Maritime sector and ports in the Caribbean: the case of CARICOM countries

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Index

List of Figures

List of tables

List of maps

Glossary

CARICOM	Caribbean Community
CAST	Caribbean Association for Sustainable Tourism
CCAA	Caribbean Central America Action
Cut	Cubic feet
CIP	Inter-American Port Committee
CSME	Caribbean Single Market Economy
CTHRC	Caribbean Tourism Human Resource Council
CTO	Caribbean Tourism Organisation
ECLAC	Economic Commission for Latin America and the Caribbean
ECSA	East Coast South America
ECUS	East Coast United States
FCCA	Florida Caribbean Cruise Association
IMO	International Maritime Organisation
ISPS	International Ship and Port Facility Security
LCL	"less than container Load"
LoLo	Lift on, Lift off: Cargoes that are loaded and discharged with cranes
NCSA	North Coast South America
NGMTS	Negotiating Group on Maritime Transport Services
NVOCC	Non-Vessel-Owning- Common-Carriers
OAS	Organisation of American States
PPP	Public Private Partnership
RoRo	Roll on, Roll off: Cargoes are loaded and unloaded with trucks
USD	United States Dollar
VEMS	Visitor Expenditure and Motivation Survey
WCSA	West Coast South America
WISCO	West Indian Shipping Corporation
WTO	World Trade Organisation

Abstract

The document assesses of the situation of the maritime sector in CARICOM[1] and presents a series of new observations and issues. Challenges and barriers in the maritime sector, or problems created through inefficiencies in the maritime sector are analyzed for: maritime freight transport, cruise shipping, ports and yachting[2]. Whilst the first three are part of the original structure of the study, the fourth is included to show the full extension of the maritime sector.

To be able to understand the challenges and role of maritime transport in a regional and global context, it is essential to consider the physical geography of the CARICOM region; CARICOM is a "conglomerate" of states that have comparable historical development paths of colonial dependency. The countries are spread out throughout the Caribbean basin and do not form a continuous territory. While cooperation between this diverse group of countries has historically developed slowly, the ambitious goal to create a Caribbean Single Market Economy (CSME) and the enlargement of CARICOM's membership has accelerated the speed of integration. Common strategies for the CARICOM maritime transport sector are always challenged by regional competitors from outside the CARICOM group. As the CARICOM region is geographically discontinuous, this fact contributes to difficulties in setting up joint strategies and regulatory frameworks, because these might easily be obstructed by the competitors.

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[1]   The analysis principally includes all CARICOM countries except Suriname and Haiti. Data and information of these countries were hard to obtain. The few data that was available does not seem sufficient for the authors to include these two countries in the analysis and recommendations. However, where possible, data of these countries was included in figures and illustrations.

[2]   Waterborne passenger transport (water taxis etc.) and other auxiliary services (ship chandler, ships yards, bunkering etc.) have specific characteristics and setting that are not included in the study, because they go beyond the focus of this work.

A number of CARICOM countries (esp. Jamaica and The Bahamas) benefit from their intermediacy setting in the principal East-West global trade routes, which pass through the Panama Canal on the one hand and for North-South routes between South America and North America on the other hand. A number of ports have been able to take advantage of their geographical position, because of the ascendant hub and spoke network in global liner shipping. On the contrary the scale of hinterlands and slow port reforms has been a drawback for development of other ports.

The transshipment market carries a significant risk for ports, since shipping lines tend to act footloose in the cost and scale driven container shipping market. The transshipment ports in CARICOM have based their success on different strategies. Freeport uses its unique geographical position and the artificially created barrier to Short Sea Shipping (SSS) in the US by the Jones Act[3]. Kingston has adopted a strategy to tie shipping companies to the port, by developing dedicated terminals and attracting private investment from shipping companies[4].

Research on freight rates in the Caribbean is of high interest, as it depicts key influencing factors. The empirical analysis discusses how factors like distance between origin and destination of cargo flows, port infrastructure, connectivity, and the number of services among others influence freight rates.

Further, CARICOM countries are part of the most attractive region for cruise ship tourism. However, CARICOM countries suffer from the footloose behaviour of the oligopolistic cruise line industry and the related bargaining power of these lines. Yachting activities have been developing at a high speed and bring new challenges and opportunities for development.

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[3] Jones Act: (Merchant Marine Act) is a United States Federal statute that requires U.S.-flagged vessels to be built in the United States, owned by U.S. citizens, and documented under the laws of the United States. Documented means "registered, enrolled, or licensed under the laws of the United States." In addition, all officers and 75% of the crew must be U.S. citizens. Vessels that satisfy these requirements comprise the "Jones Act fleet". The Jones Act also allows injured sailors to obtain damages from their employers for the negligence of the shipowner, the captain, or fellow members of the crew. It operates simply, by extending similar legislation already in place that allowed for recoveries by railroad workers and providing that this legislation also applies to sailors. Its operative provision is found at 46 U.S.C. 688(a). The Act was enacted in 1920. The chief statute that it extends to sailors is the Federal Employers Liability Act, also known as FELA.
[4] Maersk Line.

I. Characteristics of the maritime sector in CARICOM countries

This chapter outlines CARICOM's trade development, in particular maritime freight transport and port development. The overview also describes the characteristics of cruise shipping and yachting services and activities.

1. Trade development

In 2002 and 2003 CARICOM trade volumes (tons) decreased almost to levels of 1997. The United States were the most important trade partner (about 60% of all trade volume, see figure 1).

FIGURE 1
CARICOM TRADE STRUCTURE BY TRADE BLOCKS, 2000 – 2004, IN VOLUME
(Tons)
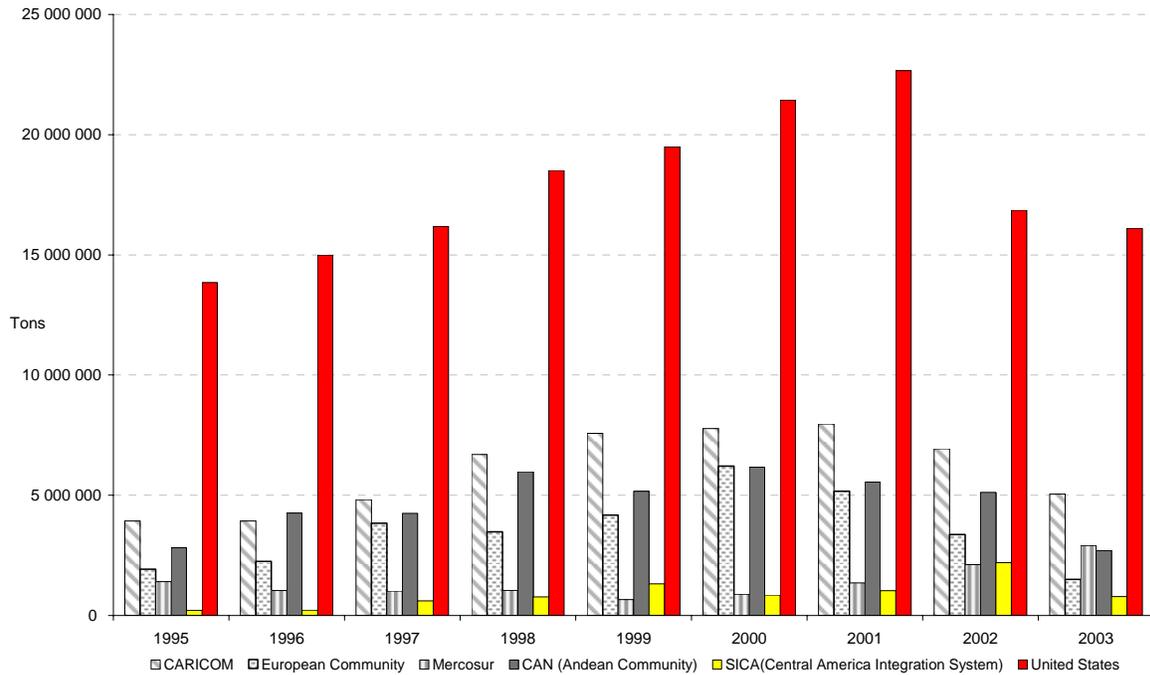
Source: The authors based on ECLAC (2006).
Note: Does not include petroleum and petroleum derivates.

The island character of CARICOM[5] is clearly reflected in the importance of ports and maritime services for trade. In terms of volume and value maritime transport is the most important freight transport mode (see figure 2). The contribution of maritime transport to economic growth has to be seen in the following context:

- Imports of manufactures to satisfy local demands and tourist industries. Internal demand has been growing slow. It is important to understand the interlinkages between the tourist industry and import demand. Tourism is a significant driver for import demands and import commodity structures. With the increase in tourism[6], demands for foreign products, such as building materials, groceries and manufacturers, have been growing substantially.

- The main import product groups are: building materials (cement), household goods, groceries and water. All countries except Trinidad and Tobago have to import petroleum products, which is the main input for generating electricity on the islands.

- Exports of primary products have decreased slowly in relative importance for CARICOM.

- CARICOM showed a moderate increase in the export of low and intermediate technology manufactures, with increases in high technology associated with IT in some specific cases.

- A lack of knowledge about the complementarity of intra-regional trade can be noticed.

- Trinidad & Tobago and Jamaica have developed towards manufacturing countries and to a certain extent are able to satisfy regional demands for manufactured goods.

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5   Except Suriname, Guyana and Belize.
6   In some of the smaller islands the number of tourists per year is often higher than the actual population.

- A number of other CARICOM countries have started to move away from mono-crop production. However, further potentials to diversify export products of the traditional agriculture industry and to instigate manufacturing industry exist, but have not realized so far. The potential to promote new products has to be flanked by effective marketing and branding strategies (i.e., the Spice Isle of Grenada).

- Trinidad and Tobago, the main producer of energy commodities, contributes the greatest share in intraregional trade of such commodities. However, the focus on energy commodities and the exploitation of these products has left maritime services and port development behind. Just recently the country has started to set up a committee to create a "real" national port authority and a maritime policy framework.

FIGURE 2
CARICOM – MODAL SPLIT IN TERMS OF VALUE BY PRODUCT GROUP, 2003
(Percentages)
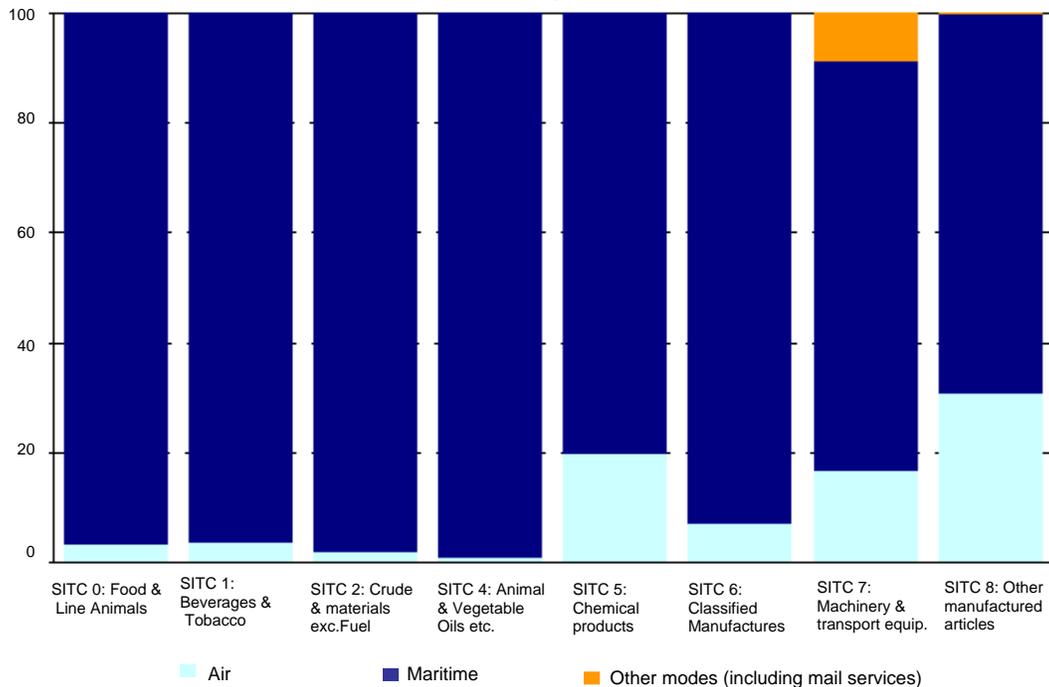
Source: Gordon Wilmsmeier based on ECLAC (2006).

The diversification of the export structure has been identified as a desirable goal for a longer period. However, this would imply the need for a co-modal transport policy, which offers a framework directly interrelated with the modal affinities of each export product flanking regional trade policies.

2. Maritime freight transport

2.1. Brief overview

Maritime freight transport has to be divided into bulk and containerized cargoes. Bulk cargoes (bauxite, petroleum derivates, sugar, ores and cement) are moved in non-regular specific services. These commodities move in specific consolidated markets and form part of vertically integrated production pattern. Containerized export products make up for a small portion in terms of total export volumes.

Extra-regional[7] imports are mainly containerized cargoes due to their product structure (manufactures and consumer products). In simple terms, maritime transport volumes, shipments to and from CARICOM countries do not have sufficient volumes to attract a significant number of regular liner shipping services[8].

The position of CARICOM countries within the global container shipping network is influenced by two contrasting situations. One is the intermediacy in the main global routes and the other is the situation of "isolated" small islands, without significant hinterlands. This biased situation and the restructuring of global container shipping networks towards a hierarchical hub and spoke and network poses significant threats and challenges especially on the smaller islands. The geographical position at the crossroads of main global north-south and east-west shipping routes allows the region to benefit from "spillover" effects of these routes.

Freight shipping capacity is provided in a competitive market free of subsidies

The provision of regular maritime services[9] is in the hands of the private sector and cannot be influenced by national or regional institutions and/or governing bodies. Fleet deployment and container capacities clearly portray that supply follows demand (see figure 3).

FIGURE 3
INDEX OF VESSEL AND TEU DEPLOYMENT IN THE CARIBBEAN BASIN, 2001-2005
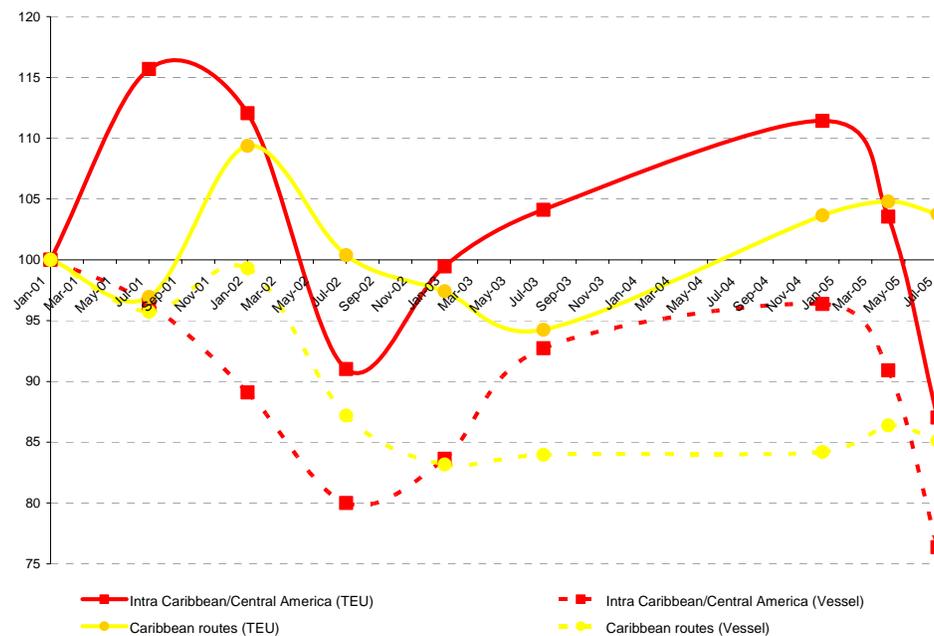
Source: The authors, liner services.

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[7]   Extra-regional refers for cargoes, who have an origin other than CARICOM.
[8]   See also World Bank 2005.
[9]   Specific ferry services between islands such as the ferry service Port of Spain – Tobago and Grenada – Carriacou are excluded in this analysis.

Transshipment has increased strongly. At a global scale the configuration of hub ports can be described as a triangle[10]. On the corners of the triangle, gateway ports form the entry to the Caribbean basin: Freeport, Colon, and Port of Spain. Freeport benefits from its strategic position as the only foreign port close to the US, which is passed by the routes from Europe that cross the Panama Canal and, WCSA and ECSA routes to the ECUS and Europe. Freeport is the entrance from where cargo can easily be distributed to and from the US on non US-flagged vessels avoiding restrictions from the Jones Act[11]. The lack of a natural hinterland makes Freeport almost a pure transshipment hub, which in difference to other cases cannot be seen as a constraint due to its unique geographical position.

MAP 1
CARIBBEAN TRANSSHIPMENT TRIANGLE WITH HUB PORTS
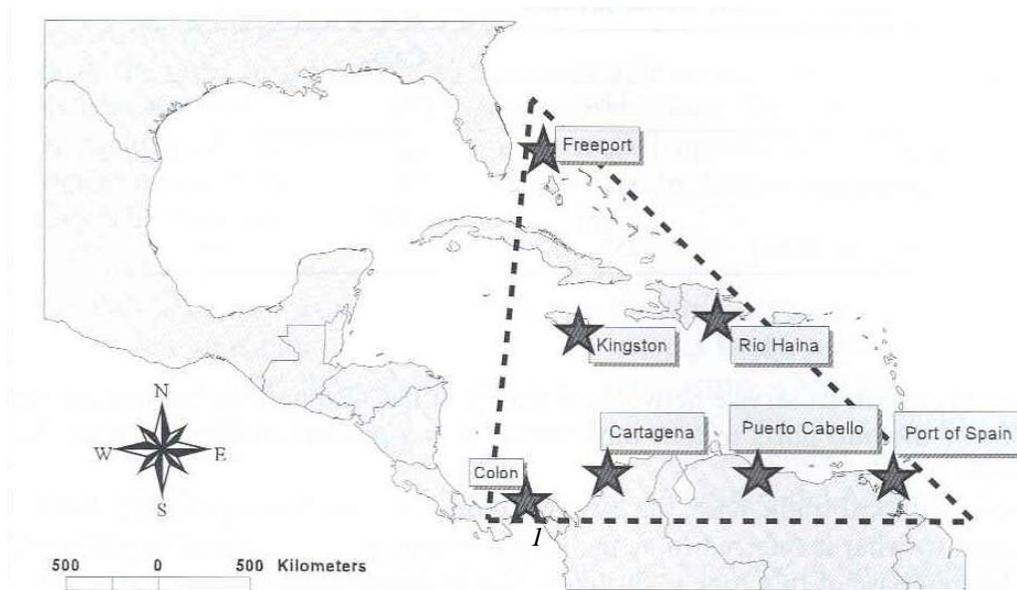
Source: McCalla et al after Hoffmann (2005).

Note: The designations employed and the presentation of material on the maps used within this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries.

Looking beyond CARICOM several ports compete as transshipment points. In the northern part of the basin Houston, Miami and Freeport, Bahamas act as such points. Within the basin Kingston, Rio Haina, San Juan and Port of Spain are major hubs. Along the NCSA, including Panama, Puerto Cabello, Cartagena and the terminals at Colon (Puerto Manzanillo, Colon and Cristobal) all act as transshipment ports.

The number of services and the number of directly connected ports describe well the embeddedness of port in the global network and simultaneously the potential for import and export development of the respective hinterland. But connectivity alone is not sufficient to explain port throughput. Although there is no doubt that containerization is a necessary condition to increase trade in CARICOM, its very presence does not guarantee that such development will occur. The reach of shipping networks from a country or port show potentials trade opportunities.

Above and beyond the number of services, ship sizes, and frequency of services, it is important to whom the ports are connected. This is particularly the case for smaller ports that rely on feeder and small

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[10]   McCalla, Slack, Comtois (2005).
[11]   Jones Act: (explanation see above).

vessel services. These ports[12] do not depend on their direct connectivity, but on the connectivity to a transshipment hub, which defines their integration in the global liner shipping network.

At a regional scale "artisanal" inter-island services have to be taken into account. These primarily provide general cargo services for local produce at short distances. This trade has a dedicated terminal in Port of Spain, where local products are moved to and from the other islands. However, this terminal is not directly connected to the main port, which would allow direct exploitation of transshipment opportunities.

<div align="center">

The adverse development in capacity deployment and growing discrepancies between traditional "artisanal" shipping and containerization pose significant challenges for the region

</div>

A growing gap between global and intra-regional services can be observed. This is a definite threat to traditional shipping to become obsolete with continuing containerization. Further, small regional producers that are probably constrained in terms of volume and knowledge to participate in containerized trades.

<div align="center">

The development of a regional maritime policy could have a significant impact on the level, structure and costs of services

</div>

2.2. Shipping service providers

Local and regional carriers continue to play a major role in local trade. But they are threatened to lose global and some of the regional trade to alliances between global operators as these can offer more competitive prices when exploiting economies of scale.

Local and regional carriers can only compete in service not in price. Their advantages lie in close customer relations with preferences and flexibility in payments.

Regional carriers are niche carriers specializing in LCL[13] and mixed container loads and non containerized goods (especially in inter-island trade).

Such services are specialized in handling cargo such as three boxes, three pallets or three containers. These types of handlings are very difficult for big operators since these do not fit in their rational of cargo handling.

US-based regional container carriers dominate the intra-regional liner services in the US-Caribbean market[14] (see figure 4 and figure 5). One dilemma is that the local carriers have to adapt to global developments (i.e., bunker rates etc.) This however is difficult in a market which is referred to be consignee-led[15]. The economies of the islands vary enormously, in size, and volumes are small and spread out. Local knowledge is vital, transit times and schedule reliability are crucial, and service must be second to none. This dilemma makes it complex to realize a profit with small liner services in the region.

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[12]   The ports are; Georgetown, Guyana; Nieuw Haven, Suriname; St. George's, Grenada; Kingstown, St. Vincent; Castries, St. Lucia; St. Johns, Antigua; Belize City, Belize; Niew Nickerie, Suriame; Campden Park, St. Vincent; Vieux Fort, St. Lucia; Basse-Terre, St. Kitts; Port Au Prince, Haíti; Port.

[13]   LCL: "less than container load" shipments.

[14]   Based on earlier observations and the structure of trade relations, the structure of service providers is considered to be comparable for US-CARICOM trade.

[15]   Consignee - Party who is to receive product; usually the buyer. One to whom a consignment is made.

FIGURE 4
MARKET SHARE OF CARRIERS OF US EXPORTS TO THE CARIBBEAN, 2002
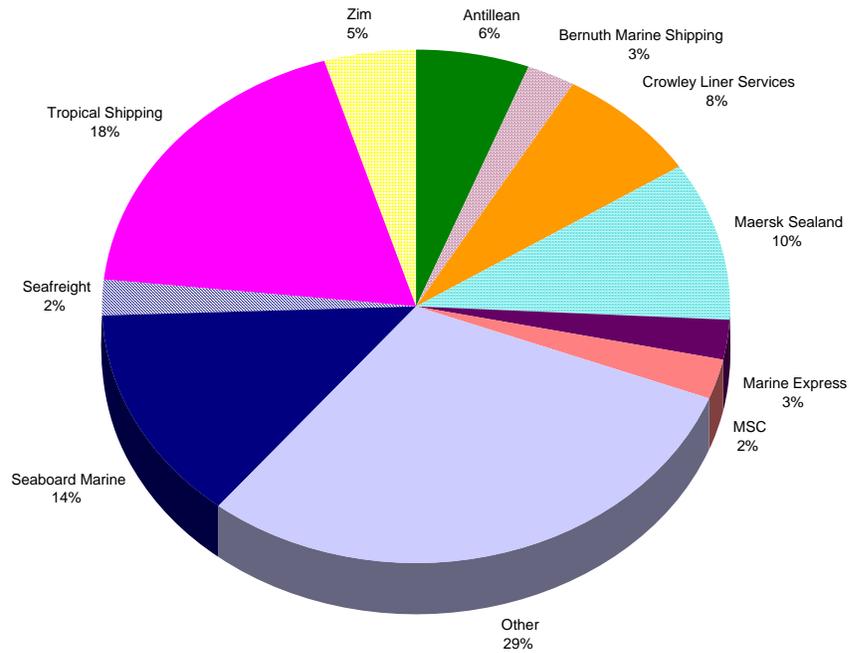
Source: Piers 2003.

FIGURE 5
MARKET SHARE OF CARRIERS OF US IMPORTS TO THE CARIBBEAN, 2002
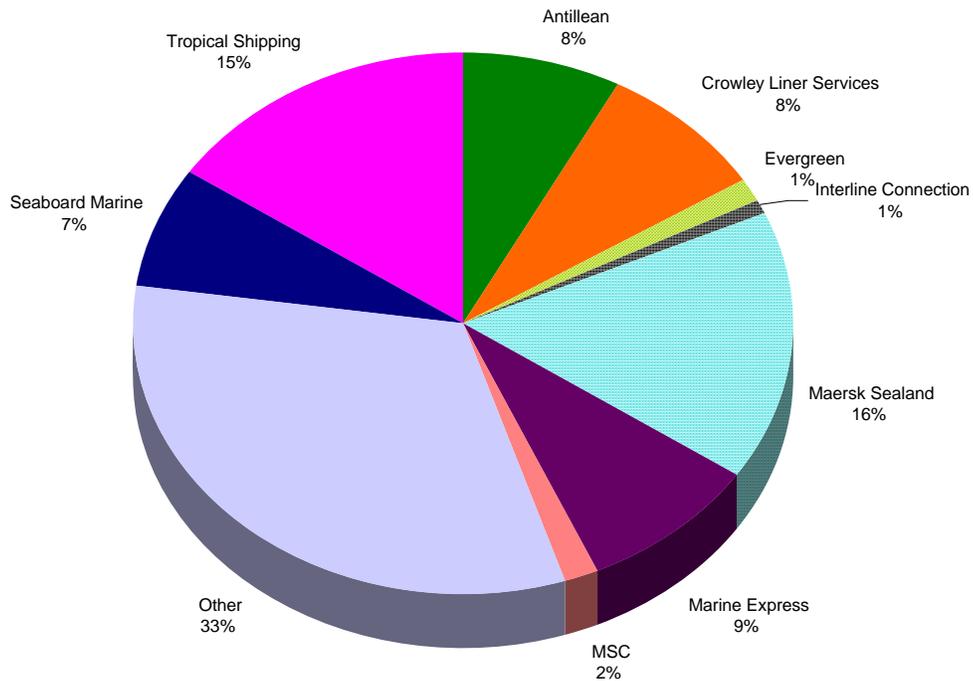
Source: Piers 2003.

Transit time is one of the most important factors in the Caribbean. An analysis of transit times though shows significant discrepancies between the theoretical time needed to move cargo between two ports and actual transit times of liner services. Moreover, the authors find evidence that with decreasing size of the economies average transit times grow exponentially.

Further, interviews revealed that fixed-day sailings are vital, because the islands are heavily dependent on imported goods. This is especially true if shipments are related to supply the cruise ship sector. In general storage capacities are limited therefore frequent and regular deliveries are crucial.

The development of the hierarchical hub and spoke network also bears advantages for regional carriers to serve as feeder to the transshipment destinations, offering an increased access to regional trade. Transport costs, when not taking into account other external influences might have the potential to decrease in a hierarchically structured liner network based on efficiency

FIGURE 6
INTRA-REGIONAL TRADE IN THE CARIBBEAN (TONS), 1995- 2003
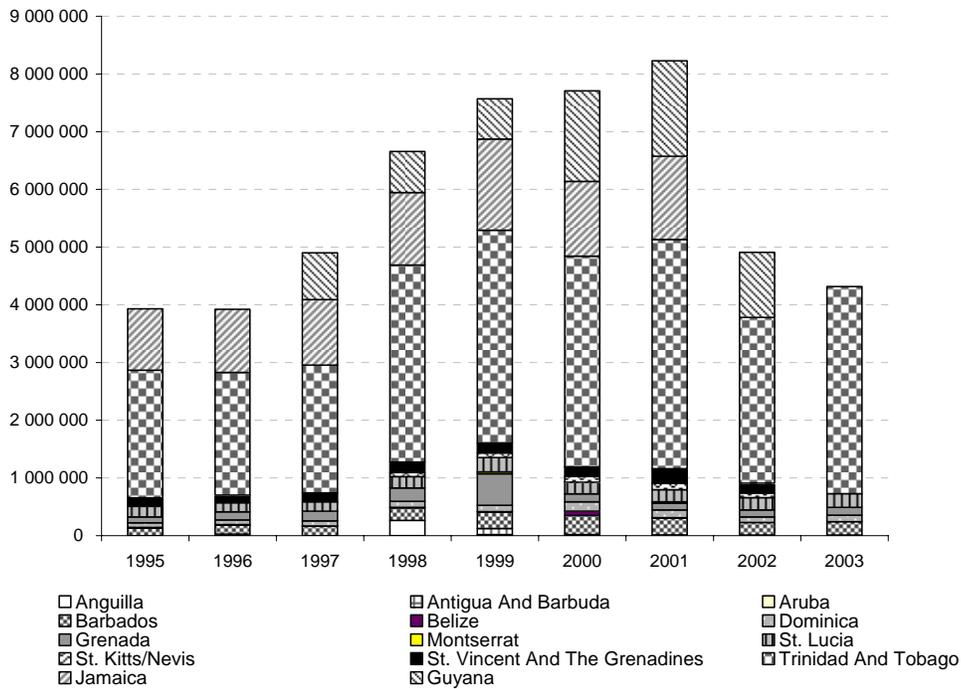
Source: The authors based on ECLAC (2006).

Note: Excludes Petroleum and petroleum derivates.

3.   Port sector

3.1. Brief Overview

CARICOM's port infrastructure is a facilitator and catalyst of maritime transport in whatever form and therefore has intermediary character in the transport chain.

Within CARICOM the following types of ports (terminals) can be identified: Specialized ports (terminals), public ports for general and containerized cargo, and transshipment ports.

Specialized terminals can be found for sugar (i.e., Georgetown, Guyana), bauxite (Jamaica, Guyana) and petroleum (Trinidad).

Transshipment ports can vary in scale and reach. Three categories of transshipment ports can be found in the CARICOM states:

- Global transshipment centres (Kingston, Jamaica; Freeport, The Bahamas).

- Regional (Caribbean) transshipment centres (Bridgetown, Barbados and Port of Spain, Trinidad).

- Inter-island transshipment centres (i.e., Bridgetown, Barbados; Castries, St. Lucia).

The other ca. 20 island public ports in general serve their natural hinterlands. Along the coasts of many islands small wharves for small scale local trade a situated. Figure 8 and Figure 9 give an overview on the port movements (2004) in the region.

Various prior analyses (Hoffmann and Harding (2003), Hoffmann (1999) and World Bank (2005) point out:

Most ports in CARICOM have adequate infrastructure capacity for current needs. However, port superstructure is often not sufficient (lack of terminal equipment etc.)

FIGURE 7
PERCENTAGE OF FREIGHT AND INSURANCE OF PRODUCT VALUE, 2003
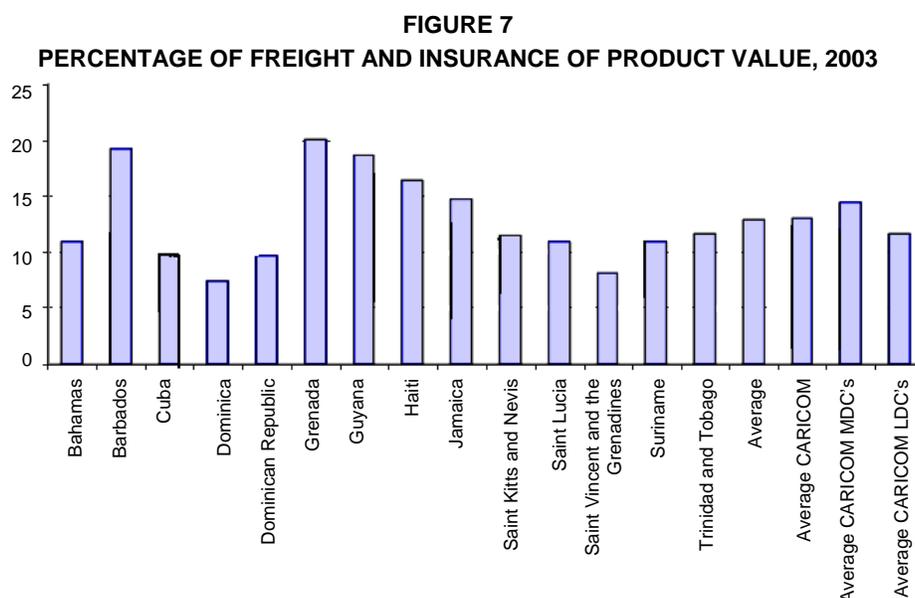
Source: ECLAC, 2005.

Most ports have implemented the first level of ISPS. However, a concerted regional action to fully comply with international standards in the medium and long term (compulsory schooling etc.) is needed. A dialogue between the CARICOM Secretariat, ECLAC and private donors from shipping companies would be beneficiary to organize schooling and experts.

FIGURE 8
CARICOM PORTS MOVEMENTS, METRIC TONS, 2004
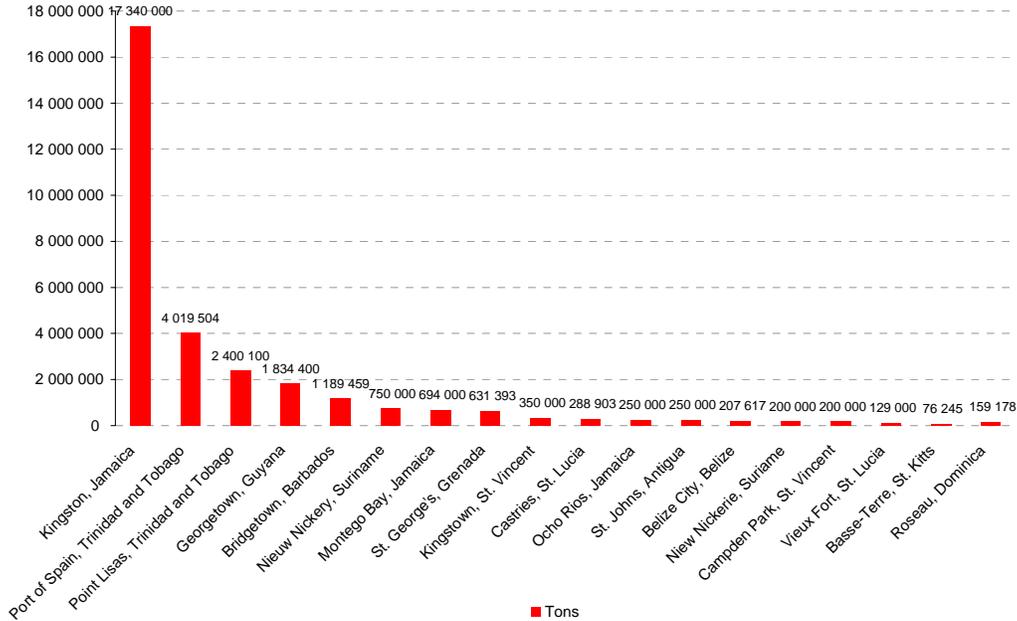
Sources: Caribbean Shipping Association 2006, Containerisation International 2006, ECLAC 2006.

FIGURE 9
CARICOM PORTS MOVEMENTS, TEU, 2004
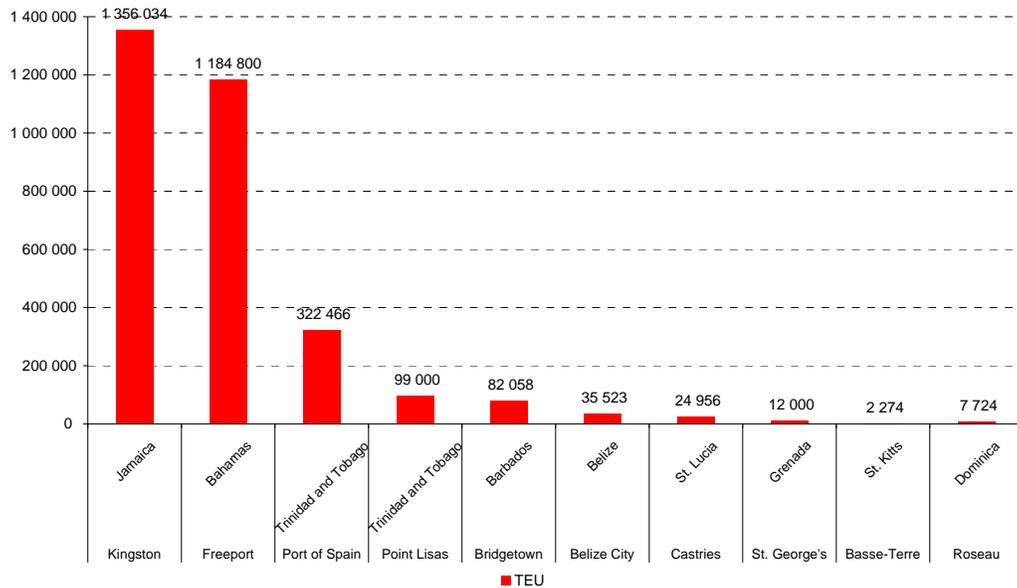
Sources: Caribbean Shipping Association 2006, Containerisation International 2006, ECLAC 2006.

CARICOM ports vary widely in efficiency, in reference to quay side operations (TEU movements), terminals (storage and handling) and related services (esp. customs). Gaps are noticeable between ports with gantry cranes, which reach levels of quay side efficiency competitiveness comparable to global standards (i.e., Kingston). Smaller CARICOM ports operate with mobile cranes in addition to the ships' own cranes. Some ports[16] even lack mobile cranes, which reduces a port's productivity significantly. These ports can only receive geared ships[17]. The latter need urgent reforms to provide adequate equipment. The ports in Guyana[18] and Suriname lack sufficient infrastructure, navigational aids and regulatory frameworks. These deficiencies increase the overall costs and time for services calling at these ports, which significantly contribute to higher transport costs for maritime transport.

The ports, integrated in the global liner service network, have devolved as landlord ports (i.e., Kingston, Freeport). Recently strongly growing ports such as Point Lisas have been successful with corporatization approaches, mixing private and public ownership.

In Barbados regulatory functions and operations have successfully been separated, resulting in efficiency increases.

Transshipment presents a potentially attractive opportunity to ports in the region, but given the footloose and competitive quality in the maritime industry potentials have to be evaluated with caution. At the level of global transshipment ports Kingston and Freeport are well established and have reached a critical mass to compete. Competition is not geographically restricted to the CARICOM states and has to be seen in the wider geographical context of the Caribbean basin. This incurs challenges for growing ports such as Port of Spain and Point Lisas.

The development of transshipment hubs and sustaining growth levels has become difficult, because of missing natural hinterlands. If ports in comparable strategic geographic positions can provide equal service quality and price, shipping lines will turn towards using the one with greater local export and import cargo. Therefore, little potential exists for small island ports to participate and compete in transshipment business (see map[19]).

For small ports the potential to emerge in the global port hierarchy to higher levels has to be well evaluated. Private investment under an appropriate regulatory framework is risk-mitigating.

4. Cruise shipping and yachting

4.1. Brief overview

The cruise industry in CARICOM has been one of the fastest growing sectors in the region and the market is expected to continue growing.

From a global perspective about 45% of all cruise ships are deployed in the Caribbean basin. Cruise ships are deployed in CARICOM throughout the year 2005. That same year almost 9.5 million cruise passengers visited CARICOM countries. Additionally crewmembers disembark. Tourism in CARICOM countries is highly, but not uniformly seasonal (figure 10 depicts the influences of the hurricane season on cruise ship tourism.).

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[16] Ports without mobile and gantry cranes are: Georgetown, Guyana; St. George's, Grenada; Roseau, Dominica.
[17] Ships with cranes installed aboard the ship. The respective ports are Georgetown, St. Georges, Castries, Port auf Prince, Carriacou.
[18] See Transport Sector Study from GOPA (2006) for details.
[19] Compare current development in the Mediterranean, where an excess of port capacity restricts island port development – Maritime Policy and Management.

FIGURE 10
SEASONALITY OF TOURISM BY DESTINATION, 2003
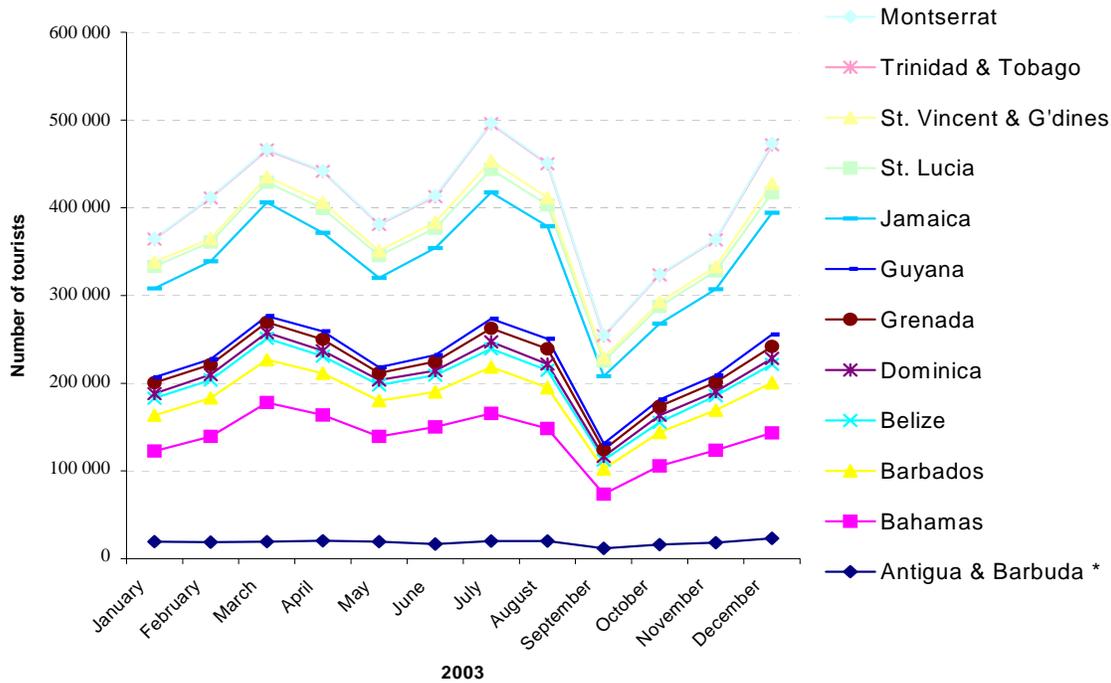
Source: The authors base on CTO (2005).

2005 was an extremely challenging year for regional tourism. The after effects of very active hurricane seasons in 2004 and 2005, the rising cost of fuel with its impact on airline costs, and resurgence of competing destinations after the Gulf War have been distinct constraining factors.

A shift towards destinations in the Western Caribbean[20] can be observed at the cost of the Southern and Eastern Caribbean[21]. From 1995 to 2004 the share of the eastern and southern Caribbean in the North American cruise market, declined from 32.3%to 20%, while that for the western Caribbean increased from 1.5% to 20.1%. Aggressive development of the US Gulf ports and in Belize intensifies this development. Besides the commonly known reasons such as energy prices and security issues, representatives from cruise lines have to satisfy the needs of a continuously growing fleet and to offer attractive "new" destinations for new and repetitive customers.

The number of tourist arrivals to CARICOM countries has grown by 2.3 percent to 3.3 million in 2005 in comparison to the previous year, while cruise passenger visitation declined by 6.3 percent to around 7 million in the same period. Major reasons for this fall-off were the unusual slow growth of ship capacity in 2005 (2.2 percent versus an average of 8.1 percent over the previous 10 years) and the re-deployment of capacity to destinations outside of the region after three successive years of re-deployment to the region due to political instability elsewhere. With the post-9/11 tendency to base more capacity in Florida and the growing focus on shorter cruises, the more southerly cruise destinations in the region have recorded the sharpest decreases.

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[20]   Western Caribbean refers to the following countries: Belize, Cayman Islands, Caribbean Coast of Mexico, Jamaica.
[21]   Southern and Eastern Caribbean refers to the Windward and Leeward Islands.

FIGURE 11
DEVELOPMENT OF THE CRUISE SHIP VISITOR – TOURIST RATIO, 2003-2005
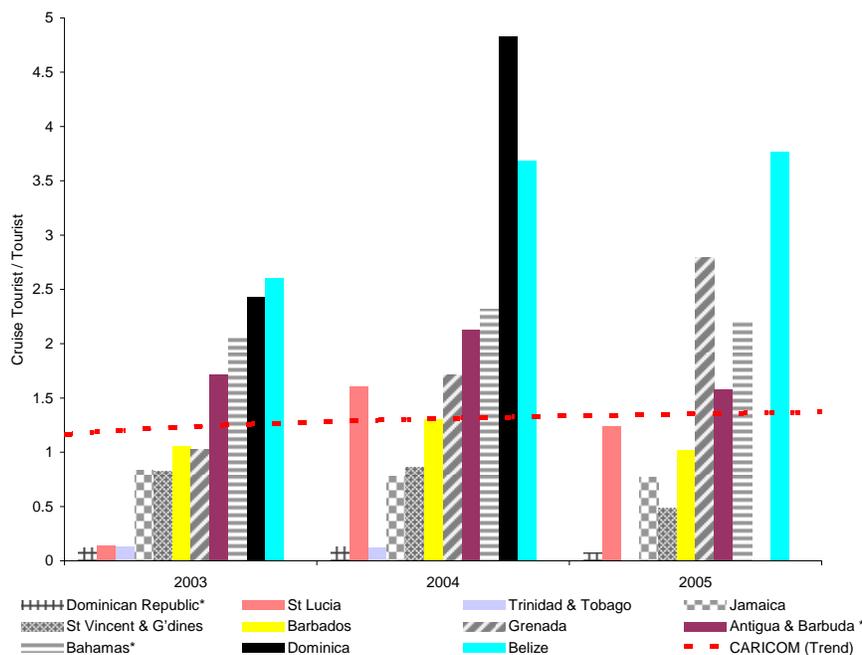
Source: The authors based on CTO (various years).
Note: * preliminary figures.

4.2 Cruise industry market structure

The cruise ship industry is highly concentrated and dominated by three companies, Carnival[22]; Royal Caribbean[23], and Star Cruises[24].

Cruise ship companies have created the Florida Caribbean Cruise Association (FCCA) to promote the interests of the cruise ship industry in the Caribbean[25]. No specific association from the cruise industry for CARICOM exists. The Association aggressively promotes the interests of the cruise lines in terms of legislation, tourism development, taxation, port safety and security issues. The FCCA is involved in port development in the region[26]. However, it was not possible to identify a port development project from FCCA in CARICOM in 2006. At the same time the member lines of the FCCA are continuously seeking new ports of call with adequate infrastructure and a variety of attractions. The FCCA[27] Member Lines are the major supplier of the CARICOM passenger capacity, currently deploying more than 100 ships in the whole Caribbean region.

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[22]   Including Carnival Cruise lines, Princess Holland America Line, Costa Cruise, P&O Cruises, AIDA, Cunard, Ocean Village, P&O Australia, Swan Hellenic, Seabourn and Windstar.
[23]   Including Royal Caribbean cruises and Celebrity.
[24]   Including Star Cruises, Norwegian Cruise Line, Orient Lines and NCL North America.
[25]   There is no specific data available for CARICOM.
[26]   The Government of the Cayman Islands has come to an agreement in principle with the Florida Caribbean Cruise Association (FCCA) whereby they will be providing the required financing for the re-development of the George Town Cruise Ship Port. The FCCA and the Cayman Islands' Government have agreed that the FCCA would fund the re-development up to a value of $10 million.
[27]   Florida Caribbean Cruise Association.

FIGURE 12
CRUISE LINE MARKET STRUCTURE, 2005

Royal Caribbean
15%

Other
32%

Carnival Cruise lines
12%

Princess Cruises
9%

Louis Cruise Lines
3%

P&O Cruises
3%

NCL Corporation
7%

Silja Oyj ABP
4%

Holland America Line Inc
5%

Costa Crociere Spa
5%

Celebrity Cruises
5%
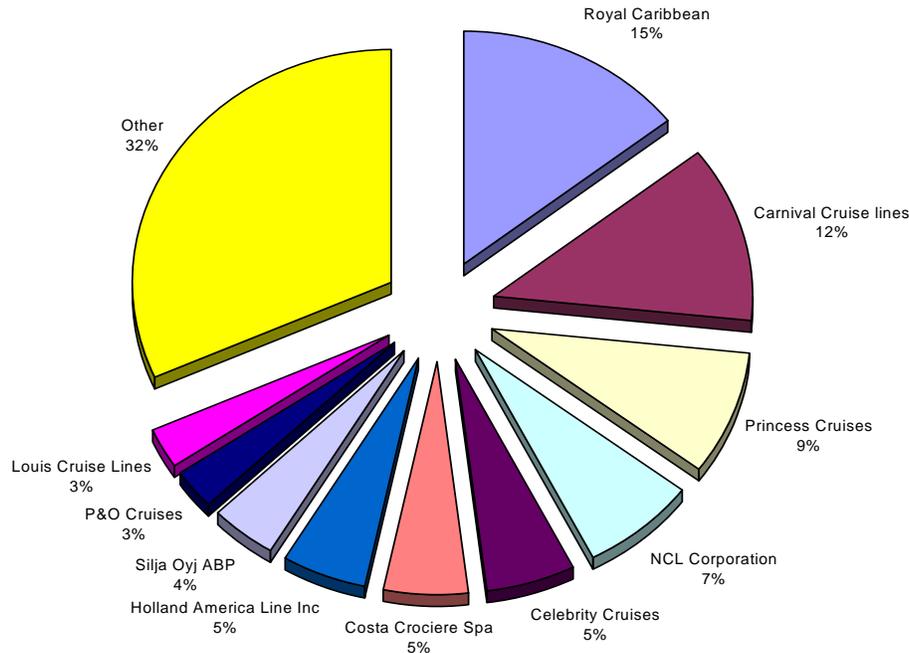
Source: The authors, based on World Cruise Industry Review have only included all vessels in
service. This survey was conducted in August 2005.

Cruise tourism development is dependent on the following, partially highly volatile factors: economic conditions in the origin countries; continuation of growth in international travel; energy prices; threats from natural disaster, geopolitical development; currency (USD) exchange rates.

The Caribbean region is already highly dependent on tourism, with this sector contributing a third to a half of GDP for most Caribbean islands. In Antigua & Barbuda and the Bahamas tourism contributes 74% and 89% of GDP respectively. Tourism contributes to economic development, if revenues and related employment can be maximized and negative impacts (such as overcrowding, destruction of natural habitats etc.) threatening the attractiveness of the destination, can be mitigated.

Currently there are no comprehensive studies for CARICOM on cost benefit analysis of cruise tourism. The main sources for revenues are cruise tourists, crewmembers and ship related charges. Revenues from cruise tourists are low in comparison to island tourists and have been declining with the extension of vertical integration of service offerings in cruise tourism (i.e., duty free on board, land tour booking and land travel carried out by cruise line companies etc.). Cruise ship visitor expenditures in CARICOM vary widely (50 USD – 250 USD/day dependent on destination). The main products and services purchased are: locally produced gifts and craft goods; food and beverages; entertainment; casino gambling; sightseeing and excursions; taxis; duty free goods. The cruise industry represents 39% of Caribbean total arrivals and accounts for some 10% of visitor expenditure[28]. However, this sub-sector has been declining, with the Caribbean receiving only 45% of the total berths marketed out of the USA as opposed to 57% in 1990[29].

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[28]   No figures exist for CARICOM only, however, the authors estimate the distribution of arrivals and expenditures to be comparable for
       CARICOM.
[29]   Improving Competitiveness for Caribbean development report of the Caribbean trade and adjustment group prepared at the request
       of the Regional Negotiating Machinery and the Caribbean Community Secretariat.

II. Influencing factors on freight rates in the Caribbean

This chapter analyses influencing factors of the freight rates and specifically addresses the role of, distance, number of service providers, port infrastructure and connectivity.

1. Factors influencing international transport costs

1.1. General aspects

This Chapter with authorization of the authors draws on the publication: "Liner Shipping Connectivity and Port Infrastructure as Determinants of Freight Rate in the Caribbean" [30].

In their paper, the authors explain that determinants of international transport costs are the topic of a growing recent literature. Interest in the topic arises from the desire to better explain economic development and international trade patterns, as well as to identify possibilities to reduce transaction costs. Most international trade is transported by sea[31], and ports are crucial nodes in the global shipping networks.

The authors explain that in accordance to the "standard gravity model". Countries that are further away from each other will trade less[32]. They argue that, however, traditional gravity models ignore the configuration of regular liner shipping services. The authors discuss that

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[30]   Wilmsmeier and Hoffmann (2008).
[31]   Kumar and Hoffmann, 2002.
[32]   Tinbergen, 1962; Pöyhönen 1963 and Linnemann, 1966.

distance matters only indirectly in the determination of freight rates by shipping companies, because it does neither reflect market structures nor network configurations, which have become increasingly important as hub and spoke network structures have been emerging and potentially impose significant deviations on actual the cargo flows.

Pure geographic distance accounts for the fact that the farther two countries are geographically apart the more likely it is that they are not connected by direct liner shipping services. To which fact liner shipping connectivity, in turn, contributes significantly.

1.2. Determinants of transport costs and rates

Transport costs are a major component of overall "trade costs". Academic research[33] provides an extensive review of trade costs, which are estimated to amount to a 170% ad valorem tax equivalent, including all transport, border-related and local distribution costs from the foreign producer to the domestic user. Initial work[34] on the determinants of international transport costs, for example uses mainly explanatory variables that are related to distance and connectivity, such as landlockedness, or if trading partners are neighbours, and to country characteristics such as GDP per capita. Several authors[35] suggest that greater distance and poor partner infrastructure increase maritime transport costs notably.

Wilmsmeier and Hoffmann focus on the role of port infrastructure and liner shipping services as determinants of international maritime freight rates. Their approach and use of explanatory variables, follows up the work of previous papers[36]. However, unlike in previous papers, which analyzed the international "freight" derived from C.I.F. ("Cost, Insurance, Freight") and F.O.B. (Free on board) values stated in individual customs declarations, their analysis is based on reported freight rates on 189 routes in the Caribbean for 20 foot standard containers in June 2006. That data was received from one major liner shipping company, "Company A", which provides shipping services throughout the Caribbean region. The presented freight rates in their sample range between 650 and 3290 USD per TEU.

Analyzing freight "rates" (published prices per TEU); from information given by one anonymous company instead of calculated freight rates from customs data (e.g. prices charged per ton of cargo) of all individual trade transactions of the entire market does not allow incorporating information on the value and volume of the transported goods in the regression analysis. Freight rates also not necessarily express real transport costs, because they are market driven. Further, the results have to be interpreted as applying to one company only. On the other hand, the information from Company A allows incorporating interesting new data on actual routes, journey times and transshipment, which previously could not be used when working with data provided by customs. Finally, the interpretation of results allows understanding the behaviour of Company A in terms of rate setting under specific market conditions.

Approximately half of the 189 routes[37] covered in their data base are served by direct liner shipping services, whereas the other half includes transshipment in ports of third countries. By way of example they show that 14 companies offer direct services between Costa Rica and Colombia, deploying a total of 50 container ships, with a combined container carrying capacity of around 61,000 TEU; the largest vessel being of 2,500 TEU. Between Costa Rica and Jamaica, there are 5 companies/ 16 ships/ 17,400 TEU/ 2105 TEU maximum size. Between Costa Rica and Guyana, there are no direct services.

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[33] Anderson and Wincoop 2004.
[34] Radelet and Sachs 1998.
[35] Martínez-Zarzoso et al. 2003; Hummels 1999, 2000 and 2001.
[36] Fuchsluger 1999, Hoffmann 2002, Kumar and Hoffmann 2002, Sánchez et al 2003, Wilmsmeier 2003 and Wilmsmeier et al 2006.
[37] Including the following countries: Antigua and Barbuda, Barbados, Belize, Colombia, Costa Rica, Dominica, Dominican Republic, Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Panama, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Suriname, Trinidad and Tobago, Venezuela, RB.

1.3. Distance, liner shipping freight rates and the concept of liner shipping connectivity

The "geography of trade", i.e., the question of who trades what with whom, depends not only on the demand and supply of goods, but also on the ability to deliver the goods to the market. Relevant aspects include geographical factors such as distance, landlockedness, and island character, as well as freight rates. Traditionally distance is assumed to be among the main determinants of freight rates and thus also of the trade competitiveness of countries. The sample of 189 freight rates of one company for the Caribbean, in principle confirms the general positive correlation between distance and freight rates. However, statistically, distance explains only one fifth of the variance of the freight rate (see model in annex 1).

Wilmsmeier and Hoffmann argue that an important, yet often neglected, determinant of trade competitiveness is transport connectivity, defined as the access to regular and frequent transport services and the level of competition in the service supply. Recent research[38] examined various aspects of maritime connectivity, incorporating measures of "connectivity" into research on maritime transport costs, looking at connectivity in the context of maritime security, measuring intermediacy and connectivity for Caribbean shipping networks and for seaport systems, also investigates the time factor in liner shipping services. UNCTAD (2006) developed a "liner shipping connectivity index" per country.

Wilmsmeier and Hoffmann use attributes of liner shipping "connectivity" such as the number of available services and the number of shipping lines operating services between pairs of countries and evaluate their potential to as indicators to describe the market condition and service level between pairs of countries.

The remainder of this chapter summarizes the econometric relationships between freight rates, distance, and various aspects of liner shipping connectivity, including transshipment, competition among shipping companies, port infrastructure endowment and transit times.

2. Econometric evaluation for the Caribbean

2.1. General variables identified

Distance is usually assumed to be among the main determinants of transport costs and thus also of the trade competitiveness of countries. In their research, Wilmsmeier and Hoffmann, find that distance explains only one fifth of the variance of the published freight rate and its explanatory value has to be questioned, especially in transshipment markets.

They find that the number of liner shipping companies providing direct services between pairs of countries appears to have a stronger impact on the freight rate than distance. For routes where there is no company providing direct service, i.e., where all containerized maritime trade involves at least one trans-shipment in a third country's port, freight rates in their sample range from 1,170 to 3,290 USD, with an average of 2,056 USD. For routes with one to four carriers providing direct services the reported freight rates range from 650 USD to 2,250 USD with an average of 1,449 USD. If five or more competing carriers provide direct services, the freight rate ranges from 650 to 1,730 USD, averaging 973 USD. Statistically, the number of carriers explains around two fifths of the variance of the freight rate.

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[38]   Kumar and Hoffmann (2002), Marquez Ramos et al (2006) and Wilmsmeier et al (2006), Angeloudis et al (2006) and Bichou (2004); McCalla et al (2005), Notteboom (2006b), Notteboom (2006a).

FIGURE 13
CORRELATION BETWEEN FREIGHT RATES (USD) AND DISTANCE (KM)

$y=0.6206x + 1019.9$
$R^2 = 0.2058$
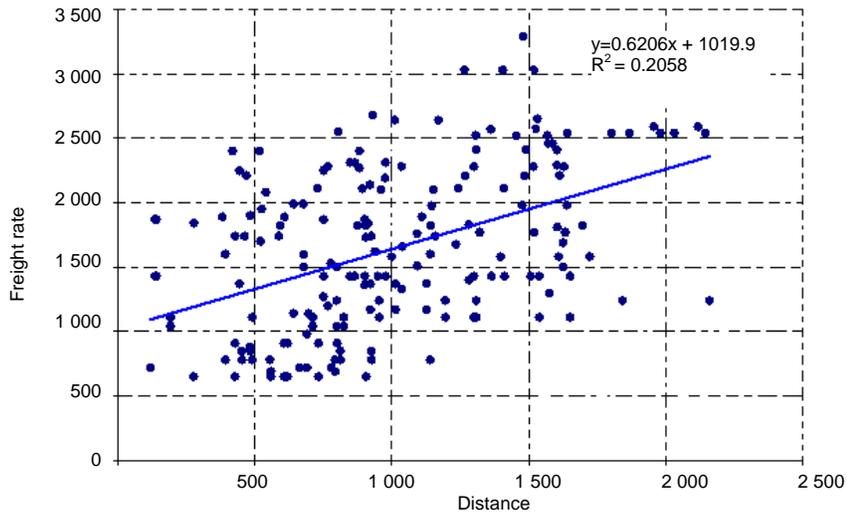
Source: Wilmsmeier and Hoffmann (2008).

FIGURE 14
CORRELATION BETWEEN FREIGHT RATE AND THE NUMBER OF
CARRIERS PROVIDING DIRECT SERVICES

$y=1814.9e^{-0.0671x}$
$R^2 = 0.4348$
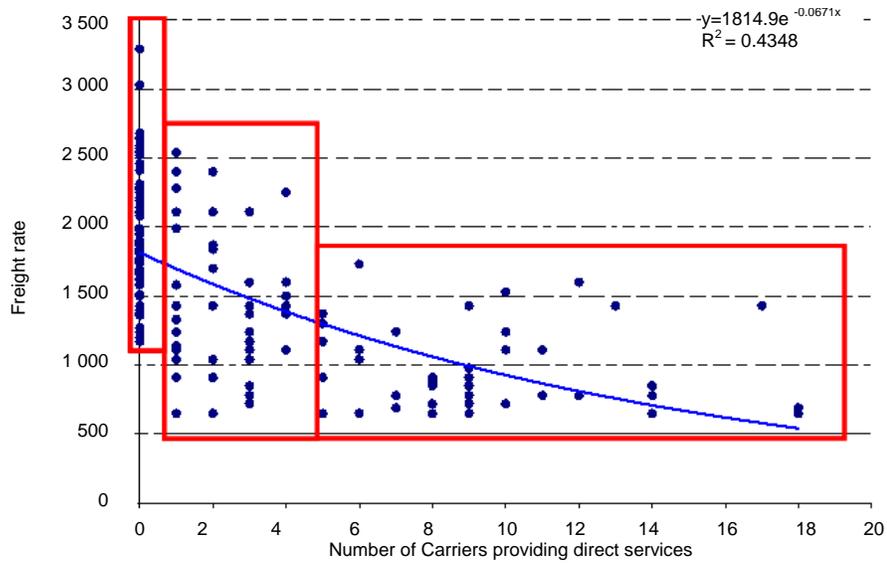
Source: Wilmsmeier and Hoffmann (2008).

More detailed analysis suggests that the following variables have a statistically significant impact on liner shipping freight rates in the Caribbean:

- Trans-shipment versus direct services;

- The number of competing carriers;

- An index of liner shipping connectivity, measuring the deployed number of ships, TEU and vessel size on a given route;

- Transit time; and,

- Port infrastructure endowment.

A model that incorporates the above variables statistically explains three fifths of the variance of the freight rate (for more detail about the model see Annex 1).

The empirical results support the hypothesis that competition between shipping lines makes shipping services less expensive for the shipper, i.e., oligopolistic market structures imply higher costs to shippers. Transit time is a more precise determinant of transport costs than distance, especially for bilateral trade routes that are not connected by direct services. At the same time trade imbalance is an important determinant of transport costs, implying higher costs for exporters from container deficit regions. A good level of port infrastructure endowment implies a reduction of transport costs. Moreover, transport costs for trade between "richer" countries are potentially lower.

These results suggest that there exists a potentially virtuous circle where higher trade volumes and economic development help to reduce transport costs, which in turn helps to promote trade and development. This circular causality could also be among the explanations why the standard gravity model tends to provide biased estimates, to overpredicting trade between low-volume traders and to underpredicting trade between high-volume traders[39].

2.2. Results of the evaluation of the freight rate on the Caribbean Market

The analysis of determinants for freight rates of a single company, as presented by Wilmsmeier and Hoffmann (2008) provides new insights on the impact of market structure on maritime freight rates. A less concentrated liner shipping market reduces freight rates for shippers. In a disperse market with low trade volumes on many routes, like the Caribbean, the number of carriers offering direct services in many cases exhibits oligopolistic market structures, which in return induces higher transport costs for trade on the respective routes. Combining information on the service of the shipping company itself with information on the market structure allows them to analyze, how the freight rates of a single company appear to influence strategic behaviour towards market competitors. Since these strategies are private sector decisions the potential influence of public policies to reduce maritime freight rates as part of trade costs is restricted.

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[39] Wall, 2000.

FIGURE 15
CORRELATION BETWEEN FREIGHT RATE AND TRANSIT TIME
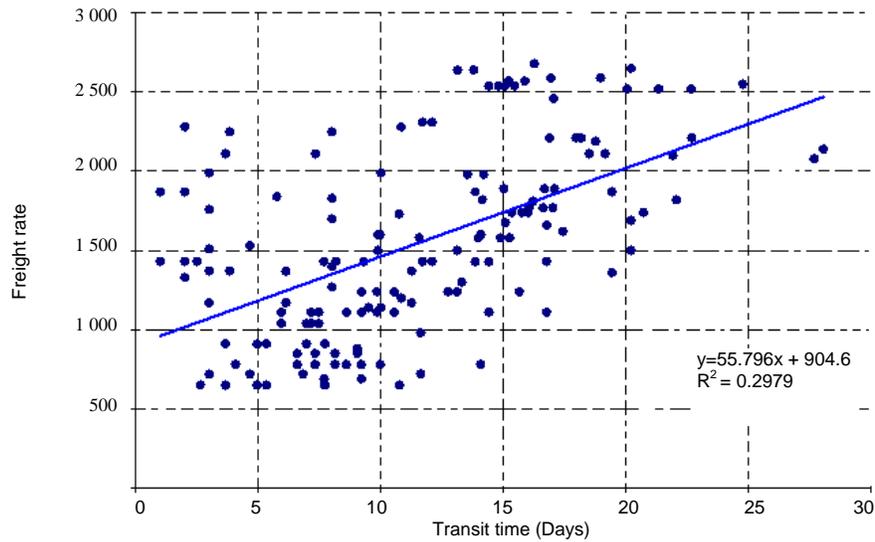
Source: Wilmsmeier and Hoffmann (2008).

Further, their results show that trade routes for which transshipment is obligatory induce higher transport costs. Transshipment in the referenced study has the equivalent impact on freight rates as an increase in distance between two countries of 2612 km. In the case of the Caribbean this implies that in many cases intra-regional trade between small islands is not competitive as compared to trade e.g. with the United States, because of the lack of direct services. These findings support arguments that aim at promoting new innovative short sea shipping concepts in the Caribbean, which offer direct services especially between smaller islands, to strengthen intra-regional trade.

Incorporating effective transit times into the analysis allows to better estimate transport costs for trade flows that include transshipment. This can be seen as an important improvement of previous models, where direct maritime distance was used as a proxy of transit times. The importance of a high degree of connectivity, i.e., being relatively central in the Caribbean maritime network, is indicated by the results for the connectivity variables and the impact of network structures should be included as an important part of future research. These results also underline the potential benefits for importers of exporters of being based near a transshipment hub.

The level of port infrastructure, such as berth length, storage capacities, maximum draft and port areas, appear to have a significant reducing impact on freight rates. This is important for policy makers, as most of the other variables that determine freight rates are beyond their control. In ports, however, the public sector can make a difference, reducing transport costs and attracting shipping services, thus further improving transport connectivity and trade competitiveness.

III. Identification of bottlenecks to competitiveness

This chapter identifies and describes several bottlenecks which impede an adequate development of the three areas under analysis:

• Maritime Freight Transport;

• Port Sector.

• Cruise Shipping and Yachting;

1.   Maritime freight transport bottlenecks

The connectivity to extra-regional markets from transshipment ports has improved since 2001 (5% increase in TEU capacity), mainly reached by the deployment of bigger ships. However, intra-regional connectivity has experienced a 12.5% drop in capacity going along with the deployment of bigger ships. Liner services for CARICOM mainly originate in Miami, Kingston or Freeport or Port of Spain. No intra-regional[40] services exist that directly interconnect all CARICOM countries, one of the reasons are the lack of sufficient demand and consequently missing economies of scale in these trades.

E.g. trade between Belize and CARICOM countries such as the Windward Islands faces these constraints of direct connectedness.

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[40] Intra-regional connectivity are regular liner services operating only with in the Caribbean basin, including routes that call at Central American ports.

One of the main competitiveness bottlenecks for the region is related to relatively high transport costs

Alan Winters (2003) reveals that small economies face severe cost disadvantages. He shows that the percentage of deviations in sea freight averages increase inversely to the size of an economy. He also demonstrates that these deviations are significantly higher for maritime transport than for other sectors.

Maritime transport costs to the CARICOM countries (ca. 13% of FOB value) are significantly higher than in other regions in the world (world av. 6.64% of FOB[41]). Exports from CARICOM countries to the US face average transport costs of 10% of FOB. The reduction of tariff barriers has accentuated the prevailing existence of non-tariff barriers, of which transport costs are one of the most important. Average freight and insurance charges as percentage of FOB for CARICOM to the US 2003 ranged between 16% (Antigua) and 7.6% (Jamaica). Countries with transshipment ports face significant lower transport costs than smaller island ports.

Besides lacking economies of scale in trade volumes, import costs are high, because of negative container trade imbalances

Repositioning of container imposes extra costs on import cargo; however, in some cases exporters profit from this imbalance and might have opportunities for lower rates on specific routes, because shipping lines try to avoid empty movements by offering low rates. The analysis of export costs shows that CARICOM exporters currently benefit from the negative trade imbalances in the region, which provides them a cost advantage to export goods. This benefit seems to be specifically true for islands, such as Grenada.

The advantages of intermediacy contributing to lower transport costs, due to higher connectivity, become evident for cargo originating in the countries with the main transshipment ports: Jamaica and The Bahamas. Politically unstable economies have significantly higher transport costs as exemplified for exports from Haiti. The analysis of transport costs shows that especially bulk freight suffers from high transport costs. This is due to low added value on these products and missing economies of scale in these trades (for comparison see section on freight rates determinants above).

TABLE 1
TRANSPORT COSTS AS PERCENTAGE OF CARGO VALUE FOR IMPORTS TO US, 2003

	Exporting Country	General cargo (containerized)	Bulk
CARICOM	Antigua	16.1%	22.1%
	Bahamas	7.9%	28.2%
	Barbados	10.2%	22.2%
	Belize	9.6%	8.5%
	Cuba		
	Dominica	9.2%	
	Grenada	7.7%	
	Guyana	14.1%	11.1%

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[41]   Developed market-economy countries (5.77% of FOB).

TABLE 1 (CONTINUED)

	Exporting Country	General cargo (containerized)	Bulk
CARICOM	Haiti	13.4%	17.4%
	Jamaica	7.6%	16.1%
	Montserrat	8.4%	
	St. Lucia	7.7%	
	Trinidad and Tobago	1.,2%	14.5%
Dominican Republic		10.4%	16.2%

Source: The authors, based on ECLAC, maritime profile.

TABLE 2
TRANSPORT COSTS AS PERCENTAGE OF CARGO VALUE FOR
IMPORTS TO SOUTH AMERICA, 2003

Import	Export	General cargo (containerized)	Bulk
ECSA	CARICOM	9.61%	26.65%
	Antigua and Barbuda	4.15%	
	Bahamas	7.48%	
	Barbados	11.63%	
	Belize	11.19%	
	Cuba	13.01%	
	Grenada	4.17%	
	Haiti	7.64%	
	Jamaica	8.49%	27.48%
	Dominican Republic	14.20%	25.00%
	Trinidad and Tobago	12.86%	
WCSA	CARICOM	16.70%	32.32%
	Antigua and Barbuda	9.21%	
	Bahamas	10.87%	
	Barbados	15.86%	
	Belize	11.01%	
	Cuba	24.14%	
	Dominica	15.50%	
	Grenada	6.26%	
	Guyana	21.54%	
	Haiti	0.90%	
	Jamaica	9.39%	21.27%
	Dominican Republic	16.67%	31.42%
	St. Vincent and the Grenadines	4.95%	
	Suriname	1.81%	
	Trinidad and Tobago	13.18%	16.63%

TABLE 2 (CONCLUDED)

Import	Export	General cargo (containerized)	Bulk
Colombia	CARICOM	12.19%	25.42%
	Antigua and Barbuda	10.87%	
	Bahamas	10.35%	
	Barbados	9.86%	
	Cuba	12.52%	33.02%
	Dominica	4.16%	
	Haiti	14.27%	
	Jamaica	6.49%	40.16%
	Dominican Republic	17.34%	45.42%
	Saint Vincent and the Grenadines	8.21%	
	Trinidad and Tobago	10.57%	20.71%

Source: The authors, based on ECLAC, maritime profile.

A recent study from Marquez et al (2006) evolves that transport costs have a higher impact on trade between two countries than distance. Therefore the high transport costs to and from CARICOM create a significant barrier to trade. The same study also analyzes the impact of port infrastructure and connectivity on transport costs, showing that a doubling of connectivity, as the construct of frequency of services, transit time, and number of services, reduces transport costs as far as 8%. Port infrastructure endowment is also found to have a significant impact on reducing transport costs, where the on quay installations are modern and adequate for current ships. These findings are underlined by Wilmsmeier and Hoffmann (2008) for the case of the Caribbean.

Inefficiencies of customs further increase costs for imports and exports. Analysis reveals that the average time of customs clearing is significantly higher in CARICOM than in other regions. It is to note that customs performance as mentioned in the beginning varies significantly throughout the different CARICOM countries[42]. Personal interviews give evidence that the lack of implementation of information technology and electronic documentation in customs is a major constraint.

Representatives from the exporting industry frequently mentioned a lack of customs efficiency as a prime constraint for export growth

The rapid implementation of electronic documentation and single window operations for customs are an explicit need in CARICOM.

Ports are the principal point of influence for governments as a potential field of intervention to reduce transport costs[43]

Since all maritime transport services are private sector activities these can be expected to operate on the routes and ports where it is economically viable. Moreover, they will adjust their rates, if necessary to cover their costs.

In the interviews several private sector stakeholders expressed concern about rate increases between 2004 and 2006. With the help of the shipping agencies the authors managed to visualize the development of rate increase for containerized cargo from of Florida to the Caribbean (Trinidad). In the

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[42] Complaints from interviewees (esp. export industries) about customs performance were received directly by the authors in Guyana, Trinidad and Tobago, Grenada, Barbados.

[43] For a broader discussion see Wilmsmeier, G., Hoffmann, J. and Sánchez, R. (2006).

period of 18 months the experienced increases were 1123 USD/20ft cont. or 1959 USD/40ft container. For LCL cargo this is an increase of 1.64 USD/cft in 24 months.

The highest increases are due to general rate increases, which are not driven by the rise of energy commodities. The figure illustrates that rate those rate increases are by far higher than the average increases over the same period on the main global container rates. Freight rate increases therefore can be seen as a main barrier to trade. The increases in the general freight rates are initiated by the shipping lines and are basically out of reach of public intervention. Price arrangements of the oligopolistic quasi monopolistic structure of maritime service providers lead to an overpricing of services, which impedes competitiveness of export products (see figure 16[44]).

FIGURE 16
CONTAINER RATE DEVELOPMENT (20 FT STD), 2003 – 2006 IN USD FOR THE ROUTE
FLORIDA – TRINIDAD (BARS) AND MAIN ROUTES (LINE)
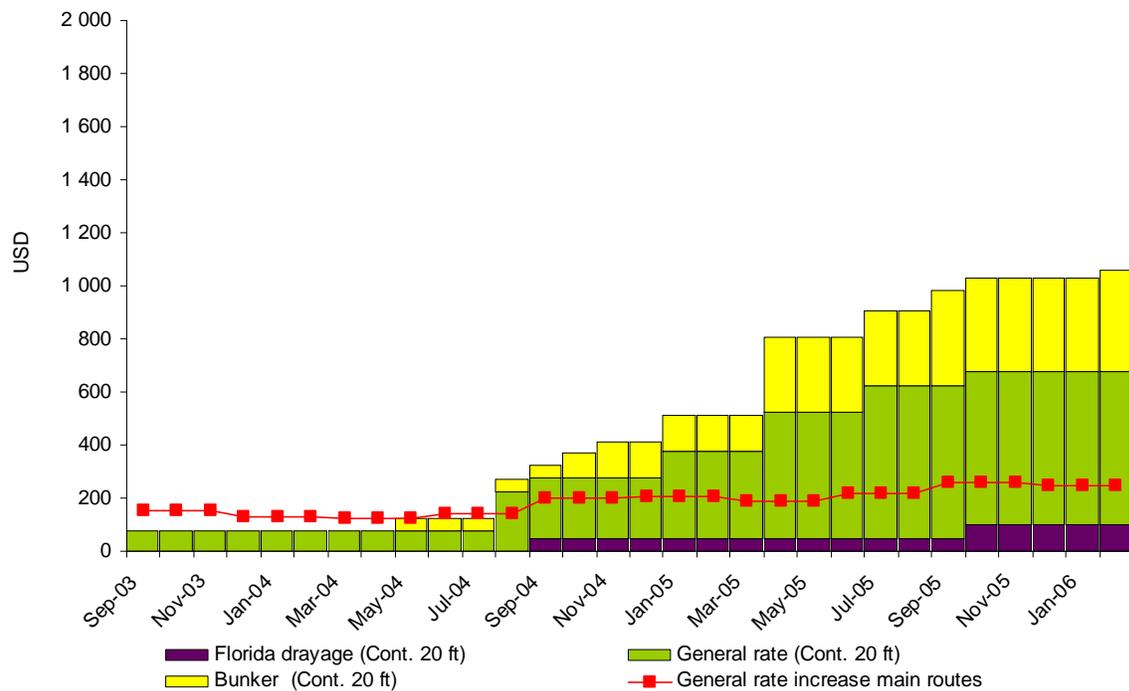
Source: The authors based on information from shipping Limited and ECLAC (2006), Trinidad.

Understanding that the current elevated transaction costs are influenced by the factors time, opportunity and information costs, the efficiency of supporting services (customs, banks, freight forwarding) is decisive for the competitiveness besides the costs and efficiency of the maritime and port industry

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[44] Bunker rate – surcharge based on the development of bunker prices; General freight rate – is the charge paid for the transportation of the container; Florida drayage - the movement of goods from the port to a distribution centre.

2. Port sector bottlenecks

Port costs ripple right through national economies, especially those of island-states. In fact, port costs affect the price of goods and services in nearly every sector of the economy. Competitiveness requires a modern, well-managed, cost effective port system[45].

While the coverage of infrastructure in CARICOM can be considered as acceptable, a major problem has been its maintenance.

Other problems of the infrastructure in CARICOM are inadequate management; tariffs that are too low to support the services, accumulated debt, a history of political interference, and discontented customers. The state of the infrastructure is also affected by the region's vulnerability to natural disasters, and the tendency of national governments to make decisions concerning major investment projects without appropriate hazard assessment and information on mitigation measures.

**A continuing challenge for CARICOM ports (esp. smaller island ports)
is the acquisition of financing for capital and maintenance projects**

Maritime transport and ports are perceived as "natural" and are not at the top of the list of priorities at the national and regional level. Due to the missing scale and importance beyond the regional level divestment of infrastructure through selling assets to the private sector is inhibited.

**The ability to attract private investment is hampered by the lack of
appropriate legislation to oversee private sector owned or
operated public utilities; insufficient skilled labour to
manage public utilities; accumulated debt of
most publicly owned utilities; under-priced
public sector services; and a history of
government interference**

This condition contributes to a situation where CARICOM ports (exceptions are Kingston, Freeport, and Point Lisas) are not operated to perform as facilitators for external trades. Institutional inefficiencies and incapacity of appropriate management incur higher costs for external trade. These inefficiencies can act as a restriction to competitiveness in external trade, which could be solved by appropriate government policies[46].

Additionally, the potential benefit of the conversion of public into private monopolies has to be questioned.

**Port services (except previously identified hub ports[47]) will have to
step up their use of computerized systems and
information technology**

The implementation of Electronic Data Interchange (EDI) system and the Internet are minimum requirements. The increase in transport capacity and further containerization will require immediate data on the exact location and status of cargo, as well as on all logistical and institutional aspects of port

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[45]   Mrs. Voisin-Tom, a member of the General Council of the Caribbean Shipping Association.
[46]   See transport discussion on transport costs and potential points of intervention.
[47]   Ports like Kingston and Freeport have already implemented these systems.

operations. In light of these requirements, all port and shipping industry sectors will have to invest more in systems communication.

Customs procedures are lacking electronic documentation and pose a significant barrier to future development. The industry needs to be moving towards a paperless world in which all types of information are handled electronically.

The ports (countries) require solutions how to bear the financial costs in the medium and long term for compliance with international norms, standards and measures, which contribute substantially to the competitiveness of a port and its attractiveness to shipping lines. Additionally, ports need technical assistance and cooperation activities specifically geared to the neediest ports for adoption of port security provisions and to foster enhanced security and safety along with the sustainable development of ports.

International certification is a key element for the creation of competitive advantages, but CARICOM ports lack the verification of advances in the areas of total quality and environmental protection

Such mechanism as the international certification of quality (ISO 9000) and environmental protection (ISO 14000) established by the International Organization for Standardization (ISO). Respective ports are currently facing the following dilemmas:

- Lack the abilities to fulfil such criteria due to a lack of skilled personal and/or training of existing personal or;

- Lack knowledge how to implement such measures and;

- Lack financial resources to apply and fulfil the requirements.

In general CARICOM faces major drawbacks that are limiting the necessary formation of human resources potentially required by the maritime sector

This refers to the schooling of the current workforce in ports and aboard of ships, as well as the training of the future workforce.

- Reduced levels of investment for port training activities, instructors' formation, texts development and research projects, and consequently high cost of educational programs.

- Limited budgeting and planning for these activities by both, port operators and authorities.

- Irregular delivery of training programs.

- Incipient programs for regional acceptance of port professional within the region.

- Lack of standardization of curricula and academic programs by formation centres and regulatory agencies.

- Insufficient number of qualified instructors, technical and academic materials, and training centres, and;

- Incipient use and yet expensive of the most recent modes of training: on-line, video conferences and other modes more cost-effective.

- Flanking measures such as capacity building to assure the proper handling and knowledge of existing information portals and modern customs operation in the exporting industry and agricultural sector, which go beyond the scope of the study.

**An significant challenge for infrastructure development in the
CARICOM countries is government interference in the operation
of public providers**

The principle of Institutional Independence has been proposed to create creditworthy Caribbean public utilities, capable of financing themselves. This would entail legislative reform, requiring, for example, rules for the naming of independent boards of directors; financial disclosure obligations; clear hiring practices; efficient and transparent public markets; and price setting freedom for utilities, subject to compliance with the price review mechanism. It would also require the strengthening of local government through management training, and enhancing the capacity of local governments to raise revenue. Adequately trained staff to ensure effective compliance and enforcement of regulations is also a prerequisite. The presence of an **Appropriate Regulatory Framework** is essential for private sector participation in infrastructure projects. This would require the rewriting of national legislation, and the upgrading of staff and their ability to enforce compliance with these regulations. For example, to manage infrastructure costs, human settlements should not be allowed to develop haphazardly without proper land-use planning. These settlements should be planned efficiently. Such polices have to be coordinated with other measures, such as green taxes and development charges directed at major land users.

In port development the importance of local and regional factors has to be considered and in various cases has produced unique frameworks, which in the worst case impede strong collaboration with the maritime sector. The most important regional and local factors are the institutional operating and regulating framework and the financial environment for investments.

A restriction to the development of maritime transport and port development, which has been mentioned by several interviewees, is the lack of national infrastructure development plans and export facilitation policies. This impedes the functioning of "port communities", mixed consultative and deliberate entities, as in Montevideo, Hamburg and Barcelona. CARICOM needs not only to focus on training facilities in the maritime and port sector, but as well in the logistics sector. The lack of infrastructure development plans is also reflected in rising congestion in port related automotive transport. The current situation in the bigger islands (Barbados, Jamaica and Trinidad) reveals the necessity to integrate national port policies in national transport and infrastructure development policies.

3. Cruise shipping and yachting bottlenecks

Cruise ship tourism can only to a certain extent be influenced directly by the CARICOM states, because liner operations and scheduling is in the hands of private sector operators. Various issues need to be addressed concerning bottlenecks and competitiveness in future development.

**Port facilities are a potential bottleneck to further cruise ship
tourism development**

With rising demands of the cruise ship industries (i.e., increase in ship sizes) for port installations (e.g., customs, immigration) and the implementation of security standards (i.e., ISPS) CARICOM countries face a significant financial challenge. Port administrations are aware that underinvestment and a lack of capacity will lead to a loss of port traffic. This pressures ports to invest in infra- and superstructure. However, countries are also aware that investment in infrastructure alone does not guarantee that more shipping lines will be attracted as customers. Extra-sectoral flanking measures need to be developed to assure the attractiveness of CARICOM states as a destination to cruise lines and their customers.

Several CARICOM ports are multi-user ports, accommodating cargo and cruise ships, which leads to conflicts in ship handling priorities, port congestion and port development strategies.

Concerns of environmental impacts are growing, especially with natural heritage being one of the main attractions of the CARICOM

Ports are in need of waste disposal facilities and sewage treatment that comply with international standards[48]. The main prevailing institutional constraints to effective waste management are summarized as follows:

- Limited absorption capacity of existing institutions;

- Inadequate or ineffective legislative instruments;

- Lack of effective enforcement of relevant existing legislation;

- Under-capitalized infrastructure;

- Inefficient and poorly defined administrative responsibilities.

CARICOM ports are in lack of auxiliary and value added services for the cruise ship industry (i.e., provision of regional products for cruise ship restaurants, drinking water, etc.)

Vertical integration in the cruise ship industry, as seen in other sectors, bears the risk to further weaken the negotiating position of the respective countries. Conversely, a direct involvement of cruise lines in ports might create closer ties between the cruise lines and a destination.

The observed shift of ship calls from the Eastern and Southern Caribbean to the Western Caribbean puts CARICOM in a difficult position, because in an overall analysis the participation of CARICOM states in the Caribbean cruise market in terms of passenger numbers has been oscillating around 40%. The structure of CARICOM to work under the consensus principle will make it hard to find a joint position, because winners and losers of the current development are at the same table. A further constraint to create a better negotiating position is that the Caribbean basin as a whole is not unified and in general forms a competitive environment.

Being aware of how external effects and changed customer perception of attractiveness, lead to rapidly changing market participation, CARICOM countries evidently lack of cooperation between them

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[48] Example: World Bank Project in OECS (2001). But project has not led to OECS or CARICOM wide implementation of international standards.

FIGURE 17
DEVELOPMENT OF MARKET SHARE IN THE CARIBBEAN BASIN, 1993 - 2005
(Percentages)
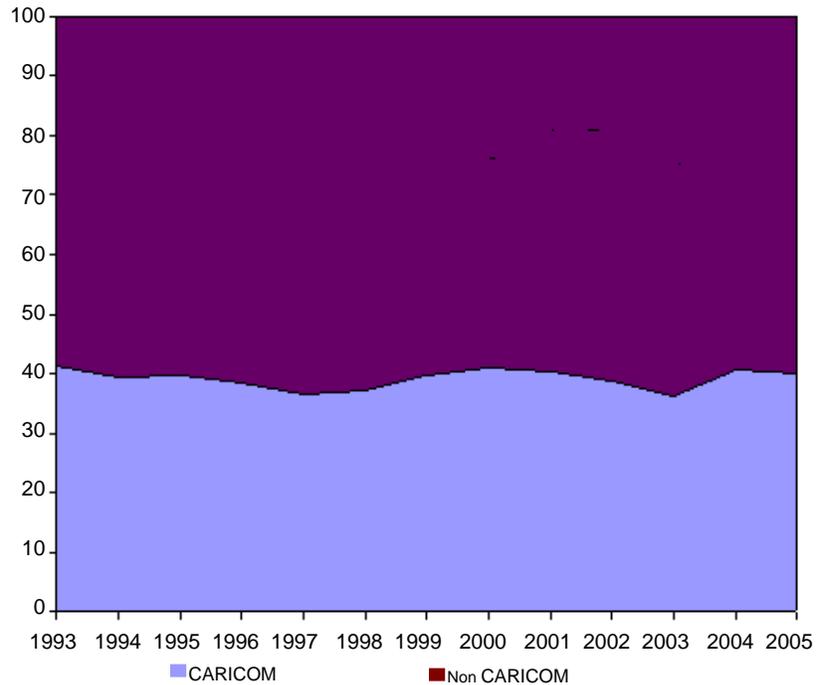
Source: The authors based on CTO figures.

The expected benefits from cruise ship development (i.e., return of cruise ship tourists as island tourists) lead countries to take decisions adverse to the common interest of the Caribbean community. These are symptoms for a lack of regional cooperation and cruise tourism policy, and cause for mutual distrust between countries.

With well organised oligopolistic market structures of the cruise ship industry in CARICOM, the sector endorses its interests in the region and neither the CARICOM governments nor the CARICOM port authorities have established a regional cruise port association. The varying cruise tourist development contributes to the difficulty to create a unified CARICOM position.

Individual ports or countries have a weak negotiating position against the demands and threats of the cruise industry

It is not uncommon that cruise lines try to intimidate countries saying that they will reduce ship calls, if the demanded measures are not realized. CARICOM countries have not yet thoroughly revised a co-opetition[49] strategy to handle their current weak negotiating position.

In case the number of cruise ship visitors grows further, this might influence the attractiveness of destinations for yachting and hotel visitors, which in return has a negative impact on tourist revenues. The cruise ship visitor/tourist ratio (see figure 11) reveals the potential threat of cruise ship visitor overcrowding. There is a lack of data and study on visitor expenditure and motivation to be able to advise governments on the impact of different tourism sectors and their economies.

A constraint for the smaller islands is that they are not attractive for cruise lines to realize their passenger exchange. While this depends to a lesser extent on the maritime sector, the interconnectedness of the air passenger transport and cruise ship tourism needs further study. The development of sea-air interfaces is an important future development activity. This increases the potential of countries to generate overnight stays from cruise line tourists at the beginning or end of their cruise trip.

Currently the yachting sector is short of a regional code of conduct for yachting vessels and marinas

This poses a threat to the long term development of the tourism (esp. yachting and diving). A compulsory implementation of a code based on the IMO Code of Conduct for the Prevention of Pollution from Small Ships in Marinas and Anchorages and the a recent United States Environmental Protection Agency (EPA) document on the control of non point sources of pollution from marinas and recreational boating and other relevant technical documents, should be addressed at a regional level.

Further, problems arise from the lack of trained local seamen with specialization for the cruise ship sector such as cooks, technicians, machinist, which could respond to the demand of the cruise ship industry

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[49] The coexistence of competition and cooperation in the port and maritime system is not well analysed. Further research would need define and analyse the intensity of coopetition, which can be explained by the level of commitment of organizational resources to relationship, resource exchange etc. For the port system the need for new forms of cooperation and competition coopetition, the combination of competition and co-operation, for the port industry is growing especially driven by the high dynamic of the maritime system.
Cooperation is the interaction process generated from relationships of acquiring common interest among organizations (Smith and Wilson, 1995). Competition is an opponent behaviour engaged by two or more groups (organizations) to attain a certain objective. A firm strengthens its competitiveness in a risky /uncertain environment in order to survive (Hill 1990). However Hamel (1991) argues that a firm should strengthen its core competitiveness through strategic alliances. Cooperation and competition have been viewed as opposite ends on a spectrum for a long time. Interorganizational relationships constitute a social structure of co-opetition, which manifests a strategy for cooperation as well as for competition. Co-opetition refers to a cooperative and competitive model adopted by a firm for developing market or reducing cost to improve the firm's competitiveness and acquire leading position. Levinson and Asahi (1999) argued that as alliance has turned to be cross-industrial and cross national mode, in order to cope with uncertainty and complexity on the global environment, firms ware forced to interact with each other cooperatively and competitively.

IV. Responses to bottlenecks

This chapter discusses potential responses recommended to solve the bottlenecks described in Chapter III.

1. Maritime freight transport and ports responses

1.1. National initiatives

Maritime policies are not specifically developed and/or implemented in the individual countries. A number of countries are currently working on specific maritime and port policies[50].

The development of maritime transport and port services and the discussion of the liberalization of such services in the WTO negotiations have important implications for the development of CARICOM countries and offer potential for services and trade development. The work of the Negotiating Group on Maritime Transport Services (NGMTS) centred primarily around what is referred to as the "three pillars" of the maritime transport sector: blue water services (i.e., international shipping services in the strict sense - freight and passenger transportation); auxiliary services such as agency, freight forwarding, cargo handling services, storage and warehouse services, freight transport agency services); and additional commitments until the work of the group was suspended in 1999.

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[50] The authors found evidence for current activities in Trinidad and Tobago, Belize, Barbados and Guyana. However, intentions to work towards a modern maritime and port policy have been found in Grenada. Jamaica and Freeport seem to have clear and adequate policy frameworks.

Today CARICOM countries[51] have a few commitments mostly related to blue water services. St Lucia and St Vincent and the Grenadines made commitments in auxiliary services; and Antigua and Barbuda and Trinidad and Tobago and Jamaica, to a lesser extent, in port services52. Further commitments of CARICOM countries are desirable to improve the competitiveness and efficiency in maritime and port services. However, such measures have to be developed and addressed at national levels and should be accompanied by training and schooling (see further recommendations) initiatives. These would work most effectively at a regional level[53].

The contentious "Singapore Issues" in the current Doha Round of the WTO have relevance for the maritime sector because it is concerned with the improvement of customs and related processes, simplification and streamlining of documents and procedures for border crossings, as well as creating an environment for transport operations that benefit stakeholders.

The development of transshipment activity has been an important issue, but as stated in the analysis brings about a high risk level, is often related to specific geographic locations, and the main transshipment ports in CARICOM are well established. Therefore, transshipment issues do not address the needs of the smaller ports in the region that are not serviced by the larger carriers as often, or on a regular basis. Various calls have been made to governments of the region to invest or make the private sector interested in regional feeder/connector services that will link the major transshipment ports with the smaller ports of the Caribbean. Possibilities exist for governments to open feeder services among the smaller ports to foreign investment. One such request was made by the European Union to the Jamaican government in the current round of Services negotiations in the WTO.

1.2. Regional initiatives

Regional initiatives from international lending institutions have been isolated activities, but have not been part of integrated transport sector regional activity.

At the CARICOM level some policy issues are addressed in the CARICOM Protocol VI – Transport policy. However, these issues are very general and solemnly express overview. The individual countries need activities to develop specific maritime and port policies, which in their fundaments allow to precise transport policy issues at a regional level. CARICOM's main objective is to coordinate and strengthen the development of marine policies in the member countries.

The ACS mainly focuses on efficiency improvements of port and shipping services. The current role is that of a mediator between the private and public sector[54]. Currently ACS and the University of Genoa develop of a regional Maritime transport and port database[55]. This project is funded by the IADB, the Italian Trust and ACS.

A main defect is the lack of a joint regional vision and goal from the countries' perspective. Currently the focus is on intra-bloc competition and not on intra-regional competition; this is especially true for transshipment activities. CARICOM needs a concerted effort across and amongst all the critical stakeholder groups.

Efforts of the Caribbean Shipping Association have been a main contributor to the successful implementation of IMO's International Ship and Port Facility Security (ISPS) Code. CSA has developed as an important organization in sensitizing governments and stakeholders, informing and educating personnel and accreditation.

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[51] Antigua and Barbuda, Jamaica, St Kitts and Nevis, St Lucia, St Vincent and Trinidad and Tobago.
[52] See annex 1 for CARICOM commitments.
[53] A detailed discussion on the opportunities and challenges of the liberalisation of maritime services related to WTO negotiations goes beyond the scope of this study and would best be analyzed in a further work.
[54] For details see Declaration of Principles. ACS 1995
[55] Collaborating institutions are: Caribbean Community (CARICOM); Caribbean Shipping Association (CSA),; Central American Commission on Maritime Transports (COCATRAM); Economic Commission for Latin America and the Caribbean (ECLAC); Organization of Eastern Caribbean States (OECS); TRAINMAR Caribbean Network; National Port and Waterways Institute of the University of New Orleans (UNO).

In general development organizations and supranational institutions are perceived to focus rather on the bigger islands. The smaller islands do not feel to be perceived and their matter treated at all. They are missing Caribbean maritime issues that go beyond transshipment hubs.

The direct IADB involvement in the port sector was a proposal for the Port of Barbados in 2003. The involved parties could not agree on the terms of the project and it has never gone under way. Regional training facilities such as the Caribbean Maritime Institute, Jamaica, the University of Trinidad and Tobago and TRAINMAR need aid to fulfil the necessary requirements to satisfy the demands of the maritime industry. There is a need for an International Organization to be the initiator and driver of some of these institutions and maybe facilitate the access to private sector donors for these institutions. Activities could include sponsoring of professors etc. TRAINMAR until recently received support from the United Nations to hold maritime transport and port related courses. After TRAINMAR started to operate as a private business, the institution developed faster in the area of business administration and related courses. Today, port and maritime transport related courses are no longer the main activity, due to lower demand after support from United Nations stopped and training fees had to be paid fully by the participants, due to missing financial resources and the fact that most shipping and maritime trade related companies are SME, for which it is hard to send staff to training s over longer periods of time.

The European Union is involved has been involved in Transportation sector studies such as the recently finished Transport Sector Study for Guyana. This study was realized by GOPA Consultants and a local Consultant. Further, involvement and activities in this field or based on the recommendations of the study are likely[56].

1.3. Donor support

Private sector activities to improve the movement of cargo through CARICOM port can be found i.e., in Dominica. Tropical shipping and Caribbean Central America Action (CCAA) have been working with the Dominica Port Authority, Customs and the Excise Division in a pilot project to improve technology which will enable materials, goods and data to be moved in "real time." The project provides for customs and the port authority to be equipped with support systems, including hardware and software technology; and, training of personnel.

Although market demand, for transshipment is growing, governments should be cautious about investing taxpayer funds in long-lived infrastructure that served footloose foreign clients. A good risk mitigation strategy would be for governments to seek private companies willing to take on the majority of the investment risk of any major additions to transshipment infrastructure. If private investors are unwilling to take such a risk, it is a signal to the government that the expected investment returns are not sufficient to offset the risk.

2. Cruise shipping and yachting responses

2.1. National initiatives

A general shortage in the public sector to addressing critical cruise industry issues has been observed. One main reason has been the perceived impossibilities, especially of small island states, to confront the negotiating power of cruise shipping lines. The proven footloose behaviour of those companies has contributed to a further subordinate behaviour of the countries.

It is also clear that direct maritime sector related activities are not the decisive factor for cruise tourism development, but the creation of an attractive "experience" of a destination.

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[56]   For details see: www.guyanatransportstudy.com.

Cruise port/terminal development should be part of such strategy. Waterfront development (including the cruise terminal) can be seen as an important potential in the future[57]

However, the lack of inter-institutional cooperation and lack of integrated government approaches impedes a broader perception of challenges and solution efforts. This is not a specific maritime sector challenge, but definitely constrains maritime sector development.

CARICOM countries should establish committees for cruise ship tourism and yachting, where not existent

2.2. Regional initiatives

Regional initiatives related to the cruise ship sector have been spot activities, but have not been part of strategic regional activity. Approaches from the OECS to levy an environmental tax and the CARICOM secretariat proposal to raise the head taxes from 5 USD to 20 USD have been trying to jointly face the challenges imposed by the cruise lines. The OECS approach was counteracted by the cruise lines addressing each individual country saying that any island that would impose waste disposal charges would lose cruise tourism, because the cruise lines would merely substitute call at ports by more accommodating ports[58]. The World Bank stepped in to realize the implementation of facilities for waste management. However, this example suggests that regional cooperation needs further external support to act cooperatively.

Regional initiatives and issues in the cruise shipping sector and yachting have been lacking awareness, contribution, and institutional leadership. Publications on relevant issues from the countries' and/or region's perspective are seldom.

2.3. Donor support

The cruise industry is seen as a private driven sector. Cruise port development in CARICOM might be able to attract donors related to the FCCA. This will depend significantly of the development of attractions on the respective islands and cruise line strategies.

Donor support from the FCCA has involved environmental related spot activities such as beach cleaning in several countries[59].

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[57] See current waterfront development activities in Port of Spain, Trinidad and respective potential activities in the recommendations and suggestions of this document.
[58] World Bank (2005).
[59] Activities have been realized in i.e., Belize and Barbados.

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Annex

Annex 1

Econometric model

This Annex was taken from Wilmsmeier and Hoffmann (2008).

The maritime freight rate charged by Company A ($FREIGHT_{ij}$) per twenty foot standard container of import cargo of country i from country j is assumed to depend on:

- Distance,

- various aspects of liner shipping connectivity,

- trade balance of containerized goods,

- various aspects of port infrastructure endowment,

- the countries' general level of development

These basic sets of variables are chosen, because they have shown to be relevant in the previous research (i.e., Clark et al 2004, Hoffmann, Micco, Pizzolotti, Sánchez, Sgut and Wilmsmeier 2003, Wilmsmeier 2003, Limao and Venables 2001). Some other variables, such as "being land-locked", that have proven to be significant previously, are not relevant for our group of countries; and some variables that had been included in previous research were not built-in our modelling approach, because we are covering a different type of data set, which does not include information on individual trade transaction, and different geographic area. Other variables with an impact on transport costs, such as fuel prices or vessel charter rates, are irrelevant for our analysis, because they vary over time and do not depend on the chosen port or trade route.

Unlike most of the previous research, we have chosen not to use logarithms. The array of values in our set of observations is relatively narrow. Using absolute values, such as USD or km, allows for a more straight forward interpretation of the results.

To capture the effect of distance, we include the distance in km between the two main ports of the importing and the exporting country[60]. In order to capture the trade balance, we include the balance of trade in manufactured goods between the two countries. In order to capture port infrastructure endowment, we include four different indicators sets of information, which we group into "components" using principle component analysis. The data is described in more detail in the section "Data". The model is given in equation (1).

o (1) $\quad FREIGHTRATE_{i,j} = \beta_0$

$+ \beta_1\ DISTANCE_{ij}$

$+ \beta_2\ CONNECT_{ij}$

$+ \beta_3\ BALANCEROUTE_{ij}$

$+ \beta_4\ INFRAIMP_i + \beta_5\ INFRAEXP_j$

$+ \beta_6\ GDPIMP_i + \beta_7\ GDPEXP_j$

$+ \beta_8\ SPEED_{ij} + \beta_9\ TRANSITTIME_{ij}$

$+ \beta_{10}\ TRANSHIPA_{ij} + \beta_{11}\ DIRECTA_{ij} + \beta_{12}\ FOURCAR_{ij}$

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[60] This measure is adequate since most of the countries under study only do have one port for containerised cargo with regular service calls.

Where:

$ß_0$ is the constant term

FREIGHTRATE is the freight rate per twenty foot standard container (TEU), published to its clients by Company A, a major liner shipping Company active in the Caribbean region.

$DISTANCE_{ij}$ is the distance in km between the main port of country i and the main port of country j.

$CONNECT_{ij}$ is an indicator of liner shipping connectivity between the importing country i and the exporting country j. In the empirical analysis of the paper, different aspects and components of CONNECT will be evaluated and interpreted in regard to their impact on transport costs. CONNECT itself is derived from principal component analysis and includes the following attributes of connectivity (number of carriers, TEU deployed, number of vessels, shipping opportunities and maximum size (TEU) of a ship on a specific route)

$BALANCEROUTE_{ij}$ is the coefficient of the imports of containerizable cargo of country i received from country j divided by the exports of containerizable cargo from country i to country j.

$INFRAIMP_i$ is an indicator for port infrastructure endowment in the importing country i. It is founded on principal component analysis.

$INFRAEXP_i$ is an indicator for port infrastructure in the exporting country j. It is founded on principal component analysis

$GDPIMP_i$ is the Gross Domestic Product per capita in the importing country i.

$GDPEXP_j$ is the Gross Domestic Product per capita in the exporting country j.

$SPEED_{ij}$ is average speed in knots calculated from the distance, including transshipment deviation, and transit time between countries i and j.

$TRANSITTIME_{ij}$ is the average transit time in days calculated from the liner shipping schedules between country i and j, in the case of transshipment routes transit times to and from transshipment ports were calculated and added, including also an estimated dwell time in the transshipment port.

$TRANSHIPA_{ij}$ is a dummy variable, which is true (1), because service from company A involves at least one transshipment between countries i and j.

$DIRECTA_{ij}$ is a dummy variable, which is true (1), if there is at least one competing company in the market, which provides a direct service between country i and j.

$FOURCAR_{ij}$ is a dummy variable, which is true (1), if the number of shipping companies operating between countries i and j is greater than four.

Appendix 1

Tables with model results

TABLE A3
DESCRIPTION OF DATA

Variable	Description	Min.	Max.	Average	Median	Standard deviation	n
FREIGHTRATE	USD per TEU	650	3 290	1 641	1 600	625	189
DISTANCE	Km between main ports	118	2 158	1 001	921	457	189
TRADE BALANCE	Tonnes of containerized Imports/ tonnes of containerized exports	0	1 096.75	27.40963	0.49972	98.52503	189
GDPEXP	GDP per capita in the exporting country	471	8 771	3 151	3 225	1 840	189
GDPIMP	GDP per capita in the importing country	471	10 538	4 213	3 594	2 742	189
NUMCAR	Number of liner companies providing direct services between two countries	0	18	2.7	1	4.1	189

TABLE A3 (CONCLUDED)

FOURCAR	Dummy variable = 1 if there are more than three liner companies providing direct services between two countries	0	1	0.22	0	0.41	189
TRANSSHIPA	Dummy variable = 1 if Company A does not provide a direct service between two countries. It uses at least one transshipment	0	1	0.83	1	0.38	189
DIRECT	Dummy variable = 1 if there is at least one company in the market that provides a direct service between two countries	0	1	0.51	1	0.50	189
TEU	Container carrying capacity deployed on direct services between two countries	0	265 984	18 836	3 654	38 952	189
NUMVES	Total number of vessels deployed on direct services between two countries	0	92	11	4	18.7	189
SHIPMAX	Maximum vessel size of ships deployed on direct services between two countries	0	6 742	1 197	707	1 634	189
NUMSERV	Number of direct services between two countries	0	31	6.3	2	7.7	189

Source: Hoffmann and Wilmsmeier, 2007.

TABLE A4
PARTIAL CORRELATION COEFFICIENTS BETWEEN VARIABLES INCLUDED IN PRINCIPLE COMPONENTS

	NUMCARIJ	TEUIJ	NUMVESIJ	SHIPMAXIJ	SHIPPOS	NUMSERV	EXPAREA	EXPSTOR	EXPLENGTH	EXPMAXDRAF	IMPAREA	IMPSTOR	IMPLENGTH	IMPMAXDRAF
Number of carriers (ij)	1 000	.735	.912	.550	.880	.939	.224	.258	.157	.074	.293	.373	.431	.293
Deployed TEU (ij)		1 000	.923	.679	.641	.690	.204	.213	.207	.168	.266	.313	.498	.359
Number of deployed vessels (ij)			1 000	.630	.816	.881	.220	.243	.192	.123	.291	.360	.515	.357
Maximum ship size (ij)					.468	.602	.108	.104	.091	.111	.234	.284	.435	.329
Shipping possibilities port level(ij)					1 000	.908	.209	.256	.232	.115	.271	.363	.498	.328
Number of services (ij)						1 000	.201	.239	.152	.104	.299	.397	.482	.357
Port area (m²)							1 000	.929	.629	.333	-.027	-.013	.000	.000
Storage area (m²)								1 000	.602	.434	-.031	-.034	-.006	-.009
Quay length (m)									1 000	.582	-.038	-.044	-.038	-.030
Max draft (m)										1 000	-.002	-.025	.003	-.033
Port area (m²)											1 000	.937	.662	.380
Storage area (m²)												1 000	.678	.466
Quay length (m)													1 000	.601
Max draft (m)														1 000

Ex

Im

Source: Hoffmann and Wilmsmeier, 2007.

TABLE A5
ROTATED COMPONENT MATRIX

Variables / Component		1	2	3
CONNECT	$NUMCAR_{IJ}$	.921	.168	.112
	TEU_{IJ}	.837	.200	.137
	$NUMVES_{IJ}$	.941	.197	.125
	$SHIPMAX_{IJ}$	.691	.198	.002753
	SHIPPOS	.855	.202	.150
	NUMSERV	.914	.210	.104
INFRAEXP	EXPAREA	.128	-.002634	.882
	EXPSTOR	.159	-.004571	.895
	EXPLENGTH	.100	-.004543	.837
	EXPMAXDRAF	.003360	.0009626	.671
INFRAIMP	IMPAREA	.009462	.928	-.0002268
	IMPSTOR	.186	.925	-.002022
	IMPLENGTH	.400	.771	-.004575
	IMPMAXDRAF	.290	.598	-.005458

Source: Hoffmann and Wilmsmeier, 2007

TABLE A6
VARIANCE EXPLAINED BY COMPONENTS

Component	Total of initial Eigenvalues	% of Variance explained	Cumulative % of variance explained
1	6.020	43.000	43.000
2	2.883	20.590	63.589
3	1.634	11.675	75.264
4	.847	6.047	81.311
5	.756	5.399	86.710
6	.597	4.265	90.975
7	.368	2.628	93.602
8	.347	2.481	96.084
9	.297	2.124	98.207
10	.008984	.642	98.849
11	.006426	.459	99.308
12	.004459	.318	99.626
13	.004066	.290	99.917
14	.001167	.002833	100.000

Source: Hoffmann and Wilmsmeier, 2007.

TABLE A7
REGRESSION RESULTS. NUMBER OF CARRIERS AND COMPETITION

Variable/ model	1	2	3	4	5	6
Observations	N = 189	N = 189	N = 189	N = 189	N = 189	N = 189
CONSTANT	1497	1719	1725	1495	1719	1641
	(15.0)	(17.4)	(17.5)	(15.0)	(17.5)	(16.2)
DISTANCE	0.36	0.29	0.28	0.35	0.29	0.36
	(4.37)	(3.83)	(3.79)	(4.36)	(3.87)	(4.63)
NUMCAR	-78.6	-42.7	-13.8	-65.1		
	(-8.7)	(-4.13)	(-0.75)	(-3.60)		
DIRECTA		-492	-516		-545	-696
		(-5.9)	(-6.2)		(-7.3)	(-9.9)
FOURCAR			-306	-153	-407	
			(-1.9)	(-0.87)	(-4.50)	
Adjusted R^2	0.428	0.516	0.523	0.428	0.524	0.480
F	71	68	53	48	70	86

Source: Hoffmann and Wilmsmeier, 2007.

Notes: T-statistics in brackets. The dependent variable is the freight rate for a standard 20 foot container from the exporting country i to the importing country j. Models were estimated by OLS.

TABLE A8
FLEET DEPLOYMENT AND COMPANIES PROVIDING SERVICES PER COUNTRY, 2004-2006

	2004	2005	Percentage change 2005/2004	2006	Percentage change 2006/2004	Percentage change 2006/2005
Average TEU capacity deployed per country	296,025	309,658	+4.6%	337,940	+14.2%	+9.1%
Average vessel size, TEU	1,212	1,254	+3.4%	1,399	+15.4%	+11.6%
Average # of companies per country	21.7	21.5	-0.7%	20.3	-6.2%	-5.5%

Source: Hooffmann and Wilmsmeier, based on ci-online.co.uk. See also UNCTAD Transport Newsletter, Fourth Quarter 2006. Data is global, for 161 countries.

TABLE A9
REGRESSION RESULTS. TRANSHIPMENTS AND COMPETING DIRECT SERVICES

Variable/ Model	7	8	9	10	11
Observations	N = 189	N = 189	N = 189	N = 189	N = 189
CONSTANT	609	1025	1146	1037	1213
	(6.2)	(9.2)	(10.3)	(10.1)	(10.9)
DISTANCE	0.35	0.24	0.24	0.24	0.21
	(4.3)	(3.1)	(3.2)	(3.3)	(2.9)
TRANSHIPA	821	627	619	644	581
	(8.2)	(6.5)	(6.8)	(7.1)	(6.5)
NUMCAR		-57			-6
		(-6.3)			(-0.4)
DIRECTA			-513		-313
			(-7.6)		(-3.7)
FOURCAR				-540	-299
				(-7.6)	(-2.5)
Adjusted R^2	0.412	0.512	0.550	0.549	0.578
F	67	67	78	77	52

Source: Hoffmann and Wilmsmeier, 2007.

Notes: T-statistics in brackets. The dependent variable is the freight rate for a standard 20 foot container from the exporting country i to the importing country j. Models were estimated by OLS.

TABLE A10
REGRESSION RESULTS. CONNECTIVITY, PORT INFRASTRUCTURE AND TRANSIT TIME

Variable/ Model	12	13	14
Observations	N = 173	N = 164	N = 173
CONSTANT	1295	1237	1573
	(16.2)	(15.5)	(49.2)
DISTANCE	0.28		
	(3.8)		
CONNECT	-287	-240	-323
	(-8.9)	(-6.8)	(-10.1)
INFRAIMP	-225	-210	-253
	(-7.1)	(-6.6)	(-7.9)
INFRAEXP	-64	-84	-95
	(-2.0)	(-2.7)	(-3.0)
TRANSITTIME		28	
		(4.4)	
Adjusted R^2	0.532	0.531	0.496
F	50	47	57

Source: Hoffmann and Wilmsmeier, 2007

Notes: T-statistics in brackets. The dependent variable is the freight rate for a standard 20 foot container from the exporting country i to the importing country j. Models were estimated by OLS. N varies somewhat due to unavailable data for some variables on some routes.

TABLE A11
REGRESSION RESULTS. CONNECTIVITY, PORT INFRASTRUCTURE, TRANSIT TIME AND ADDITIONAL VARIABLES

Variable/ Model	14*	15	16	17	18	19
Observations	N = 164	N = 164	N = 164	N = 164	N = 164	N = 164
CONSTANT	1237	1207	1356	1057	927	948
	(15.5)	(15.3)	(14.3)	(8.3)	(7.5)	(9.7)
CONNECT	-240	-226	-204	-174	-204	-130
	(-6.8)	(-6.5)	(-5.8)	(-4.9)	(-5.8)	(-3.3)
INFRAIMP	-210	-214	-212	-196	-201	-128
	(-6.6)	(-6.8)	(-6.9)	(-6.5)	(-6.5)	(-4.0)
INFRAEXP	-84	-94	-105	-88	-78	-16
	(-2.7)	(-3.1)	(-3.4)	(-2.9)	(-2.5)	(-0.5)
TRANSITTIME	28	28	33	48	40	13
	(4.4)	(4.5)	(5.0)	(6.2)	(5.5)	(2.0)
BALANCEROUTE		0.84	0.81	0.86	0.91	
		(2.8)	(2.7)	(3.0)	(3.1)	
GDPIMP			-0.01755	-0.02419		
			(-1.4)	(-2.0)		
GDPEXP			-0.04101	-0.04505		
			(-2.5)	(-2.8)		
SPEED					39	34
					(3.4)	(2.9)
TRANSHIPA						708
						(5.7)
DIRECTA						-308
						(-3.5)
Adjusted R2	0.531	0.551	0.566	0.593	0.571	0.608
F	47	41	31	31	37	43

Source: Hoffmann and Wilmsmeier, 2007.

Notes: T-statistics in brackets. The dependent variable is the freight rate for a standard 20 foot container from the exporting country i to the importing country j. Models were estimated by OLS.
*Model 14 was already presented above. It is included again in this table for ease of reference.

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