack of local services for grain market forecasting place limitations on the decision making. Therefore, purchasing and transporting decisions are highly influenced by the opinion of those external advisors based in the US. PR's grain-importing firms have developed some kind of dependency on these services.

4. The lack of analysis of the cost of transport. Particularly in the grain sector, a few animal feed mills buy CIF priced per metric tonne without consciously evaluating the cost per service included. For instance, \$218 per MT of maize, although it could be considered a fair price, if it were segmented the cost of transport could be identified to improve their business analysis. However, the real cost of sea transport is unknown to them.

The synthesised knowledge applied to this exploratory research concluded that many dimensions associated with the Cabotage Act are integrated into the operational stage earlier in the supply chain. Certainly, it has effects on the agribusinesses' competitiveness and although some of the participants have implemented strategies to reduce this impact, in general, the costs of the Cabotage dimensions are transferred to consumers.

The assets, logistics capabilities, transportation infrastructure, skills and culture are vital variables that should be considered for a true evaluation of the NTM phenomenon. Setting up ambitious, actionable objectives without considering these resources may result in the formulation of the desired vision and purpose but they will be far from identifying areas of opportunity.

### **7.2.0 Contribution of the phenomenon analysis**

This thesis represents the first attempt to gauge the effect of an external NTM on the competitiveness of the agribusiness supply chain in PR. Previous publications use different classical theoretical approaches to evaluate the topic by estimating the welfare cost through econometric models without taking into account the particularities between sectors. This is the first time that this issue is considered in academic research exploring the agrifood supply chain. In addition, the scope used to analyse the effects of this phenomenon on the consumers of the agribusinesses' raw materials is distinctive.

To evaluate levels of competitiveness, particularly those aspects associated with efficiency of the agribusiness supply chain, it is necessary to analyse the institutional environment, organisational structures and their level of development, innovation or diversification and the trade capacity. This exploratory analysis using interviews shows how the infrastructure limitations, the mixed regulatory frameworks and the lack of public centralised data are elements that aggravate the effects of cabotage.

PR's Government is blind to the collection and analysis of data (Krueger et al, 2015). Valuable information would be helpful to evaluate PR's real cost of imports to businesses. It would facilitate the identification and digitalisation of protocols, routes optimisation for trade and seek new business opportunities.

The findings provide information for the actors in the grain sector, livestock producers and produce importers, and on the main actors' position earlier in the supply chain, some of its structures and the development of the chain in general in relation to cabotage. A special contribution can be found in the NTM analysis of maritime transportation, specifically on SIDSs and other island territories that are affected by trading policies imposed by developed countries or large economies. It should be admitted that this kind of NTM was designed for developed countries, massive markets and highly populated nations, diluting its real costs among them without significant effects.

[The developed countries] ... can sustain and afford the luxury of their inefficiencies. However, the LDCs cannot if they want to sustain growth. (Stiglitz, 2000:p.453)

This research could be considered supportive of the current claims for the relaxation of the Cabotage Act on PR's market, such as that for the US Virgin Island and a few others. A comprehensive programme that allows PR a more flexible business political framework could reduce some of the inequitable disadvantages imposed by the current political status (Federal Reserve Bank of New York, 2014). However, in the case of complete cabotage liberalisation we are of the believed that the importing sectors explored (grain importers, animal feed mills and fresh-produce importers) would be more focused on conducting business with the US than abroad. The lack of private investments in the port terminal infrastructure is currently one limiting factor in the capacity to import from abroad. A complete relaxation of cabotage would avoid the urgent need for infrastructure transformation and for innovative actions to achieve greater efficiency in the global market. The current suitability for importing from US providers undermines the search for more global business interactions.

The idea of liberalising cabotage for the fuel sector only, although not analysed in this thesis, seems to be interesting in relation to this issue. Certainly, it would be particularly limited to the use of tankers, of which there are so far very few in the US fleet. Nevertheless, it would be beneficial for all the economic sectors and citizens in general, particularly if it is at lower costs than the imports from Trinidad y Tobago.

It is a fact that the nation's economy has not experienced the effects of sea liberalisation because it has been continuously imposed for almost nine decades. Regarding an increase in PR's food vulnerability associated with the NTM itself, it is unlikely to correlate with a direct effect. However, when the maritime cabotage is analysed by its interaction with other NTMs or its resultant factors and dimensions, it is possible to support the assertion that some distortions of the food supply chain vulnerabilities may limit the access to food. On the other hand, the continuous reduction in the local farming and the increasing dependency on food imports – the



majority from only one domestic port – are issues that should be analysed extensively in a scenario of total liberalisation. The lack of food production with restrictive conditions for imports may raise the cost of food with effects on well-being.

### **7.2.1 Contribution to theory, method and practice**

This thesis may contribute to theory by applying an international qualitative method for evaluating and classifying an external non-tariff measure's effect on an SIDS:

1. In the literature accessed, the US Cabotage Act is not assessed using OECD frameworks to classify a NTM. PR's political framework and its lack of participation at international forums such as OECD, limit the cross-analysis and the scenarios to compare. Whilst Cabotage Act effects are on domestic trade only, it operates as an external anti-competitive NTM limiting PR's interest in developing sustainable agribusiness production. The combination of these two aspects (anti-competitive NTM and PR's agribusinesses) is not considered in the previous literature studied.

### **7.3.0 Recommendations**

Through the design, the data gathering and their analysis, many other topics and ideas were generated for further research.

1. Differences among sectors, lack of similarities in its supply chain protocols and/or the process of applying the method will commonly result with silent areas not considered during our data collection. These factors could be added to the conceptual diagram (4.4). Additionally, a model to explore firms' behaviour might be considered.

2. A supply chain is commonly representative of a number of participants (companies or individuals) that are involved in the inbound and outbound or 'up and downstream' movements of products and services from the point of origin to the customer (Mentzer et al, 2001:p.4). In this case it seems that two oligopolistic (maritime transportation and energy) structures are affecting another oligopoly structure (grain importers). Exploring cabotage and evaluating the level of collusion between those structures was an angle that was poorly developed in this project.

3. It was mentioned that in the grain sector the importers have similar port terminal structures with a relatively low level of efficiency. An evaluative field design would be a useful observational instrument to contrast their strengths and weaknesses during their unloading process.

4. The quantitative cost estimation of the sea transport on different feedstuff formulations was not accomplished due to the lack of specific codifications in the public reports. This analysis would have been an interesting theoretical exercise to evaluate the cost of a complete formulation with the aim of estimating the costs for the farmers more accurately.

5. The effects of the Cabotage Act on the fertiliser sector were occasionally mentioned in this thesis but an exploration of it was not considered in this research. The case for the meat importers' sector was excluded too. Similarly, it happened with the sector of services related to agribusiness trades. Probably, the first two agribusiness sectors (fertiliser and meat) could be considered by the conceptual diagram, but, the sector of services may require a particular view due to its regulations and challenges. However, all the three sectors are worthy of more studies.

6. This research was more focused in exploring the current operational activities that might be affected by the US cabotage Act in the agribusinesses. However, we are of the opinion that the tangible and intangible capabilities such as: technology or infrastructure, and customers' feedback integration or reputation respectively, needs to be more explored to evaluate change opportunities. Besides, agribusinesses' routines and its interactions are angles that could be more deeply explored to assess their strategic opportunities. These could be studied through a dynamic capabilities framework (Teece, 1997).

### **7.3.1 Limitations**

1. Although an exploratory research, the mixed method designed was convergent. To reinforce the qualitative analysis the GTM was introduced to generate data in a systematic form. However, a quantitative phase to validate the data

generated by the semi-structured instrument is absent. As a result, the research methodology may lead to ambivalence in generalising the findings based on participants' bias views.

2. Another challenge was the uncertainties when taken out of the context of the agrifood sector particularly between two different forms of supply chain (grain and produce importers). Besides, the size of the industries increases the possibility of bias and distortions in the findings.

The topic required interviewing executives, managers and some of the responders can be quite reserved in offering critiques or talking about their own firms' weaknesses. This is particularly important, moreover when the researcher is faced with the responders' avoidance of criticism and controversy or to collect sensitive data useful to identify inefficiencies in their operational routines.

3. The paucity of quantitative data at the government level, as well as the limitation of access to private sector data, affects the evaluation of this anti-competitive measure dramatically.

For instance, due to the lack of data the analysis presented in this thesis is not consider the nominal rate of assistance for PR's agribusinesses and it may affects the net analysis of costs. The nominal rate of assistance for the US<sup>130</sup> was not considered applicable due to the assumption that PR's market requires a different analysis.

Statistics about the specific commercial trade, and details of containerisation accountability, tracking and tracing are not public information. It is also believed that the majority of the maritime companies on the island do not have the capacity to offer clear and reliable information to their consumers. Thus, it seems that the island food security is in the hands of the maritime transporter companies.

4. Although the research instrument were designed to validate the participants' views through questions of their firms' operational's activities and the

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<sup>130</sup> Anderson and Nelgen (2013) said that the nominal rate of assistance to the US agriculture between between 2007—2010 was estimated in 10%.

majority of them expressed high interest of the topic, cognitive dissonance occurred. In situations where an individual must choose between two incompatible beliefs or actions its justification were taking into account in our analysis. However, it may introduce the researcher's bias views.

5. The framework contributes to and enriches the existing literature and provides background for further academic research in this subject. However, this research involved a single case study (PR) applied to the agribusiness importers' sector. Therefore the proposed conceptual framework may not be suitable for other sectors and the findings would need to be delimited through further research.

6. Due to the small number of firms, there were variables that could not be kept constant, thus it is possible that the agribusinesses' supply chain differences have affected the study.

7. The plethora of variables that are related to the Cabotage Act as an NTM that may affect the agribusiness competitiveness was the biggest challenge to selecting and analysing the phenomenon and its dimensions. The risks that this entails are inappropriate data disaggregation and the underestimation of factors.

8. Spanish was the language used in the interviews; thus, some regional statements have the risk of mistranslation.

#### **7.4.0 Avenues for further research**

1. The Government of Puerto Rico does not have an executive plan to promote the optimisation of commercial sea routes as is happening for airlines and cruise lines. Through a cross-analysis of commercial sea routes, more possibilities to trade with other Latin American countries could be identified, helping in planning and profitability. How much is PR's importing from abroad but through the US?

2. Why not operate satellite farms? The fresh-produce importers' sector could create a supply base of small farmers and increase the local production volume. Importers have the control of the supply chain; thus, they could incorporate satellite

farms into their chains to produce high-value perishable produce. It could bring them more control of production, high quality, reduced time and risk in transit, freshness and the possibility to pursue niche markets rather than operating on the basis of low price–low production cost.

3. Why not develop a regional partnership for grain importers? It seems that the biggest issue is confidence between companies facing similar environmental conditions. This requires a high level of intercommunication in the supply chain, but the grain volumes from abroad could be managed at lower rates in a partnership.

4. This research integrated different approaches to combining socio-economic, environmental and management aspects to evaluate the effects of a regulatory framework for agribusiness to improve sustainable competitiveness. A similar exercise could be designed to evaluate other regulations for food that have been imposed under scientific criteria but without considering whether they are worth the cost. Inevitably, some existing policies are more likely than others unnecessarily negatively. Therefore, future research studies may take this first stance for competition assessment to evaluate the plethora of regulations that directly affect the traditional agricultural sector.

5. Although this thesis and the framework used contribute to the existing literature, providing a more academic background for further academic research on this subject, other participants in the agrifood supply chain could be affected by anti-competitive measures that they do not necessarily recognise or identify.

### **7.5.0 Final remarks**

This chapter provided the final critical analysis of the research. The research questions and objectives were also revisited along with the main contributions from the conceptual framework, and the resulting conceptual systems were discussed. Limitations and recommendations for further research were also identified.

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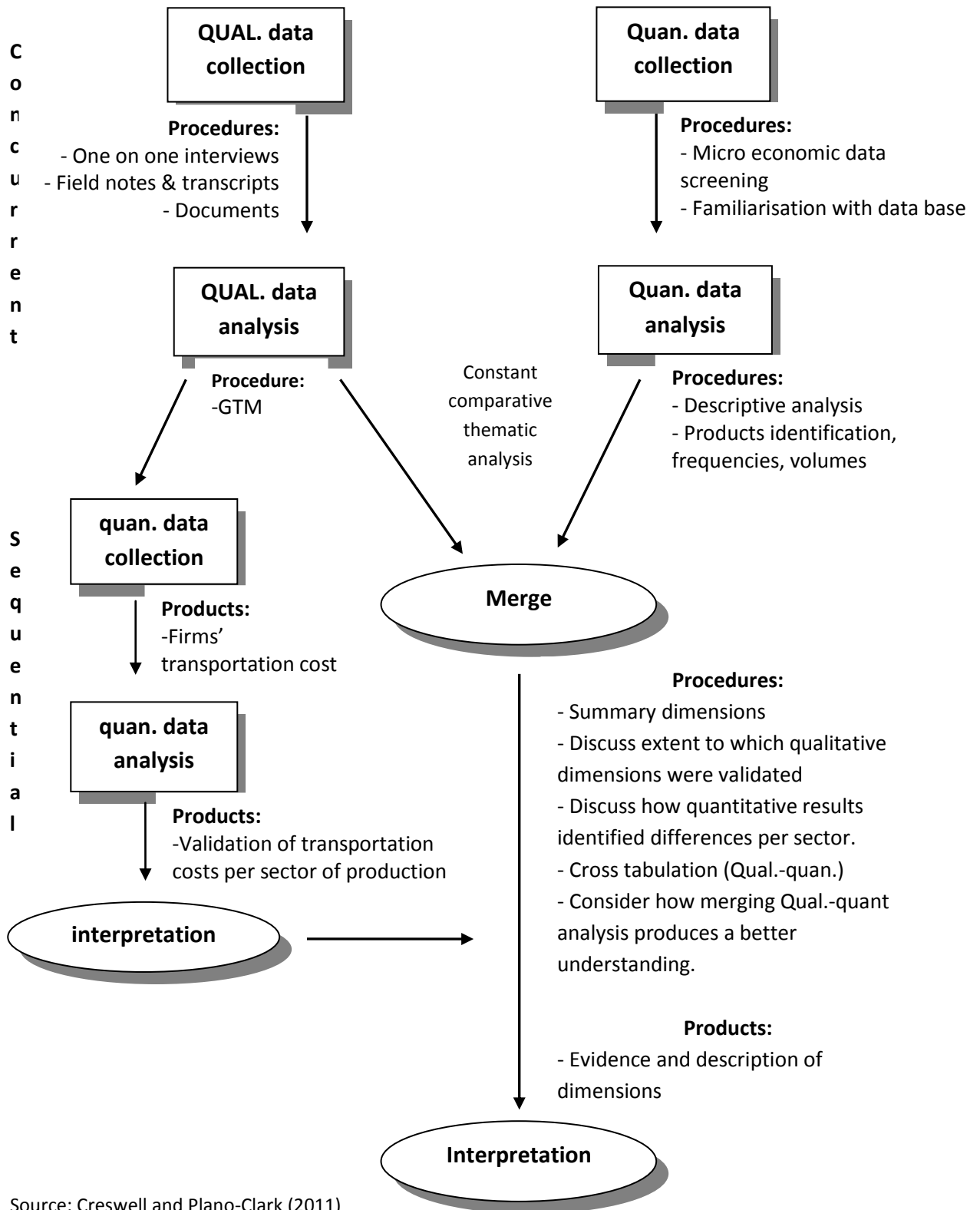
### **8.1.0 Puerto Rico Congress hearings sound recordings**

- Colegio de Abogados de Puerto Rico. (2014) *Deposition RS 237 – April 2013*, by Esq. Ana I. Rivera, President. Presented on 27th January, Commission of Civil Rights, Citizens Participation and Social Economy, Senate of Puerto Rico, San Juan.
- Estudios Técnicos, Inc. (2014) *Deposition RS 237 – April 2013*, by José J. Villamil, President of the Board. Presented on 30th January, Commission of Civil Rights, Citizens Participation and Social Economy, Senate of Puerto Rico, San Juan.

- Hawaii Shippers' Council. (2014) *Deposition RS 237 – April 2013*, by Michael N. Hansen-President. Presented on 29th of January, Commission of Civil Rights, Citizens Participation and Social Economy, Senate of Puerto Rico, San Juan.
- Herrero, J. (2014) *Deposition RS 237 – April 2013*. Presented on 5th February, Commission of Civil Rights, Citizens Participation and Social Economy, Senate of Puerto Rico, San Juan.
- MIDA. (2014) *Deposition RS 237 – April 2013*, by Mr Manuel Reyes Alfonso, Executive Vice-President. Presented on 28th January, Commission of Civil Rights, Citizens Participation and Social Economy, Senate of Puerto Rico, San Juan.
- PR Chamber of Commerce. (2014) *Deposition RS 237 – April 2013*, by Jorge Cañellas, President. Presented on 29th January, Commission of Civil Rights, Citizens Participation and Social Economy, Senate of Puerto Rico, San Juan.
- PR Department of Agriculture. (2014) *Deposition RS 237 – April 2013*, by Hon. Myrna Comas, Minister of Agriculture. Presented on 28th January, Commission of Civil Rights, Citizens Participation and Social Economy, Senate of Puerto Rico, San Juan.
- PRICO. (2014) *Deposition RS 237 – April 2013*, by Luis Ortiz, Executive Director. Presented on 28th January, Commission of Civil Rights, Citizens Participation and Social Economy, Senate of Puerto Rico, San Juan.
- Rochet Santoro, N. (2014) *Deposition RS 237 – April 2013*. Presented on 30th January, Commission of Civil Rights, Citizens Participation and Social Economy, Senate of Puerto Rico, San Juan.
- Valentín-Mary, J. (2014) *Deposition RS 237 – April 2013*. Presented 27th January, Commission of Civil Rights, Citizens Participation and Social Economy, Senate of Puerto Rico, San Juan.

## 9.0.0 Appendices

Appendix A: Research design flowchart



Source: Creswell and Plano-Clark (2011)

## Appendix B: Sample description

### Academic Background

Assoc. Degree or less	8%
Bachelor degree	58%
Postgraduate degree	33%

### Gender

Male	92%
Female	8%

### Experience (year in the same institution)

	Sector	In rel. to the whole sample	
Private	100%	79%	> 10 yrs.
ONG	100%	8%	> 10 yrs.
Public	67%	8%	< 10 yrs
	37%	4%	> 10 yrs.

All the participants were in full-time employment as an owner, CEO, general managers, division or technical or purchase managers. Although these variables were not considered on this thesis, the sample gender shows the highest disparity. This may create a situation where the study may be generalized and/or applied to both gender but lack of equality. Similarly participants may, unintentionally, ignore evidence if it conflicts with their social identities or beliefs, which the gender could be a bias' factor.

On the other hand, the interviewees of this research were identified by the sample firms according to their own corporative level of responsibility. It may sustain a gender-fair sampling process. However, even though that the instrument of interview and its process were identical across conditions, both genders could have bias views and it would be taking into account on future studies.



## Appendix C: Participant information sheet

You are being invited to take part in a research study conducted by the Bradford Centre for International Development (BCID) at University of Bradford, United Kingdom. Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this!

### **Who will conduct the research?**

William Suárez II Gomez, PhD student at BCID, University of Bradford, UK.

### **Title of the Research:**

Cabotage: The effect of an external non-tariff measure on the competitiveness of agribusiness in Puerto Rico

### **What is the aim of the research?**

To explore, clarify and quantify if possible, the effects of the US Cabotage Act as an external NTM on the PR's livestock sector and if possible, areas of opportunity in the supply chain competitiveness.

### **Why have I been chosen?**

We chose you to participate in this study because you are a manager of logistic and accountancy in an agribusiness highly dependent of the maritime transportation. Your professional experiences, knowledge and opinion, is vital for us to accomplish the aim of this research.

### **What risk and/or benefits I will have?**

No risk is previewed because the process is totally harmless and flexible. Respondents can decline to answer any question or topic and will have absolute control over process when they can pause or stop the recording machine any time during the audio-recording session. It will be strictly voluntary and won't receive any financial benefit in return. However, at the end of the project, participants' entities will receive a digital report summary of the research results but no other tangible object.

### **What would I be asked to do if I took part?**

If you agree to take part, we will ask you to answer some questions. The discussions should take between 45 and 90 minutes.

**What happens to the data collected?**

All the information you give us will be confidential and used only for the purpose of this study. Once all the data have been transcribed, analysed and the thesis be approved the tapes and backup copies will be destroyed six month after.

**How is confidentiality maintained?**

The information given will not be made available to anyone not directly involved with the study. This is to protect the privacy of participants. However, names of the participants will/can be written on the study materials, that is including the interview guides. The interview guides will be kept by the researchers and nobody else will be allowed access to them. Anonymity may also be offered on request.

**What happens if I do not want to take part or if I change my mind?**

It is up to you to decide whether or not to take part. If you decide to take part you will be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason and without detriment to yourself.

**Will the outcomes of the research be published?**

The outcome of the research will be submitted as a part of a doctoral research and published in an eventual thesis and other publications.

**Contact for further information in PR**

William Suarez II Gomez  
Email: [agrowillie@yahoo.com](mailto:agrowillie@yahoo.com)

**Research Supervisors:**

Dr. David J. Potts	email: <a href="mailto:d.j.potts@bradford.ac.uk">d.j.potts@bradford.ac.uk</a>
Dr. Hossein Jalilian	email: <a href="mailto:h.jalilian@bradford.ac.uk">h.jalilian@bradford.ac.uk</a>

## Appendix D: Proposal of semi-structured interview questions

### ***Participants: Representative of the importer's company***

1. Does the Cabotage Transportation (CT) is used by your company? Does your company use Foreign Transportation companies (FFC)? How frequent is the use of CT vs. FTC by your company?
2. Does the logistic services provided by CT is different than FTC? Which of those potentiate more your access to a wide variety of services in benefit of your business? Which one offer you more access to a wide variety of markets?
3. How would you describe the management style of your organization to deal with the Maritime Transportation Cost? What strategies does your organization use to compete in this market? How does your organization mitigate the maritime cost to be competitive in the market?
4. How often do you interact with transportation and logistics suppliers? How would you describe your suppliers' services for your company success? Where are your suppliers located? How would you describe your corporative relationship with your foreign vs domestic suppliers? Could you please describe how often are the supply chain revisions in your company to improve the intercommunication with your suppliers?
5. How dependent is/are your organization(s) from the maritime transportation? Is the linkage with suppliers and customers exploited, according to the firm's value chain? Could you please describe the company's searching process to get more access to international suppliers?
6. Does your organization outsource? What criteria does your organization use in terms of making sourcing decisions? Where and what aspects of production do you outsource? ¿How useful for your company are the services of the CTC vs. FCC?
7. Your company maintain high stocks to offer speedy delivery to your customers? How the cost of inventory is manage in relation to the fleet cost? Does your organization have designed logistic protocols to deal with the cost and being efficient in this process? Could you describe it?

Appendix E: Consent form

Research Title:

CABOTAGE: THE EFFECTS OF AN EXTERNAL NON-TARIFF MEASURE ON THE  
COMPETITIVENESS OF AGRIBUSINESS IN PUERTO RICO

Aim of the Research: To explore, clarify and quantify if possible, the effects of the US Cabotage Act as an external NTM on the PR's livestock sector and if possible, areas of opportunity in the supply chain competitiveness.

Name of Main Researcher: William Suarez II Gomez

Supervisors: Dr. David J. Potts and Dr. Hossein Jalilian.

I have read and understood the attached information sheet giving details of the research project. I have had the opportunity to ask the researcher questions that I had about the project and my involvement in it and understand my role in the project.

My decision to consent is entirely voluntary and I understand that I am free to withdraw at any time without giving a reason. I understand that data gathered in this project will be for research purposes.

I understand that my name will not be used in the report, and that every effort will be made to protect my confidentiality.

Participant's name (capitals).....Date.....

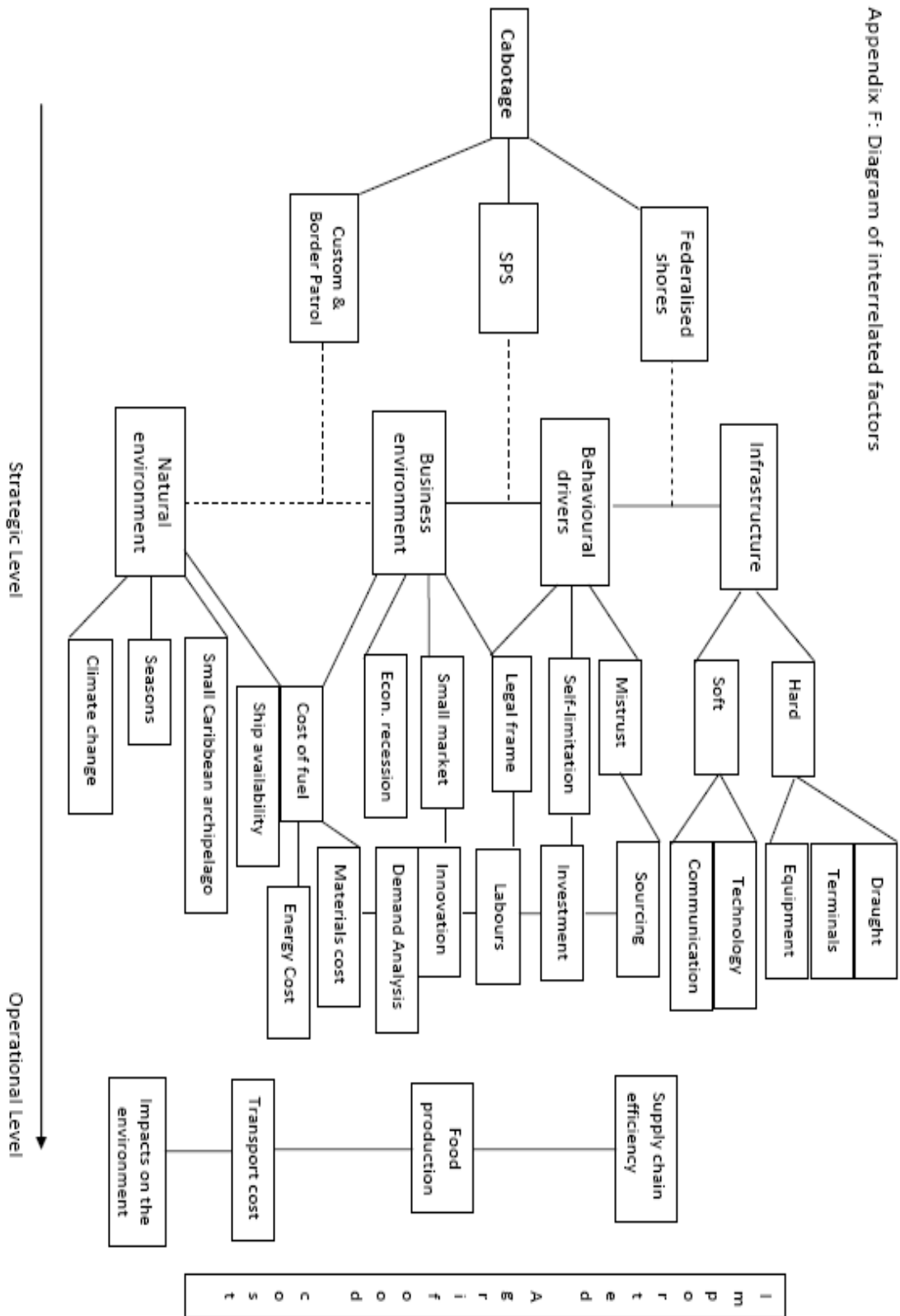
Participant's signature.....Date.....

Participant's email .....

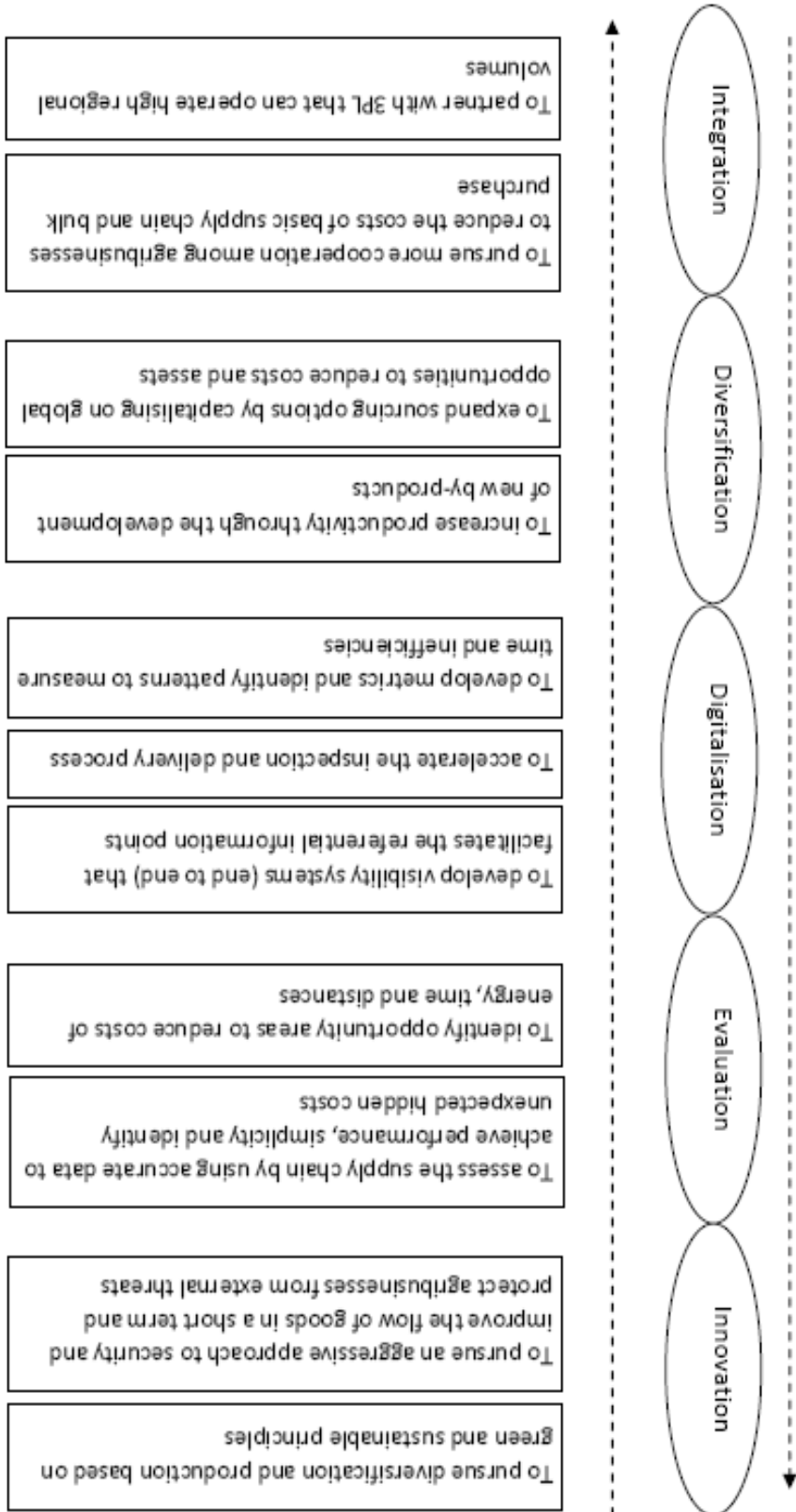
Researcher's Signature:.....Date.....

This study has been reviewed and received ethics clearance through University's Research Ethics Board (file # EC1819)

Appendix F: Diagram of interrelated factors



Appendix G : Supply chain internal opportunity areas



Appendix H: Analysis of Strengths, Weaknesses, Opportunities and Threats (SWOT) of cabotage in PR's agribusinesses

<b>Strengths (S)</b>	<ul style="list-style-type: none"> <li>- Free access to the US market</li> <li>- Geographical proximity between PR &amp; US</li> <li>- Domestic maritime firms have exclusive terminals' agreements in US ports             <ul style="list-style-type: none"> <li>- Similar regulations than the US market</li> </ul> </li> <li>- Access to diverse products and volume rates through the US market             <ul style="list-style-type: none"> <li>- Consolidated services available for LCL from the US (P)</li> <li>- Strong network with US agrifood traders companies</li> <li>- Harmonised technical issues</li> </ul> </li> <li>- Firms with strategic locations provide shortest routes to seaports             <ul style="list-style-type: none"> <li>- Roads connectivity to the ports are in reasonable conditions</li> <li>- Company experience trading with and shipping to PR</li> <li>- High frequency of domestic deliveries and products availability</li> </ul> </li> <li>- Relatively high number of barges authorised to serve the inbound US market             <ul style="list-style-type: none"> <li>- Barrier of market entry</li> <li>- Existing local distribution and sales network</li> <li>- Availability of some subsidies</li> </ul> </li> <li>- Rapid inventory turn-over (due to produce perishability)             <ul style="list-style-type: none"> <li>- High local storage capacity (G)</li> <li>- Good cooperation among firms (G)</li> </ul> </li> <li>- Good infrastructure of climatized warehouses (P)</li> <li>- Well-educated, young and dynamic workforce</li> </ul>
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<b>Weaknesses (W)</b>	<ul style="list-style-type: none"> <li>- Dependency of the US market</li> <li>- No national plan for removal of the NTM or an internal needs scenario             <ul style="list-style-type: none"> <li>- Lack of political powers and resources to address the NTM</li> </ul> </li> <li>- No formal centralised follow-up mechanism or monitoring instrument             <ul style="list-style-type: none"> <li>- Limited cooperation at regional level</li> <li>- Small market in contraction</li> </ul> </li> <li>- Lack of scale, hence variable costs tend to be higher when volumes are lower             <ul style="list-style-type: none"> <li>- Low or scarce native raw-material production</li> </ul> </li> <li>- Most of trades between US &amp; PR depart from ports highly affected by similar climatic conditions and seasons.             <ul style="list-style-type: none"> <li>- Lack of performance monitoring and evaluation system at firm level                 <ul style="list-style-type: none"> <li>- Low product quality image (G)</li> <li>- Outdated terminal infrastructure (G)</li> </ul> </li> </ul> </li> <li>- Terminals more suited for domestic river barges than for foreign ships (G)             <ul style="list-style-type: none"> <li>- Highly sedimented sea terminals thus short draught (G)</li> <li>- Lack of in-house staff for out-sourcing products</li> <li>- Limited supporting industry</li> </ul> </li> <li>- Low innovation and level of products diversification compare to the newest firms             <ul style="list-style-type: none"> <li>- Limited cash flow</li> <li>- Capacity underutilization (G)</li> <li>- Limited future profitability</li> <li>- Low possibility of export (G)</li> <li>- Limited array of goods and services</li> </ul> </li> <li>- Low visibility among supply chain participants             <ul style="list-style-type: none"> <li>- Supply chain efficiency</li> <li>- Low profit margins</li> </ul> </li> <li>- High impact of the oil and energy prices on production costs</li> <li>- Lack of investments in a more efficient equipment and infrastructure             <ul style="list-style-type: none"> <li>- High transport costs with special attention to the inland roads</li> <li>- Weak branding or products differentiation</li> </ul> </li> <li>- Low investments in local raw-material production</li> <li>- Improvement in quality standards concerns on the health effects of using low quality products</li> <li>- Lack of training and academic education on agrifood supply chain on the undergraduate and graduate university programmes</li> </ul>
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<b>Opportunities (O)</b>	<ul style="list-style-type: none"> <li>- US FTAs may give more access to foreign products at low tariff rates</li> <li>- Increase designs and production of efficient technologies and transports</li> <li>- New regional ports such as Panama Channel, Limon (Costa Rica), Mariel (Cuba) and Haina (Dom. Rep.) may result in higher traffic on the region             <ul style="list-style-type: none"> <li>- Low entry of new competitors</li> <li>- Logistics increasing regional commerce</li> <li>- Consolidation services for LCL from Latin America (P)</li> <li>- New designs of packaging and refrigerated containers</li> </ul> </li> <li>- Growing health consciousness supportive of local products consumption             <ul style="list-style-type: none"> <li>- Agronomic potential</li> <li>- Sourcing of Latin-American producers with new products</li> <li>- Adapted to high SPS and environmental regulations</li> </ul> </li> <li>- To expand its coverage on e-commerce, formulations designs and products diversification</li> <li>- Aware about the limitations to trade imposed by US cabotage framework</li> </ul>
<b>Threats (T)</b>	<ul style="list-style-type: none"> <li>- No legal framework for removing exogenous NTM</li> <li>- Domestic sea industries, US Navy and sea unions are strongly opposing to change             <ul style="list-style-type: none"> <li>- Limitations (US-SPS) to negotiate with external markets</li> <li>- Low maritime direct connectivity with foreign regional ports</li> <li>- Low adoption of more efficient technologies in the maritime firms</li> <li>- Volatility cost in maritime transportation rates, fuel and oil prices</li> </ul> </li> <li>- The impact of the global economic crisis experiences in US but also in some Latin American countries upon the agrifood sectors             <ul style="list-style-type: none"> <li>- Volatility cost in agrifood products</li> </ul> </li> <li>- Higher risks and insurances costs due to climate uncertainties</li> <li>- Maritime firms consolidations creating oligopolistic transport structures             <ul style="list-style-type: none"> <li>- Oligopolistic structures on the grain production</li> </ul> </li> <li>- US framework force to comply with unions, labour, SPS and environmental standards             <ul style="list-style-type: none"> <li>- High labour costs in comparison to the region                 <ul style="list-style-type: none"> <li>- Strong import competition</li> <li>- Limited local loans for investments</li> <li>- Reduction in the local population</li> <li>- Reductions in the imported volume</li> </ul> </li> <li>- Low opportunity to enter new markets in the region (G)</li> <li>- Lack of US flagged vessels available to serve small markets</li> </ul> </li> <li>- Lack of access to better offers or products on shipbuilding at reasonable prices out of the US market             <ul style="list-style-type: none"> <li>- The US decisions to relay in FTA relations without considering PR's reality</li> <li>- Lack of foreign investments in the maritime logistic service providers in PR</li> </ul> </li> </ul>



## Appendix I: Output of the ground topics generated by group of participants

Issues gathered by factors associated to TRANSPORT-SERVICE-PRODUCT

### GRAIN SECTOR

#### Government/Policy (PR and/or US)

##### 1. Regulations as limitation to explore trade with effects in buyers decision making

BCo1 (66,178,272,274,300,333)

ACo3 (134,493,154,156,463)

C3Co2 (221,316,324,269,320)

ACo8 (165,232, 288,290)

##### 2. Labour regulations

ACo1 (159,161,166,170)

BCo1 (212, 313,338)

ACo3 (486,504,506)

C3Co2 (72,76,80,86,91,98,102,107,109,157,163,276)

ACo4 (96,133,153,225,248)

ACo5 (505,541,177,558, 582,591)

BCo5 (273,337, 42,129,137,240,256)

#### Environment

##### 1. Climate change or season conditions (Effects on products accessibility for buyers)

ACo1 (192,200,241)

BCo5 (182,281)

ACo6 (134,180,182,186,363)

## External

### 1. Supporting industries and diversity of service

BCo2 (171,178,196,276)

ACo3 (83,87,94,120,188)

BCo5 (191,193,377)

### 2. Quality of service

BCo2 (165,202,252)

ACo3 (146,174,321,358,369)

ACo4 (131,141,149,172,178, 208)

### 3. Transportation availability and rates/volume

ACo1 (50,65,111, 269)

BCo2 (81,87,91,133,140,168,310,565)

ACo3 (89,107,111, 132,215,277,306,310,423, 520)

ACo5 (126,137,139,211,277,471)

BCo5 (69,85,104, 108,351)

## Internal

### 1. Agribusiness logistics and supply chain strategies (in relation to the maritime transport)

BCo2 (95,107,120,150,153,163, 256, 314, 334, 433, 542)

ACo3 (138,143,202, 204,228,241,243,260,388, 438, 445,601)

BCo5 (68,131,141, 188,209, 265,271, 292,299, 354)

ACo8 (58,81,102, 114,120, 130,177, 222,331,366)

## 2. Business Interconnectivity

BCo2	(35,222,367,401)
ACo3	(248,286, 303,319)
ACo5	(72,166,185,201,301, 307,410)

## 3. Rivalry/Cluster

BCo2	(344, 354,418)
ACo3	(85,164,230,288,397, 447)
ACo5	(102,114, 116,118, 222,267, 271)
ACo6	(209,212, 307,313)

## Infrastructure

### 1. Hard infrastructure (docking, port-terminal, equipment efficiency, vessels, etc)

ACo3	(400,469,502, 509,544,556,575)
C3Co2	(42,45,52,56, 61,150,187, 191,201,206)
ACo6	(73,75,78,88, 91,96,102,110,175,184,199,201,230,290)

### 2. Soft infrastructure (technicians, advisors, internal structure diversity, R&D, legal corporate status, etc.)

ACo5	(112,313,315)
ACo8	(278,282,286)

## Distrust

### 1. Technical issues in quality and volumes (quantity measures)

Buyers preferences by market stability

ACo1	(210,217,219,224)
BCo2	(283,289,316,405)
ACo3	(148,154,160,168,206)
C3Co2	(172,184,287)

## FRESH PRODUCE SECTOR

### Government/Policy (PR and/or US)

#### 1. Regulations as limitation to explore trade with effects in buyers decision making

B1Co9	(28,43,93)
B2Co9	(68,71,84)
ACo10	(245,261, 265,267, 280)

#### 2. Labour regulations

ACo10	(263)
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### Environment

#### 1. Climate change or season conditions (Effects on products accessibility for buyers)

BCo10	(110,115,118,290)
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### External

#### 1. Supporting industries and diversity of service

ACo9	(76,78,80,143,162,172)
BCo10	(72,75,77,94, 140,165,181)
BCo11	(90,154,218,220,222,233)

#### 2. Quality of service

B1Co9	(28,46,48, 129)
B2Co9	(45,47,50, 53,61)
BCo11	(92,392,523,525)

#### 3. Transportation availability and rates/volume

B2Co9	(20,27,29, 31,36,41)
BCo10	(50,52,54,97,161,254,256,258)
BCo11	(105,107,116,162,168,172,209,328,370)

## Internal

### 1. Agribusiness logistics and supply chain strategies (in relation to the maritime transport)

ACo10 (30,63,79,115, 128,130,148, 150,153, 191,220, 225,250)

BCo10 (41,61,86,88, 104,106,125, 153,243, 248,299,330)

BCo11 (54,56,77,79,87,179,273,277, 298,333)

### 2. Business Interconnectivity

BCo10 (25, 45, 59,184,187,191, 204,234)

BCo11 (47,51,128,139,291,417,424,432,437)

### 3. Rivalry/Cluster

ACo10 (89,91,110,208,286)

BCo11 (194,250,365)

## Infrastructure

### 1. Hard infrastructure (docking, port-terminal, equipment efficiency, vessels, etc)

ACo10 (100,102,104, 108,259)

### 2. Soft infrastructure (technicians, advisors, internal structure diversity, R&D, legal corporate status, etc.)

BCo10 (131,212,219,265)

BCo11 (257,306,390,419,498)

## Distrust

### 1. Technical issues in quality and volumes (quantity measures)

Buyers preferences by market stability

BCo11 (97,378,486)