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### **Value Chains and Connectivity in the Caribbean**

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#### Abstract

This paper examines global value chain (GVC) activity in the Caribbean, through the lens of newly assembled data on value added trade. It finds that GVC participation is quite weak by world standards. Moreover, connections with the large regional markets of the USA and Canada are sometimes stronger than connections within the Caribbean. The paper then examines data that could help explain these findings, focusing on bilateral trade costs and transport connectivity, as influenced by non-traditional trade policies like regulatory barriers. It concludes that there is considerable scope for the Caribbean to promote value chain integration by improving connectivity in all its dimensions, especially air.

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# Contents

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Abbreviations and acronyms	4
1. Introduction: Trade and Trade Costs in the Caribbean	5
2. Value Chains as Networks of Trade in Value Added	7
3. Connectivity and Value Chains	10
4. Policy Implications	13
References	14

## Abbreviations and acronyms

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ACI	Air Connectivity Index
GVC	global value chain
LPI	Logistics Performance Index
LSCI	Liner Shipping Connectivity Index
RVC	regional value chain

# 1. Introduction: Trade and Trade Costs in the Caribbean

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The Caribbean countries<sup>1</sup> are characterised by small populations and land areas, as well as a generally intermediate development status, which combine to make it difficult to integrate into the regional and global trading systems. Although all countries can gain from specialisation by comparative advantage, it is difficult for this process to run its full course when trade costs are very high: relative prices remain insulated from the changes that integration with world markets can bring, and consumers and firms that use imported intermediate inputs are limited in the range of goods to which they have access at competitive prices. In addition, local exporters are held back, which in turn limits dynamism in the labour market that can create good jobs, and contribute to value added in these small economies.

One metric that provides an overall indication of a country's degree of integration with world markets comes from the ESCAP-World Bank Trade Costs Database (Arvis et al., Forthcoming). The database provides a comprehensive measure of bilateral trade costs. It incorporates all factors that drive a wedge between factory gate prices in the exporting country and consumer prices in the importing country. It therefore covers the full range of trade frictions, including tariff and non-tariff barriers, regulatory measures, standards, differences in cultural and legal institutions, and geographical and historical factors. Bilateral data can be aggregated into a single number per country by calculating 'average' trade costs, in the sense of a constant value for trade costs that, if applied to all bilateral partners, would result in the same level of total trade as is actually observed in the data. It is important to stress that although expressed in ad valorem equivalent terms (percent of factory gate price), trade costs as used here refer to the ratio of international trade costs to intra-national trade costs (goods produced and consumed in the

same country). Results therefore need to be interpreted with caution.

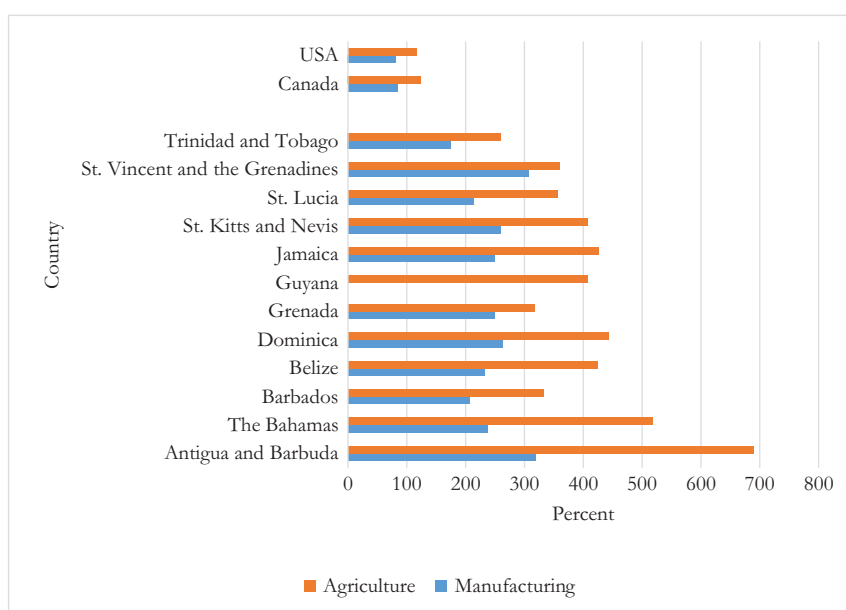
Results for the Caribbean as defined in this brief, along with the major international markets of Canada (a Commonwealth member) and the USA (not in the Commonwealth), are shown in Figure 1. The first point to note is that trade costs in the Caribbean are between two and four times as high as in the comparator markets in manufacturing, and between two and nearly six times as high in agriculture. This figure reinforces the view that despite being geographically relatively close to the major markets of the USA and Canada, the Caribbean countries remain, in general, isolated from international trade due to overall high levels of trade costs. Geography is of course part of the story: the Caribbean countries are distant from other world markets in Europe and Asia, for example. But it is also likely that policy plays a role, both in terms of pure trade policy, and also the set of measures surrounding infrastructure development and utilisation – particularly air and maritime transport, a subject that will be returned to later in this Policy Brief.

Another significant finding that emerges from Figure 1 is that trade costs in agriculture are higher than in manufacturing for all countries. This facet of the data is something that the Caribbean has in common with the rest of the world (Arvis et al., Forthcoming). Policy is an important part of the reason why trade costs in agriculture are elevated compared with manufacturing: world markets for primary products, as well as processed goods, are subject to a range of tariff and non-tariff barriers, as well as domestic regulatory measures such as product standards and health requirements. Not all of these measures holding back agricultural trade are protectionist in intent, but the point remains that their effects can be serious, in particular for small developing economies like those in the Caribbean.

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<sup>1</sup> For the purposes of this document, the Caribbean is taken as being limited to Commonwealth Caribbean countries only, namely: Antigua and Barbuda; the Bahamas; Barbados; Belize; Dominica; Grenada; Guyana; Jamaica; St. Kitts and Nevis; St. Lucia; St. Vincent and the Grenadines; and Trinidad and Tobago.

Figure 1. Trade costs in agriculture and manufacturing, percent ad valorem equivalent, selected countries, latest available year (2012).



Note: Data are not available for manufacturing in Guyana.

Aggregate numbers such as the ones in Figure 1 are important for giving general context to the observed pattern of trade in the Caribbean. But there is also insight to be gained from looking at the underlying bilateral data (see Table 1). For brevity's sake, consideration is limited to Trinidad and Tobago, which has the lowest trade costs in the region.

Table 1. Trade costs with selected other countries for Trinidad and Tobago, manufacturing and agriculture, percent ad valorem equivalent, 2009.

	Manufacturing	Agriculture
Antigua and Barbuda	220%	NA
Barbados	69%	143%
Belize	124%	NA
Dominica	87%	183%
Guyana	NA	170%
Jamaica	78%	316%
St. Kitts and Nevis	148%	293%
St. Vincent and the Grenadines	118%	94%
USA	102%	129%

Note: Data are unavailable for the remaining Caribbean countries and Canada.

For most developing regions, trade costs with other countries in the same region are typically lower than those with external markets. This pattern is only partly reflected in the Caribbean data: for Trinidad and Tobago, trade costs in manufacturing are lower with Jamaica, Dominica, and Barbados than with the United States, but trade costs for the remaining Caribbean countries are higher. This finding suggests that some degree of regional integration has, on average, taken place, although experiences differ widely from one part of the region to another. In agriculture, the picture is clearer: regional markets remain highly segmented relative to links with the USA. There is clearly much work to be done in the area of promoting agricultural trade among Caribbean countries.

The sources of trade costs in the Caribbean – looking beyond geography to consider policy and institutions – need to be understood so that appropriate actions can be taken to better integrate the regional economy, and develop a solid basis of intra-regional, as well as extra-regional, exchange. The remainder of this Policy Brief addresses the issues that arise in this context from the perspective of value chains, a business model that is well established in some parts of the world, but only now starting to develop in many smaller economies.

## 2. Value Chains as Networks of Trade in Value Added

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A value chain is a set of economic activities needed to bring a product to market, from conceptualisation and research and development, to manufacturing, to marketing and sales, to post-consumer recycling. Over the last two decades, some value chains have internationalised to the point where global value chains (GVCs) and regional value chains (RVCs), in which activities are split across multiple national territories, are now common in many parts of the world, at least in some sectors. Most concentrated in ‘factory Asia’ as well as in developed Europe, GVCs are an important reality for developing countries.

Analytical and policy work is still catching up with this new reality, as it offers a number of challenges. On the one hand, it is important to develop measures of trade in value added, as opposed to measuring trade on a gross shipments basis, so as to emphasise the activity of value addition that is core to the relationships among actors in value chains. Secondly, trade in tasks rather than final goods is becoming more pronounced in many parts of the world, but realities differ from region to region and from sector to sector, so it is important to reach a nuanced understanding of the way in which value chains operate internationally.

In terms of economic development, GVCs offer the perspective of being able to tap international markets for trade and investment without development of whole-product supply chains. Instead, a country can specialise in the performance of a single task or production of a single part, which is then shipped overseas, combined with inputs from other countries, and finally transformed into a consumer product.

Value chain development is at a relatively early stage in the Caribbean compared with East and Southeast Asia in terms of developing the firm-level linkages and relationships that characterise GVCs, in particular the forging of connections between large lead firms active in international markets and local suppliers of goods and services (tasks). However, there is some evidence of the development of value

chains in some sectors, such as (processed) food and beverages, and metal products.

Although value chains are better known in manufacturing sectors, they are also developing in agriculture. Value chain analysis for an agricultural commodity would emphasise all of the steps required to get the product to market, from obtaining seeds and other inputs and financing these and the other operations of the farm, through harvesting methods, post-harvest treatment and storage, processing at various stages into transformed agricultural goods, logistics and handling, transport, and distribution to the final consumer through outlets like supermarkets or specialty shops. In this context, intermediate inputs are typically services, such as transport, logistics and distribution, as well as goods such as seeds, fertilisers and products used in food processing.

In the metal products sector, the concept of a value chain again incorporates all steps needed to get a simple manufactured product from the conceptual stage to acquisition by a consumer, and post-consumer stages. Activities involved include design, component manufacture, assembly of finished products, transport to the market of the final consumer, marketing, and sales and distribution. Intermediate inputs in this case are raw materials, as well as transport, logistics and distribution services.

A key concept related to the development of GVCs in the region is trade in value added. Traditional trade statistics are reported on a gross shipments basis, which means that they do not net out intermediate input use. This situation is in contrast to the national accounts, where inputs are subtracted before calculating GDP and other aggregates. Recent developments in empirical international trade have enabled researchers and international agencies to develop measures of the value added embodied in a country’s exports, accounting for the fact that part of the gross shipments value of those same exports is made up of intermediate goods, some of which are imported. Accounting for these kinds of transactions is crucial in the GVC context, because that business model can be viewed as the co-ordination of value

addition and movement of intermediate inputs across national boundaries in the context of production of final goods and services.

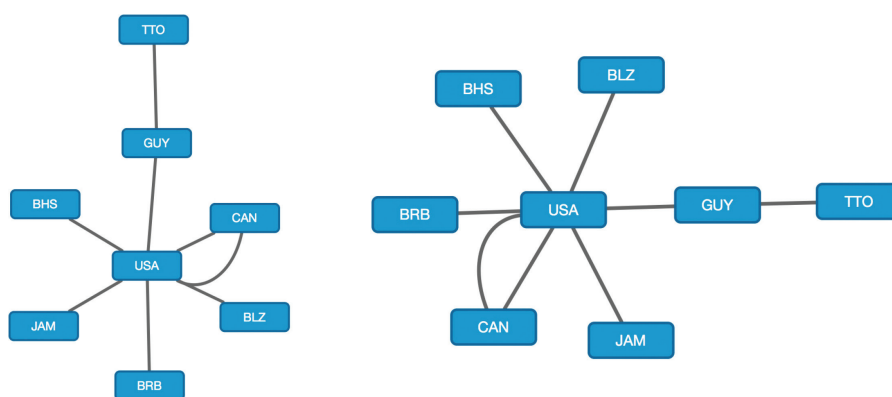
This Policy Brief uses the Eora input-output matrices to calculate measures of value added in exports for those Caribbean countries for which data are available as well as two significant trading partners, Canada and the USA. Consideration is given to two sectors in particular: food and beverages, and metal products. These sectors are important in the value added exports of a number of Caribbean economies, and represent the basis for possible value chain development in a number of other economies. The two sectors were chosen to highlight the fact that value chains can be active in primary and secondary sectors, based on existing trade patterns observed in the Caribbean. Of course, many Caribbean countries are relatively reliant on services, such as tourism. However, as those sectors have developed in the region, they do not display strong value chain characteristics in most cases, hence the focus on the sectors chosen here.

Although the trade in value added statistics used here can be informative, they come with major caveats regarding data quality. Input-output tables are estimates based on national sources, along with assumptions made as to the use of imported intermediates. Often, it is necessary to convert national sources to a standardised classification using a concordance, but doing so can introduce statistical noise. Finally, it is generally recognised that trade in value

added statistics are most accurate at the aggregate level, and for large economies. Accuracy is more of an issue for small economies, which is the case here, and when the analysis is undertaken at the sectoral level. Nonetheless, the approach is potentially fruitful in terms of highlighting general tendencies in the regional value chains, and is useful to policy-makers because of the novelty of the entire analysis.

To emphasise that value chains are networks of co-ordinated transactions rather than a linear series of point-to-point movements, Figures 2 and 3 represent the value added in exports data in network form for food and beverages and metal products respectively, taking 2000 and 2012 as the base years. For each country, only its largest export flow among regional partners and Canada and the USA is considered, in order to lay bare the most basic structure of the Caribbean value added trade network. Each country is represented as a box, and its largest trade flow is a line connecting it with the destination market. There is no unique graphical representation of data such as these, but the interpretation of the diagrams is that more central countries in the trading network tend to appear as central hubs in the diagram, while more peripheral countries appear as less well-connected spokes. The reason for only considering the largest export flow of each country is that from a graphical point of view, the diagrams become overly complex and difficult to interpret when trade flows with all partners are considered.

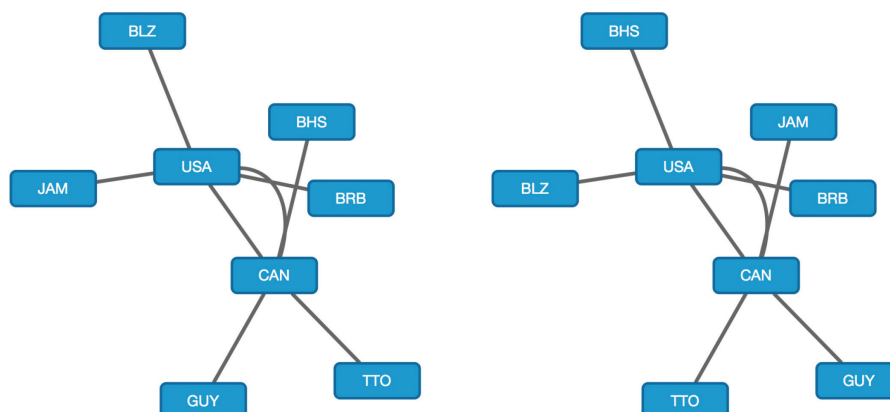
Figure 2. Network representation of value added trade in food and beverages in the Caribbean, largest export flow only among the partners considered, 2000 (left) and 2012 (right).



**Note:** Country codes are the Bahamas (BHS), Belize (BLZ), Barbados (BRB), Canada (CAN), Guyana (GUY), Jamaica (JAM), Trinidad and Tobago (TTO), and the United States (USA). Data on the remaining Caribbean countries are not available.



Figure 3. Network representation of value added trade in metal products in the Caribbean, largest export flow only among the partners considered, 2000 (left) and 2012 (right).



**Note:** Country codes are the Bahamas (BHS), Belize (BLZ), Barbados (BRB), Canada (CAN), Guyana (GUY), Jamaica (JAM), Trinidad and Tobago (TTO), and the United States (USA). Data on the remaining Caribbean countries are not available.

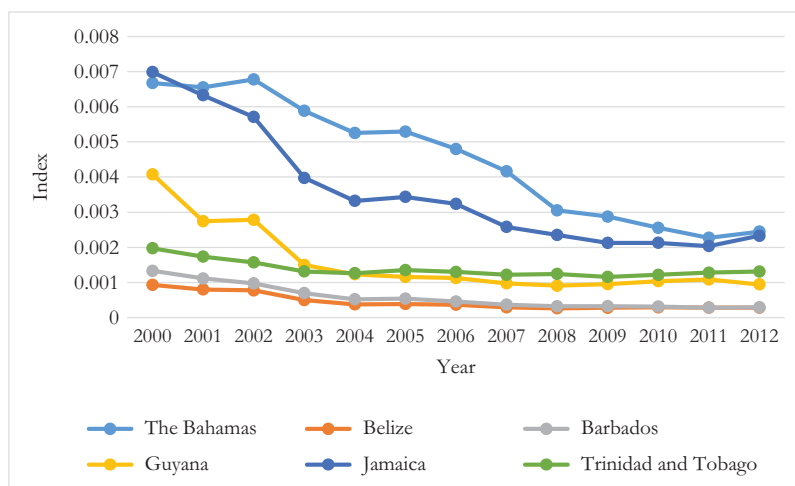
Together, the two figures highlight the key role played by the USA and to a lesser extent Canada as sources of demand for the Caribbean’s value added in both sectors. Both networks are quite stable over time, although there is some limited movement in the case of metal products.

For food and beverages, only one Caribbean country (Trinidad and Tobago) has its largest export flows with another country in the region (Guyana). For metal products, all Caribbean countries have their largest export flow with either the USA or Canada. Although GVCs typically have a significant regional component, the relative size of the Caribbean and

continental markets mean that the pull of the latter is so strong that it tends to overshadow intra-regional linkages. Nonetheless, there is evidence of important value chain activity in these two sectors, primarily in the form of linkages between the Caribbean countries and their Northern, developed neighbours.

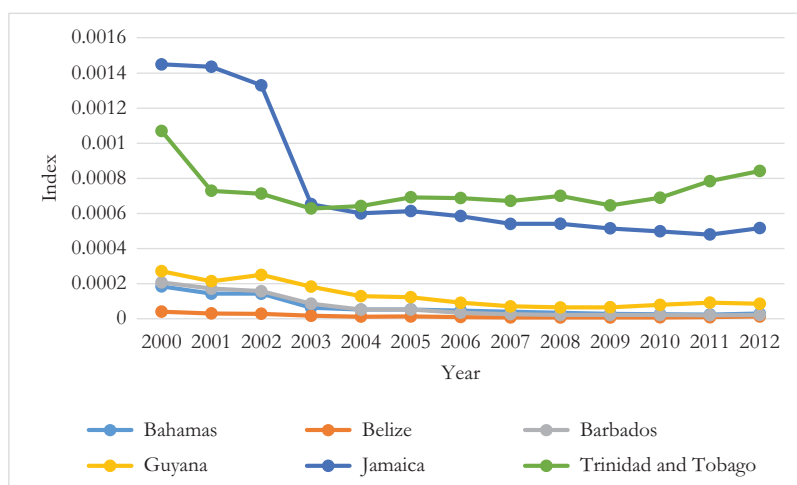
One way of measuring a country’s ability to connect to value chains is to use the lens of centrality, a concept that is well defined in the network science literature (Shepherd and Archanskaia, 2014; Shepherd, Forthcoming). A country is more central to a network if it is strongly connected to other countries that are themselves relatively central. It is less central

Figure 4. Connectivity (centrality) in food and beverages, selected countries, 2000–2012, index between zero and one.



**Note:** Canada and the USA are omitted from the figure because their scores are so much larger than those of the Caribbean countries that the latter become unreadable.

Figure 5. Connectivity (centrality) in textiles and clothing, selected countries, 2000–2012, index between zero and one.



**Note:** Canada and the USA are omitted from the figure because their scores are so much larger than those of the Caribbean countries that the latter become unreadable.

if it is weakly connected to countries that are themselves relatively peripheral. Centrality is closely related to the concept of connectivity as it is operationalised within the networks of value added trade that are referred to as GVCs.

Figures 4 and 5 present value chain connectivity (centrality) scores for Caribbean countries over the 2000–2012 period for food and beverages and metal products respectively. In the global context, they have very low scores in both cases. Canada’s connectivity score in 2012 was 71 times higher than that of the highest-placed Caribbean country in food and beverages, and nearly 100 times higher for metal

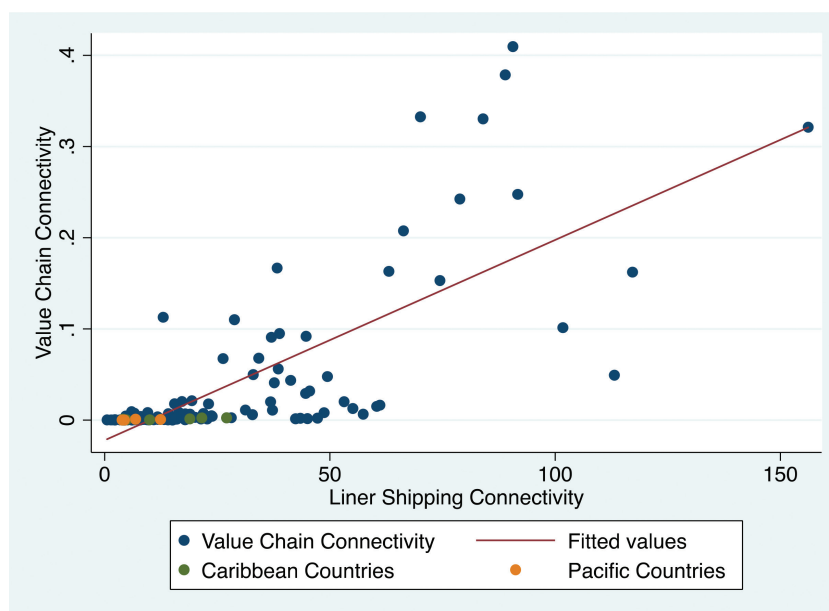
products. The USA’s scores were even higher. Clearly, some Caribbean countries are extremely isolated from value chain activity, as indicated by their scores close to zero on the connectivity index. In both sectors, the trend is also of concern: most Caribbean countries are becoming less connected in relative terms over time. So although there is some evidence of value chain development, these countries are not integrating into the GVC business model as fast as other economies around the world, and their relative connectivity is apparently decreasing, not increasing. Clearly, developing stronger value chain linkages should be an important policy priority for Caribbean governments.

### 3. Connectivity and Value Chains

What are the drivers of the relative isolation of Caribbean countries from GVCs in key sectors like food and beverages and metal products? Geography clearly plays a role, but its influence is mediated through the ability of countries to connect to global transport networks in the maritime shipping and airline sectors, which in turn is affected by market institutions and regulations. It is important to see what the connections are between these two areas, so that appropriate transport sector policies can be designed to promote GVC integration.

Figure 6 takes the case of maritime connectivity, using UNCTAD’s Liner Shipping Connectivity Index (LSCI), and highlighting the Commonwealth Pacific countries in addition to the Caribbean countries, to provide a point of comparison with other small island economies. For reasons of space, only the case of food and beverages is considered, but little turns on this choice as the underlying dynamic is the same for metal products. The upward sloping line of best fits shows that countries that are better connected to sea lanes are also

Figure 6. Liner shipping connectivity vs. value chain connectivity in food and beverages, 2012, index numbers.



better able to connect to GVCs in the processed food sector. Caribbean countries are in green, and Pacific countries are in orange. Some of the Caribbean group are more or less clustered around the regression line, which suggests that their performance in GVC connectivity is approximately in line with what would be expected given their ability to connect to global shipping markets. However, there are some cases of Caribbean countries below the regression line, which suggests that they are not taking full advantage of the opportunities offered by their maritime connectivity. Clearly, work is needed to mobilise policy responses and private sector resources, covering transport but also going beyond, to help the Caribbean better connect to international markets. Incremental improvements, in collaboration with development partners, may be possible. Perhaps due to proximity to the US market, some Caribbean countries are noticeably better connected to international shipping routes than the comparator countries in the Pacific. Clearly, policymakers need to leverage links with the USA and Canada, as well as the larger markets in Latin America, to promote both liner shipping connectivity and value chain development.

Figure 7 presents a similar analysis for air transport connectivity, using the World Bank's Air Connectivity Index (ACI). Again, the upward sloping line of best fit shows that countries that are better connected to global air

transport markets are also better connected to GVCs in food and beverages. The GVC connectivity performance of the Caribbean countries is essentially in line with what would be expected given their ability to connect to global air transport corridors, but it is important to note that they are again clustered in the bottom left corner of the figure, which suggests relative isolation from transport and trade networks on the whole, even though they have the advantage of geographical proximity – and in many cases direct air links – to the USA. Issues of trade and investment policy in air services are also of relevance to this analysis. They are somewhat better connected in terms of air transport than the Pacific countries, but that does not translate into major gains in value chain connectivity. Their higher scores are driven by connections to the USA, which could, in principle, form the basis for exporting selected processed agricultural products to that market, such as those based on tropical products. Nonetheless, policy is a key determinant of air transport connectivity, in particular the number and quality of Bilateral Air Services Agreements.

Finally, Figure 8 consolidates the available information on connectivity performance by examining the association between value chain connectivity and the World Bank's Logistics Performance Index (LPI). The LPI is a weighted average of six indicators, and is based on a survey of around 1,000 logistics professionals.

Figure 7. Air transport connectivity vs. value chain connectivity in food and beverages, 2012, index numbers.

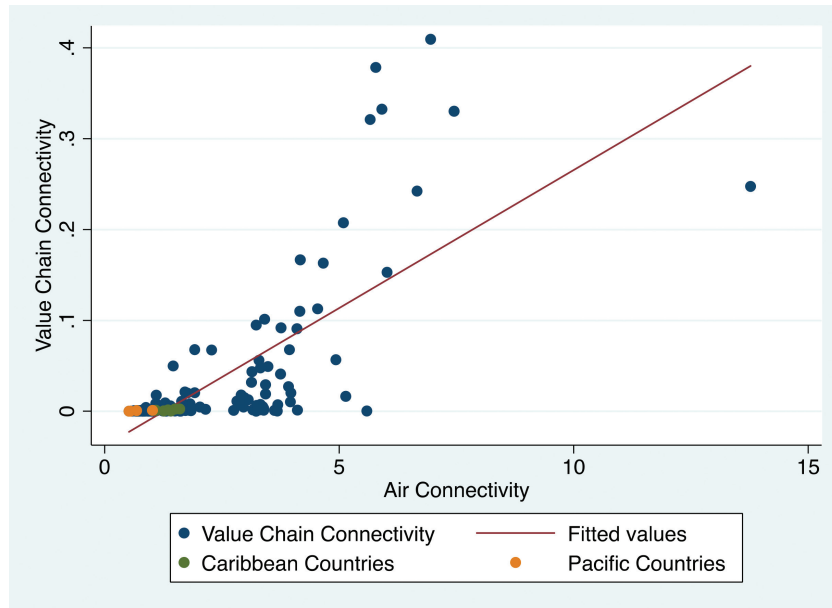
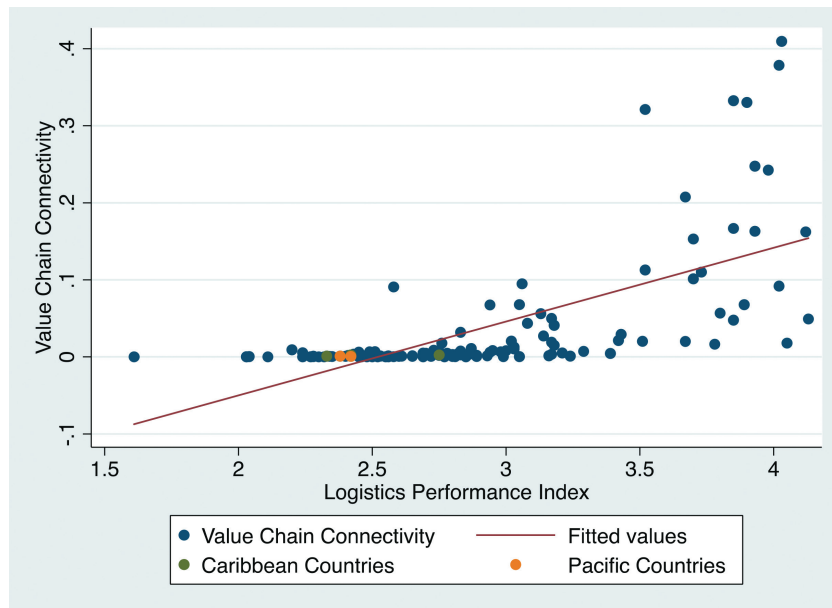


Figure 8. Logistics performance vs. value chain connectivity in food and beverages, 2012, index numbers.



It takes into account performance on trade and transport-related infrastructure, customs clearance, the ease of arranging competitively priced shipments, the ability to track and trace consignments, timeliness of delivery, and the competence and quality of logistics services. As for the LSCI and the ACI, the Caribbean countries have low scores relative to international

benchmarks, but perform approximately in line with what would be expected given their trade facilitation environments. Logistics performance in the Caribbean is reasonably similar to what is observed in The Pacific, with the exception of the Bahamas, which has a noticeably higher score.<sup>2</sup> The positive association between the LPI and value chain connectivity

2 The Bahamas has special trading arrangements with the USA, which might influence this conclusion.

suggests that regional value chains could be strengthened, and the Caribbean countries' competitive position improved, by upgrading

overall trade facilitation performance through measures such as regulatory reform and private sector development.

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## 4. Policy Implications

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This Policy Brief has analysed the trading position of Caribbean countries through the lens of value chain analysis, based on an understanding of GVCs as network businesses. It has mobilised new data on trade costs and trade in value added to better understand the relative position of the Caribbean, focusing on two key sectors: (processed) food and beverages, and metal products. These sectors were chosen for analysis based on their importance in the value added exports of Caribbean countries.

Key findings include the fact that despite the development of value chain activity in some countries, many parts of the region remain isolated from world markets, including trade in value added. Major markets like Canada and the USA are important for most Caribbean countries as sources of final demand in both sectors, with intra-regional trade links of lesser quantitative importance due to the extreme differences in relative market size between the two nearby developed country markets and the Caribbean countries themselves. The finding that Caribbean countries are only very weakly connected to global networks of trade in value added is likely due to their correspondingly weak performance on metrics of air and maritime transport connectivity on an overall basis, despite the existence of connections with the USA. Indeed, the trend in connectivity scores in both sectors considered here is worrying: the competitiveness of the Caribbean appears to be slipping, and the region is not integrating into GVCs as rapidly as is the case in other parts of the world, particularly Southeast Asia. It will be important for the Caribbean countries to develop stronger linkages with Canada and the US at the level of individual firms, so that global leaders can exert a structuring and organising role in terms of local value added activities. There is a basis to build on, but it is important that integration be advanced more rapidly.

Looking forward, what can policy-makers do to try and improve the situation? The first

priority should be transport, and the development of stronger linkages with key nodes in global transport networks. These networks are the lifeblood of GVCs, and there is scope for Caribbean countries to reduce their very high trade costs by at least a certain amount by examining policies – including liberalisation – that could help boost connectivity, and help develop the private sector in these areas. Air and maritime transport are both important, although for different types of goods. Typically, air transport is only used for goods that are highly perishable, or which have a high value to weight ratio. The two sectors considered here probably do not qualify under either of those criteria, but other sectors (such as tropical agriculture) might. As a result, it will be important for future analytical work to look at the factors that are holding back the Caribbean countries from achieving greater maritime transport connectivity. Of course, demand and market size are key. But boosting local value addition and developing links with large, geographically close destination markets would increase demand for shipping services. It will be important to examine whether or not policy settings are right to support this process over the medium term.

Closely linked to transport is the logistics sector, and there is much work suggesting that logistics performance is a key determinant of a country's ability to be competitive in global markets, including through joining and moving up in GVCs. This sector therefore also deserves attention. Although attracting foreign investment to small economies is difficult, it may be that improvements in the business climate can help mobilise the private sector to improve the Caribbean's ability to connect to global markets, or at least the key external markets of Canada and the USA, and perhaps some of the larger countries in Latin America. Logistics performance in the Caribbean is weak by global standards, but North American countries are very strong performers. Although development levels

and economic characteristics are very different, there is likely a role for technical assistance and capacity building in the broader regional context to help develop the sector and promote the Caribbean's competitiveness. There is clear scope to boost economic integration by developing the logistics sector, including through leveraging international integration of key services markets such as transport, freight forwarding, and express delivery services.

Second, it is important to recognise that the development of value chains is primarily a private sector agenda. Policy therefore needs to be accommodating to private sector development. A climate of certainty, and a strong business environment, are key considerations for investors, foreign and domestic alike. There is clearly room to improve in terms of the ease of doing business in some countries in the Caribbean. The top-ranked Caribbean country in the World Bank's Doing Business project is Jamaica, at 64th. Most other countries in the region rank considerably lower. There is considerable room to use sensible regulatory reforms to boost these rankings and make it easier for the private sector to connect to global markets for goods, services, people, and ideas. Easing these burdens will incentivise local businesses to develop and expand, and could potentially help them move gradually into foreign markets.

Part of the private sector development agenda should include measures to help local businesses overcome common export barriers faced by small and medium sized enterprises, including a lack of information on foreign market opportunities, and the need to comply with often costly standards and regulations, particularly in sectors like food. Working with international partners and donor agencies will be important in the context of building up private sector capacity in this area. It may be appropriate to consider targeted interventions such as

export promotion to overcome information barriers. This proposal does not equate to large-scale subsidisation of exports, but instead to the correction of a common market failure that particularly affects small-scale firms.

Although the Caribbean faces considerable challenges in terms of GVC connectivity, it will be important for policy-makers to look at ways in which interventions and regulatory reform can be leveraged to help local businesses enter GVCs, and then move up to higher value added activities with important spillovers for the economy. One immediate priority is the reinforcement of regional trading structures: intra-regional trade costs are quite high, and policy attention could usefully be directed towards measures to reduce them. These moves should be accompanied by the development of international gateways that enable trade to take place with other partners like Canada, the USA and Latin America. A central part of this overall agenda should be improvement of the trade facilitation and logistics environment through appropriate regulatory reform and private sector development, to boost competition and service quality as well as the quantity and quality of infrastructure. The starting point is the WTO's new Agreement on Trade Facilitation – Caribbean countries would be well served by being ambitious in their Category A notifications, and should in any event conduct needs assessment exercises to identify obligations that will require technical and financial assistance from development partners to implement. Of course, the Agreement is only the starting point for trade facilitation reforms – Economic Partnership Agreements and the CARICOM Single Market and Economy can also help this process along – and a broader approach to deal with infrastructure and service sector competitiveness can bear real fruits in terms of improved outcomes.

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