Do North-South Trade Partnerships Benefit the Export Industries of SIDS?

The Case of CARICOM and the USA

Renaldo Ramnath,
Department of Economics, University of the West Indies, St. Augustine, Trinidad and Tobago.
email: renaldo.ramnath@my.uwi.edu
Roger Hosein,
Department of Economics, University of the West Indies, St. Augustine, Trinidad and Tobago.
email: roger.hosein@sta.uwi.edu
George Saridakis,
Department of Marketing, Entrepreneurship and International Business, Kent Business School, University of Kent, Canterbury, Kent, England. email: g.saridakis@kent.ac.uk

Declaration of Interest Statement: The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding Statement: The authors received no financial support for the research, authorship, and/or publication of this article.

Ethical Approval and Informed Consent Statement: There are no human participants in this article and informed consent is not required.

Abstract

This paper assessed the export impact of the USA trade preferences program CBERA on the SIDS of CARICOM and found that the preferential trade agreement positively impacted the region's exports to the USA. However, endogenous and exogenous challenges prevent the region from maximizing export opportunities present in CBERA. Using fixed and random effects estimations along with the PPML estimator of the gravity model, we identified that there is a negative relationship between USA's GDP per capita and CARICOM's exports to the country. To identify the markets in which CARICOM's exports are inferior and vulnerable to import substitution and market share loss, we segmented the region's exports to the USA into two quality groups. This paper is the first to estimate the gravity model for vertical market segments. Estimates of the model illustrate that the negative relationship between CARICOM's exports and the USA's economic growth is more acute in the high and medium quality market relative to the low-quality market and more negative for non-energy exports relative to total exports. We argue that the expansion of the USA's energy industries along with the deindustrialization of some of the CARICOM's non-energy sectors are key factors in the negative relationship between the USA's GDP per capita and CARICOM's exports and the negative estimates of price elasticity of demand and corresponding market share losses of the region's exports to the rest of the world. These findings highlight that CARICOM countries must implement significant policy and institutional changes to promote the development of their export industries to capitalize on the export opportunities presented in the CBERA preferential trade agreement.

JEL Classifications: F14, F12

Keywords: CARICOM, CBERA, Projection Models, Gravity Model, Market Segmentation

1. Introduction

Trade liberalization has expanded globally over the past forty years and the proliferation of trade agreements have significantly increased bilateral trade between countries Baier and Bergstrand (2004), Behar and Cirera-i-Crivillé (2013) and Ganelli & Tervala (2015). In this global trade regime, factors such as the instability of multilateral trade preferences Pose (2019), risk of export threat and the need for greater market access have pushed developing countries of the Global South into pursuing trade agreements with the Global North Blecker (1996), Shadlen (2008), Sahakyan (2016), Trejo-Nieto (2023) and Busse et al. (2024). These North-South Trade Agreements provide the export industries of developing countries with greater market access relative to that available through multilateral trade agreements Shadlen (2008), Thrasher and Gallagher (2008), Manger and Shadlen (2014), Bernhardt (2016), Sahakyan (2016) and

Kurata, et al. (2020). However, there is little evidence of developing countries significantly expanding their market share in the respective export markets in the global North under these trade agreements Sheldon (2012), Manger and Shadlen (2014), Sahakyan (2016), Caglayan & Demir (2019) and Trejo-Nieto (2023).

This paper is the first to assess the estimate impact of a North-South Trade Agreement, in the USA trade preferences programs for the Caribbean and Central America, on the Small Island Developing States (SIDS) of the Caribbean Community (CARICOM). We also go further to assess the competitive performance of CARICOM's non-energy and agriculture exports to the USA, the region's largest export market, and examine if the region's exports are inferior, vulnerable to import substitution and market share loss under this North-South agreement. The USA trade preferences programs for the Caribbean and Central America were initiated by the Caribbean Basin Economic Recovery Act (CBERA). CBERA facilitates the region with duty free access to the USA market for exports of agriculture products classified under Harmonized System (HS) chapters 1 to 24; methanol exported under HS 290511; energy products classified under HS chapter 27 and textile and apparel products classified under HS chapters 50 through 63.

To assess the impact of CBERA on CARICOM's exports to the USA, we first employ the projection models used by Pelzman & Schoepfle (1988) to compare CARICOM's actual export values of eligible products to projected estimates. The three projection models examine the extent to which CARICOM's CBERA eligible exports exploited preferential trade opportunities in the USA market. We then employ a gravity model to investigate the effects of CBERA and the economic growth of CARICOM and the USA on the region's exports. The model is also estimated for CARICOM's non-energy exports, motivated by the reality that the expansion of the USA's energy industries has led to the country substituting the import of energy commodities with domestic production. We find that the preferential trade program positively impacted the region's exports to the USA. We also find that there is a negative relationship between USA's economic growth and CARICOM's exports. This relationship was also noted with a greater negative coefficient for the region's non-energy exports, suggesting that the region's exports are inferior relative to world exports in the USA market.

To identify the markets in which the region's exports are inferior and vulnerable to import substitution and market share loss, we segment the region's exports to the USA into two groups, one which comprises CARICOM's high and medium quality exports and one which comprises its low-quality exports. Our first approach to identify vulnerable export markets is to estimate the price elasticity of demand of the USA for CARICOM's exports and estimate the extent to which CARICOM's products were displaced by exports from the world. We then apply the gravity model for the segmented exports of CARICOM, and further disaggregate non-energy exports to estimate the model for agriculture exports. This allowed us to focus on the relationship between the economic growth of the USA and the region's exports of seafood, agricultural commodities, manufactured food and beverages.

The results of the gravity models illustrate that for the region's high and medium quality exports, there is a larger negative coefficient for the USA's GDP per capita relative to the results of the aggregated dataset. We also find that the negative relationship between CARICOM's exports and the USA's economic growth is more acute in the high and medium quality market relative to the low-quality market and more negative for non-energy exports relative to total exports. These results corroborate the findings of the aggregated total export models and the estimates of the price elasticity of demand and the CMS analysis, indicating that CARICOM's high and medium quality exports are vulnerable to market share loss to world exports and import substitution in the USA market. The USA's GDP per capita was not statistically significant for the high and medium quality agriculture exports and the low market export segment.

We argue that the negative coefficients of the USA's GDP per capita and negative estimates of price elasticity of demand and corresponding market share losses for the market segments do not indicate that all of the region's products are of inferior quality. The expansion of the USA's energy industries along with the deindustrialization of some of the CARICOM's non-energy sectors are key factors in the negative relationship. The development of the USA's oil and natural gas industries has led to an expansion in both upstream and downstream energy production prompting the USA to transition from a net importer to a net exporter of many energy products. Import substitution is also evident in non-energy sectors such as rum, with the USA's tax breaks for rum producers in the US Virgin Islands and Puerto Rico, which functions as a subsidy for rum production in these countries. These tax breaks place rum industries of CARICOM countries such as Barbados, Guyana, Jamaica and Trinidad and Tobago at a disadvantage. The deindustrialization of some of CARICOM's non-energy sectors also led to a decline in non-energy exports to the USA. Non-energy exports from Trinidad and Tobago, CARICOM's largest exporter, declined over the review period as the country was impacted by the corrosive effects of the Dutch Disease Wenner et al. (2018) and Hosein et al. (2022). The region's textile exports also declined precipitously as Jamaica's economy shifted to financial services.

The paper is structured as follows. In Section 2 we present theoretical insights into the performance of CARICOM's exports under CBERA by employing projection models in a comparative analysis with actual export value and employ a gravity model to investigate the effects of CBERA and the economic growth of CARICOM and the USA on the region's exports. We then seek to identify the export markets in which the region's exports are inferior, vulnerable to import substitution and market share loss and investigate the causes. Section 3 presents the methodological framework of the gravity model employed to evaluate CBERA's impact and CARICOM's Export Vulnerability in the USA Market. Section 4 presents the data. Section 5 discusses the empirical findings of the descriptive statistics employed and the econometric analyses. The final section concludes the paper.

2. Theoretical insights

2.1 Evaluating the Impact of CBERA on CARICOM's Export Performance in the USA Market

We are primarily interested in evaluating the impact of the CBERA on CARICOM exports to the USA. To achieve this, we first employ the models used by Pelzman & Schoepfle (1988) to compare the actual export values of eligible CARICOM products in 2022 to the projected estimates. The three projection models in the partial equilibrium, export expansion and shift share examine the extent to which CARICOM's CBERA eligible exports exploited preferential trade opportunities in the USA market. We estimate these projection models utilizing Harmonized System (1996) sub-heading 6-digit data over the period 2000 to 2022 sourced from the World Integrated Trade Solution (WITS).

The partial equilibrium approach is illustrated through a system of demand and supply equations for the USA and CARICOM:

$$x_{world,i} = f(P_{World,i}) \tag{1}$$

$$x_{CARICOM,i} = f(P_{CARICOM,i}) \tag{2}$$

$$P_{World,i} = P_{CARICOM,i} \tag{3}$$

Equations (1) and (2) illustrate that the export value of product i is a function of the exporter price of that product. Where $x_{world,i}$ represents world exports to the USA market, $P_{World,i}$ represents the price of world exports to the USA market, $x_{CARICOM,i}$ represents CARICOM's exports to the USA market, $P_{CARICOM,i}$ represents the price of CARICOM's exports to the USA market. Differentiating equations 1 and 2:

$$\partial x_{CARICOM,i} = \frac{\partial f(P_{CARICOM,i})}{\partial P_{CARICOM,i}} \partial P_{CARICOM,i} + \frac{\partial f(P_{CARICOM,i})}{\partial P_{World,i}} \partial P_{World,i} \tag{4}$$

$$\partial x_{World,i} = \frac{\partial f(P_{World,i})}{\partial P_{World,i}} \partial P_{World,i} + \frac{\partial f(P_{World,i})}{\partial P_{CARICOM,i}} \partial P_{CARICOM,i} \tag{5}$$

Solving equations 3 and 4 for the proportional changes in exports yields:

$$\Delta x_{CARICOM,i} = [\frac{e_{world,i}}{(1-e_{CARICOM,i})}] \tag{6}$$

Where $e_{world,i}$ and $e_{CARICOM,i}$ represent the price elasticity of supply of World exports and CARICOM's exports to the USA respectively.

We estimate the USA's price elasticity of demand for CARICOM's exports using the standard methodology Parkin, et al. (2008), Gwartney, et al. (2017) and Gillespie (2019):

$$e_{CARICOMi,t-t+1} = \frac{\partial x_{i,t-t+1}}{\partial P_{i,t-t+1}} * \frac{P_{i,t}}{x_{i,t}} \tag{7}$$

Where $x_{i,t}$ represents the export value of product i and $P_{i,t}$ represents the export price of product i respectively in base year t. In this analysis, the final year represented by $t+1$, is 2022.

Equation (6) can be utilized to estimate the export expansion of CARICOM's CBERA eligible exports to the USA by multiplying the value of the region's exports of product i in the base year:

$$x_{CARICOM,i}^{t+1} = [\frac{e_{world,i}}{(1-e_{CARICOM,i})}] * x_{CARICOM,i}^{t} \tag{8}$$

We also use the export expansion model as applied by Pelzman & Schoepfle (1988), where equations (1) and (2) is reduced into a single export expansion equation:

$$x_{CARICOM,i}^{t+1} = e_{world,i} * x_{CARICOM,i}^{t} \tag{9}$$

In the constant share model, Pelzman & Schoepfle (1988) indicated that projections of future CBERA exports to the USA can also be based on the assumption that exports will grow at a constant rate as illustrated:

$$x_{CARICOM,i}^{t+1} = a_{CARICOM,i}^{t-m,t} * x_{CARICOM,i}^{t} \tag{10}$$

Where the constant share term $a_{CARICOM,k}^{t-m,t}$ represents the growth rate of CARIOCM's exports to the USA over the period $t-m \; to \; t$.

Pelzman & Schoepfle (1988) argued that the constant share model is simplistic in projecting export values as takes a narrow perspective in projecting exports based solely on the growth rate of CARICOM's exports over one historical period. This simplistic approach excludes considerations of the performance of world exports relative to the region. Pelzman & Schoepfle (1988) proposed the use of the shift share model which facilitates variation of the constant share term:

$$x_{CARICOM,i}^{t+1} = [r_{World,i}^{t,t+1} + b(R_{CARICOM,i}^{t-m,t} - r_{World,i}^{t-m,t})] * x_{CARICOM,i}^{t} \tag{11}$$

Where $r_{World,i}^{t-m,t}$and $r_{World,i}^{t,t+1}$ represent the growth of world exports to the USA over the periods $t-m, t$ and $t, t+1$ respectively, which in this study represents 2000 to 2010 and 2010 to 2022 respectively. The shift share model is superior as it factors in the growth rate of World exports over two historical periods $t-m, t$ and $t, t+1$ with CARICOM's over $t-m, t$, thus placing greater weight on the performance of the world export market in projecting CARICOM's export values.

The shift share model factors in a competitive dimension in projections by incorporating the impact of changes in the growth rates of world exports over multiple periods as 'shifters' on CARICOM's projected exports of product k. The impact of exogenous 'shifters' was also examined by Dinc and Haynes (2005) in their study of the impact of productivity changes in export industries on international trade. The shift share model was also utilized by Lakkakula et al. (2015) for international trade research in assessing the global rice trade competitiveness and Borusyak et al. (2022) in their estimation of the effect of China's import competition on manufacturing employment in the USA.

The Balassa Revealed Comparative Advantage (RCA) index of CARICOM for product j as applied by Balassa (1965), Shafaeddin (2004), Jenkins (2008), Geda & Meskel (2008) and Lederman, et al. (2008) is then employed to corroborate the projection estimates. The RCA index is estimated as a ratio of CARICOM's export share of product j relative to the World export share of product j in the USA market:

$$RCA_{ij} = \left(\frac{x_{CARICOM,j}}{X_{CARICOM,t}}\right) / \left(\frac{x_{world,j}}{X_{world,t}}\right) \tag{12}$$

An estimated RCA of greater than 1 indicates that the country has a revealed comparative advantage in the respective product.

We then deploy a gravity model to assess the relationship between CARICOM's exports to the USA and the economic growth of both the region and its largest trading partner. Our investigation also assesses the impact of CBERA on the region's eligible sectors of agriculture, energy and textiles in driving the region's exports to the USA as the determinants of trade agreements can be captured by time invariant characteristics of countries Baier & Bergstrand (2009). We also estimate the model for CARICOM's non-energy[1] exports respectively to assess the impact of CBERA on the region's exports of agricultural commodities and manufactured products. Our estimation of the non-energy export model is motivated by the reality that the expansion of the USA's energy industries has led to the country substituting the import of energy commodities with domestic production. The assessment of non-energy exports thus excludes these developments and allows up to estimate the trade opportunities for CARICOM's exports of agricultural and manufactured products.

[1] CARICOM's non-energy exports excludes both upstream and downstream oil and natural gas products of the HS Chapters 27 mineral fuels, oil and products of their distillation, 28 inorganic chemicals, 29 organic chemicals, and 31 fertilizers.

2.2 Assessing the Vulnerability of CARICOM's Exports to the USA: Inferiority, Import Substitution, and Market Share Loss in the Global Context

To assess the competitive performance of CARICOM's export products in the USA market, we segment the region's exports into two quality ranges using the method applied by Fontagné et al. (2008), Batista & Liu (2017) and Ramnath, et al. (2024). In developed countries, such as the USA, quality has an important role in import decisions Silva & Hidalgo (2020). The first segment comprises the total value of high and medium quality exports and the second segment comprises the total value of low-quality exports of CARICOM countries. We segment the exports of CARICOM's countries used in the dataset at the HS6 product level into low-quality, medium-quality and high-quality product ranges through the application of a derivation of the methodology used by Fontagné et al. (2008) and Batista & Liu (2017). McKelvey (2011) indicated that it is likely that the quality and price of goods are correlated, and that the quality of goods demanded is not very sensitive to changes in price. Appendix 2 illustrates the methodology of the market segmentation, which is based on the relative unit value of the export product, is a reflection of the weighted average of firms' export prices.

We apply three approaches to assess whether exports from the Southern exporters of CARICOM to the largest Northern market, the USA are inferior, vulnerable to import substitution and market share loss. The first is to estimate the price elasticity of demand from the USA market for CARICOM exports in the two quality segments using the standard methodology illustrated in equation (7), as estimates that correct for quality substitution are similar to those that do not McKelvey (2011). Product differentiation can lead to inaccurate estimates of price elasticity using traditional models Crozet & Erkel-Rousse (2004) and Silva & Hidalgo (2020).

Secondly, to validate the elasticity results, we apply an extension of the Constant Market Share (CMS) analysis to estimate the share of CARICOM's exports which were displaced by exports from the Rest of the World (this group contains the exports of all countries except CARICOM) in both quality segments. It should be noted that a sensitivity analysis of the CMS analysis conducted by Bowen & Pelzman (1984) indicated that CMS estimates are impacted by changes in the base year, with substantial variations of CMS estimates and frequent sign changes. Thus, we also experiment with time varying estimates of price elasticity of demand and the extension of the CMS analysis by varying base year t among the years 1992, 2000 and 2010. As it relates to the estimation of the price elasticity of demand, this approach is similar to that applied by Baumeister & Peersman (2013) to account for the volatility of prices.

The CMS analysis here is an extension as applied by Batista (2008) and Jenkins & Edwards (2015), attributes the increase/decrease of an exporter's market share which is ascribable to decreasing competition at the product level over a period to its competitors in a zero-sum game. This extension follows that applied by Fagerberg & Sollie (1987), Ahmadi-Esfahani (2006), Simola (2017), Bagaria & Ismail (2019) and

Kamal, et al. (2020). Batista (2008) developed an extension of the CMS analysis to that applied by Batista & Azevedo (2002) which is based on the relative growth rates of the exporter and its competitors. Here we utilize the methodology applied by Jenkins & Edwards (2015) which is an extension of applied by Batista (2008) to calculate the loss of market share by CARICOM to the Rest of the World, in a particular product i, in the partner market is defined as:

$$\Delta k_{CARICOMi,Rest\ of\ the\ Worldi} = \Delta k_{CARICOMi} * k^{t}_{Rest\ of\ the\ Worldi} - \Delta k_{Rest\ of\ the\ Worldi} * k^{t}_{CARICOMi} \tag{13}$$

Where $k^{t}_{Rest\ of\ the\ World}$ and $k^{t}_{CARICOM}$ are the export shares of The Rest of the World and CARICOM in the partner market in base year *t*. Thus, the total loss of export share by CARICOM in a specific export product is segmented between the exports of other countries relative to their respective share of the export market at the base year and the gain in market share over the review period. The aggregate loss of CARICOM's market share to the Rest of the World is illustrated by summing over all products:

$$\Delta k_{CARICOM,Rest\ of\ the\ World} = \sum x^{t}_{K} * \Delta k_{CARICOMi,Rest\ of\ the\ Worldi} \tag{14}$$

Where x^{t}_{K} is the share of product i in word exports to partner market *k*.

Finally, we estimate the gravity model in both quality segments of CARICOM's total, non-energy and agriculture[2] exports to investigate whether the negative relationship between USA's GDP per capita and CARICOM's exports in the aggregated model holds in both the high and medium and low-quality market segments of all and non-energy exports. In our investigation into identifying the markets in which the region's exports are vulnerable we further disaggregate non-energy exports to estimate the model for agriculture exports. This allows us to focus on the relationship between the economic growth of the USA and the region's exports of seafood, agricultural commodities, manufactured food and beverages. This approach is expected to illustrate the prospects of the region's export sectors from a vertical perspective in the USA market to and will guide policy makers in the development of endogenous initiatives required for CARICOM to maximize the opportunities presented by CBERA.

[2] Agriculture exports include seafood, agricultural commodities, manufactured food and beverages classified under HS chapters 1 through 24.

3. Methodological Framework to Evaluate CBERA's Impact and CARICOM's Export Vulnerability in the USA Market

Our approach relies on the gravity model of trade, which describes the bilateral trade flow between countries. The model explains that the trade volume of a country is a function of the GDP of the country and its trade partner as well as, the bilateral distance among the trading parties. The traditional gravity model proposed Tinbergen (1962) is illustrated:

$$X_{ijt} = \alpha + \beta_1 Y_{it} + \beta_2 Y_{jt} + \beta_3 D_{ij} \tag{15}$$

where X_{ijt} is the export value of country j to country i, Y_{it} is the GDP of country i, $Y_{jt}$is the GDP of country, D_{ij} is the bilateral distance between country i and country j, which provides an indication of the transportation cost of trade and t is the time dimension. The α and βs are unknown parameters to be estimated. However, equation (15) assumes that that the cost of trade depends solely on bilateral separation of the countries, an unfair assumption as in reality other factors are involved. The omission of these factors in the traditional model leads to heteroscedasticity in the model, resulting in biased OLS estimates. This is compounded by the 'multilateral resistance' in the form of the associated export costs faced by developing countries, such as CARICOM relative, to the rest of the world Anderson & van Wincoop (2003). We apply the Pooled Ordinary Least Squares (POLS) regression along with the fixed and random effect estimations employed by Hausman (1978) to estimate a gravity model where panel cross sections are independent. The fixed and random effect estimations control for unobservable variables such as the 'multilateral resistance' illustrated by Anderson & van Wincoop (2003) and trade frictions which impact the export capacity of countries included in the panel. The one-way error component equation (16) below illustrates the fixed and random effect estimations.

$$X_{ijt} = \alpha + \beta_1 Y_{it} + \beta_2 Y_{jt} + \omega_{it}, \omega_{it} = \gamma_{it} + \varepsilon_{it} \tag{16}$$

Where ω_{it}, γ_{it} and ε_{it} are the residual term, the unobserved country-specific effect and the remainder disturbance respectively.

When the residuals are independent from the remainder disturbances, ε_{it} are independent and identically distributed with constant variance and γ_{it} are assumed to be fixed parameters and the fixed effect model is applicable. When the variances of ε_{it} and γ_{it} differs the random effect model is applicable. Here, γ_{it} is also independent of ε_{it} and γ_i. In the random effect model, the remainder disturbance and the unobserved country-specific effect are assumed to be random, independent, and identically distributed with constant variance and zero mean. The weakness of the fixed effect model is the loss of a degree of freedom where each parameter has its own singular effect and the variance which is correlated to the regressors. The random effect model is employed to overcome this issue as it is based on the assumption that the variance across the individual countries used in the panel is independent of regressors. To decide whether the fixed or random effect model is applicable we apply the Hausman test and to test for cross sectional dependence in the country panel, we apply the Breusch–Pagan Lagrange Multiplier test to check the cross sectional dependence to validate the random effect model.

We also employ the Poisson Pseudo Maximum Likelihood estimator (PPML) to avoid biased estimates stemming from zero export flows in the panel and accounts for the presence of heteroscedasticity in the model Santos Silva & Tenreyro (2011). The PPML model eliminates the issue of zero export values through specification of the exponential form instead of the natural log form. The PPML model also accounts for the endogeneity of CBERA and the 'multilateral resistance' illustrated by Anderson & van Wincoop (2003). These features make the PPML model preferable relative to POLS in the development of trade policy Shepherd (2013). The model is given in equation (17) below:

$$X_{USAjt} = \alpha GDPPC_{jt}^{\alpha} GDPPC_{USAt}^{\beta} D_{ij}^{\gamma} CBERA_{ij}^{\delta} NatRes_{ij}^{\theta} Agri_{ijt}^{\sigma} GFC^{\phi} COVID^{\vartheta} e^{\mu_i d_i} \tag{17}$$

where X_{USAjt} represents the exports of CARICOM country j at time t to the USA. $GDPPC_{jt}$ is the GDP per capita of the CARICOM country j at time t, $GDPPC_{USAt}$ is the GDP per capita of the USA at time t, D_{ij} is the bilateral distance between the USA and CARICOM countries. The bilateral distance variable is included as a 'multilateral resistance' explanatory variable to mitigate omitted variable bias. We segmented the values of CBERA eligible exports and non-CBERA eligible exports and use the dummy variable to estimate the impact of the preferential trade agreement on the region's exports to the USA. $CBERA$ represents the dummy variable for the total value of CBERA eligible exports of CARICOM country j. $NatRes$ represents the natural resources rents (% of GDP) of the CARICOM country j at time t. $Agri$ represents the agriculture, forestry, and fishing, value added (% of GDP) of the CARICOM country j at time t. GFC represents the dummy variable for the Global Financial Crisis for the years 2007 and 2008. COVID represents the dummy variable for the COVID-19 pandemic for the years 2020 and 2021. $\alpha, \beta, \delta, \sigma, \phi, \theta, \vartheta$ are parameters to be estimated. In estimating of the model, we took the log of the continuous variables, namely, GDP per capita, bilateral distance, total natural resource rents (% of GDP) and agriculture value added (% of GDP). Since the bilateral distances between CARICOM countries and the USA are of similar values, the variable D_{ij} is omitted from the model. The constant term α represents the average impact of exporters GDP per capita growth on their exports.

4. Data

We utilize data from the United Nations Comtrade database, accessed through the World Integrated Trade Solution (WITS), and the World Bank's World Development Indicators (WDI) database to construct the variables used in our models. Table 1 provides a description of the variables used in the gravity models, along with their sources. Additionally, Tables A6 to A8 in the Appendix present summary statistics for all variables used in the respective model categories.

Table 1. Variables used in the regression models.

Variable	Description	Source of Data
X_{USAjt}	The Value of Exports from CARICOM country j to the USA was used and logged. For the models to estimate CBERA's Influence on CARICOM Exports to the USA, country exports were segmented into CBERA eligible exports and CBERA ineligible exports. For the models to assess the vulnerability of CARICOM's exports to the USA, the total value of country exports was used.	Data on bilateral imports at the aggregate level for the period 1992-2022 was sourced from the United Nation's Comtrade database accessed through the World Integrated Trade Solution (WITS).
$GDPPC_{jt}$	The GDP per capita of the CARICOM country j was used and logged	Data on GDP per capita (Current), was sourced from the World Bank's World Development Indicators (WDI) database.
$GDPPC_{USAt}$	GDP per capita of the USA country was used and logged	Data on GDP per capita (Current), was sourced from the World Bank's World Development Indicators (WDI) database.
$CBERA$	A dummy variable was created to capture the effects of CBERA. '1' was assigned to the total value of CBERA eligible exports from the CARICOM country to the USA and '0' was assigned to the total value of CBERA ineligible exports from the CARICOM country to the USA.	Author Compilation
$NatRes_{jt}$	NatRes represents the natural resources rents (% of GDP) of the CARICOM country j at time t	Data on natural resources rents (% of GDP), was sourced from the World Bank's World Development Indicators (WDI) database.
$Agri_{jt}$	Agri represents the agriculture, forestry, and fishing, value added (% of GDP) of the CARICOM country j at time t.	Data on agriculture, forestry, and fishing, value added (% of GDP), was sourced from the World Bank's World Development Indicators (WDI) database.
GFC	GFC represents the dummy variable for the Global Financial Crisis for the years 2007 and 2008.	Author Compilation
$COVID$	COVID represents the dummy variable for the COVID-19 pandemic for the years 2020 and 2021.	Author Compilation

5. Empirical results

5.1 Results of CBERA's Influence on CARICOM Exports to the USA

Tables A1 to A3 in the Appendix illustrate the results of the three projection models. The results of the partial equilibrium, export expansion and shift share models projected that CARICOM's CBERA eligible exports would contract over the review period, but non-CBERA eligible exports would expand. However, export values illustrate the inverse, indicating that the CBERA positively impacted the region's export industries. This is corroborated by the RCA estimates in Tables A4 and A5 which illustrate that most of the region's exports which have a comparative advantage in the USA market are concentrated in CBERA eligible trade classifications. These results indicate that from both the relative export elasticity and growth rate perspectives, CARICOM's CBERA eligible exports outperformed world exports in the USA market over the review period. However, several of the region's non-energy exports in the base year 2000 were either miniscule or not exported to the USA in the final year 2022

The major products which CARICOM outperformed projections were energy exports of crude and refined oil, liquified natural gas, natural gas liquids and methanol. The region's minor exports which outperformed projections emanated from its non-energy sector and largely centred around frozen seafood, with other agriculture exports in molasses, chocolate and non-alcoholic beverages exceeding their estimates. Results of the three projection models highlighted export opportunities for the region in the USA's seafood and agriculture markets, as exports of citrus fruits, citrus juices, beer, liquor and other alcoholic beverages fell short of projections. The shift share model projected the region's 2022 export value of grapefruit juice at $38.1 Million in 2022 versus $434k in actual grapefruit juice exports in 2022 and beer at $26.9 Million versus $17.1 Million in actual exports.

Table 2 below illustrates a summary of the results of the gravity model for CARICOM's exports to the USA with respect to the Log Exports for the period 1992 to 2022, illustrating the coefficients for CARICOM and the USA's GDP per capita and the CBERA dummy variable. Table A9 illustrates the full estimates for both models. The datasets included the CARICOM countries of The Bahamas; Belize; Barbados; Dominica; Grenada; Guyana; Jamaica; St. Lucia; St. Vincent and the Grenedines; Suriname and Trinidad and Tobago. The POLS and PPML models passed the omitted variable diagnostic test for all exports, whilst the POLS model passed the omitted variable test for non-energy exports and was significant at the 5% level for the PPML model. The Hausman test revealed that there is no systematic difference in coefficients between the fixed and random effect models, indicating that the random effect model is preferred. This was corroborated by the Breusch–Pagan Lagrange Multiplier test which indicated that random effects are present in the model.

Table 2. Summary results of CARICOM Gravity Model with respect to the Log Exports to the USA for the period 1992 to 2022.

Gravity model:	**All Exports**				**Non-Energy Exports**			
Method:	**Pooled OLS**	**PPML**	**Fixed Effects**	**Random Effects**	**Pooled OLS**	**PPML**	**Fixed Effects**	**Random Effects**
Log GDP per capita CARICOM	1.05	0.36	1.05	1.08	1.04	0.37	1.04	1.05
	(7.91)***	(4.09)***	(8.61)***	(10.06)***	(8.09)***	(4.69)***	(8.92)***	(10.18)***
Log GDP per capita USA	-1.32	-0.48	-1.32	-1.59	-1.17	-0.47	-1.17	-1.40
	(-3.15)***	(-3.14)***	(-3.43)**	(-4.31)**	(-2.89)***	(-3.23)***	(-3.19)***	(-3.94)***
CBERA	0.17	0.04		0.16	0.05	0.01		0.03
	(2.56)**	(2.58)***		(0.56)	(0.49)	(0.70)		(0.13)

*** Denotes significance at all possible significance of 1%. ** Denotes significance at all possible significance of 5%.* Denotes significance at all possible significance of 10%.

Results illustrate that the dummy variables for exports of CBERA eligible exports is positive and significant for total exports in both the POLS and PPML models indicating that CARICOM's exporters benefitted from the trade preference program. However, the CBERA dummy is insignificant for CARICOM's exports of non-energy products. Results corroborate the estimates of the projection models where the region's energy exports outperformed projections whilst non-energy exports largely underperformed. The coefficient of GDP per capita for CARICOM is positive and statistically significant for both the total export and the segmented non-energy export models, indicating that as CARICOM's economies grow, they will export more to the USA. This is expected as CARICOM's of export sectors of agricultural products, energy commodities, the mining of minerals such as aluminum ores and unsophisticated manufactured products play significant roles within the economies of the region. However, the coefficient for USA's GDP per capita is negative and statistically significant for both models. This negative relationship is greater for the region's total exports relative to the segment of its non-energy exports. Estimates indicate that as the USA economy continues to grow, its imports of both energy and non-energy products from the region will decline, with the decline in energy imports estimated to be greater than that of non-energy products. This is significant for CARICOM as the number of products in which CARCOM had a revealed comparative advantage declined over the 2000 to 2022 period as the region's largest exporter, Trinidad and Tobago became specialized in the export of energy commodities, Guyana has begun exploitation of its vast oil and natural gas reserves and the Jamaica's textile industry declined.

5.2 Findings on the Vulnerability of CARICOM's Exports to the USA Market

The negative relationship between the USA's GDP per capita and CARICOM's exports for both total and non-energy exports prompt further investigation into identifying the markets in which the region's exports are inferior and vulnerable to import substitution and market share loss. Table 3 below illustrates the estimates of CARICOM's exports of inferior goods as a percentage of the region's total exports along with the region's export share which lost market share to exports from the Rest of the World over the review periods. Notably, estimates of CARICOM's exports of inferior goods in the high and medium-quality export markets are significantly higher than the corresponding estimates in the low-quality market, illustrating that the region's exports in this market segment are vulnerable to import substitution and market share loss in the USA. Estimates of CARICOM's exports of inferior goods comprised 75.73% of its total high and medium quality exports in 2022 with the base year of 2000 and 28.99% of total exports with the base year of 2010.

The results of the extension of the CMS analysis corroborate the estimates of the price elasticity of demand by the USA for CARICOM's exports as a greater share of the region's high and medium quality exports were displaced in export markets relative to the low-quality exports over the review periods. The export shares of the region which lost market share to the Rest of the World over the review periods were higher in the high and medium quality markets relative to the low-quality markets. Approximately 19.98% and 48.65% of CARICOM's high and medium-quality exports in 2022 lost market share to the Rest of the World over the 2000 to 2022 and 2010 to 2022 review periods. Many of CARICOM's exports in the high and medium quality market are energy commodities and unsophisticated manufactures. This is significant as these products originate from region's key export industries. Over both the 2000 to 2022 and 2010 to 2022 review periods, CARICOM's high and medium quality exports lost market share in many of the export and related markets in which the region had a negative price elasticity of demand, namely the export of frozen and processed seafood, food manufactures such as spices, margarine, confectionary, biscuits, baked and processed foods, preserved fruits, juices, mineral water, rum, refined petroleum oil, cosmetics.

Table 3. CARICOM's 2022 Exports of Inferior Goods in the USA Market.

Period	Low Quality		High and Medium Quality	
	Exports of Inferior Goods (% Total Low-Quality Exports)	Exports Which Lost Market Share (% Total Low-Quality Exports)	Exports of Inferior Goods (% Total High and Medium Quality Exports)	Exports Which Lost Market Share (% Total High and Medium Quality Exports)
1992-2022	0.17%	1.34%	4.79%	5.91%
2000-2022	2.40%	1.41%	75.73%	19.98%
2010-2022	4.60%	2.09%	28.99%	48.65%

Source: Calculated from WITS Data.

The relatively large proportion of inferior goods produced in CARICOM can be explained by the region's limited availability of skilled labor and technology which are required in the production of high-quality goods. High quality products are generally more expensive as they are developed through advanced technology and innovation; high quality of inputs; instensity of skilled labor and efficient management Verhoogen (2008), Schott (2004), Khandelwal (2010), Kugler & Verhoogen (2012), Fan, et al. (2015) and Ing, et al. (2018).

Tables 4 and 5 illustrates a summary of the results of the gravity model for CARICOM's high and medium-market and low-market exports for the region's total, non-energy and agriculture exports to the USA respectively with respect to the Log Exports for the period 1992 to 2022, illustrating the coefficients for CARICOM and the USA's GDP per capita. Tables A10 and A11 illustrate the full estimates for both models. The POLS and PPML models passed the omitted variable diagnostic test for the estimations of the region's total, non-energy and agriculture exports of high and medium quality. Similar to the aggregated export model, the Hausman test revealed that there is no systematic difference in coefficients between the fixed and random effect models, indicating that the random effect model is preferred. This was corroborated by the Breusch–Pagan Lagrange Multiplier test which indicated that random effects are present in the model.

Results for the total, non-energy and agriculture export models illustrate that the coefficients of GDP per capita for CARICOM are positive and statistically significant in both quality segments which is expected. For the region's non-energy exports to the USA, the coefficients of GDP per capita is highest for non-energy exports and lowest for agriculture exports which is a subset of the latter. This highlights both the relatively small size of the agricultural and fishery sectors in the GDP of CARICOM countries and the low of development of the region's agricultural export industries which limits the capacity of countries to fully exploit the CBERA for HS chapters 1 to 24.

The coefficients of USA's GDP per capita are more negative in the high and medium quality segment of total and non-energy exports relative to corresponding coefficients from aggregated models illustrated in Table 2. These results corroborate the findings of the aggregated total export models, the estimates of the price elasticity of demand and the CMS analysis, indicating that CARICOM's exports are vulnerable to import substitution in the USA and market share loss to world exports. The USA's GDP per capita was only statistically significant for the PPML model estimations for agriculture exports in both market segments. These results can be attributed to both endogenous and exogenous challenges which prevent the Southern exporters of from maximizing export opportunities present in CBERA. We argue that the negative coefficients of the USA's GDP per capita and negative estimates of price elasticity of demand and corresponding market share losses do not indicate that all of the region's products are of inferior relative to those from the Rest of the World. The expansion of the USA's energy industries along with the deindustrialization of some of the CARICOM's non-energy sectors are key factors in the negative relationship. The negative price elasticity of demand for methanol can be explained by the expansion of the USA's natural gas industry from shale plays. Over the review period, cheap natural gas from shale plays have led to the commissioning of several methanol plants in the USA, enabling the USA to shift to a net exporter of methanol in 2022. Similarly, the negative price elasticity and market share loss in the refined oil market can be explained by the expansion of oil production in the USA over the review periods. According to the US Energy Information Administration, field production of crude oil by the USA increased from 5.8 million barrels per day in 2000 to 11.9 million barrels per day in 2022, leading global crude oil production.

Segments of CARICOM's non-energy sector are also vulnerable to import substitution. In the market for rum, the negative price elasticity of demand and loss of market share of CARICOM's exports highlights the impact of the USA's tax concessions for the rum industries of the US Virgin Islands and Puerto Rico, which functions as a subsidy for rum production in these countries. These tax breaks place rum industries of CARICOM countries such as Barbados, Guyana, Jamaica and Trinidad and Tobago at a disadvantage. Results are important for CARICOM's trade policy, as the USA's high economic growth over the medium term is expected to lead to the USA's import demand substituting away from both CARICOM's energy and non-energy exports. The deindustrialization of some of CARICOM's non-energy sectors also led to a decline in non-energy exports to the USA. Non-energy exports from Trinidad and Tobago, CARICOM's largest exporter, declined over the review period as the country's non-energy sector experienced the corrosive effects of the Dutch Disease Wenner, et al. (2018) and Hosein, et al. (2022). The region's citrus and textile exports also declined precipitously, corroborated by the RCA estimates in Tables A4 and A5, as Jamaica's economy shifted to financial services. Other exogenous challenges center around the associated export costs faced by the region relative to the rest of the world, which is a major factor in bilateral trade flows and have a relatively large dampening effect on bilateral trade between large countries of the global north and small countries of the global south Behar & Cirera-i-Crivillé (2013). The authors went on to state that the dampening effect increases as the number of countries in a trade agreement increases. These results and significant for CARICOM, as the number of products in which CARCOM had a revealed comparative advantage declined over the 2000 to 2022 period as the region's largest exporter, Trinidad and Tobago became specialized in the export of energy commodities, Guyana has begun exploitation of its vast oil and natural gas reserves and the Jamaica's textile industry declined. Results also suggest that for CARICOM to expand its export market share in USA, the trade preferences of CBERA may need to be tailored to support endogenous growth initiatives from the region's exporters, in line with the ‘appropriate industrial policy’ suggested by Landesmann & Stöllinger (2019) geared to the development of region’s export industries.

Table 4. Summary results of CARICOM Gravity Model with respect to the Log High and Medium Market Exports to the USA for the period 1992 to 2022.

Gravity model:	All High and Medium Quality Exports				High and Medium Quality Non-Energy Exports				High and Medium Quality Agriculture Exports			
Method:	Pooled OLS	PPML	Fixed Effects	Random Effects	Pooled OLS	PPML	Fixed Effects	Random Effects	Pooled OLS	PPML	Fixed Effects	Random Effects
Log GDP per capita CARICOM	1.20	0.39	1.20	1.18	1.24	0.42	1.24	1.21	0.67	0.36	0.67	0.77
	(5.92)***	(3.04)***	(5.92)***	(7.06)***	(7.22)***	(3.89)***	(7.22)***	(8.29)***	(4.01)***	(3.10)***	(4.01)***	(5.12)***
Log GDP per capita USA	-2.10	-0.68	-2.10	-2.36	-1.94	-0.67	-1.94	-2.06	-0.45	-0.37	-0.45	-0.75
	(-3.27)***	(-2.75)***	(-3.27)**	(-3.99)**	(-3.58)***	(-3.70)***	(-3.58)***	(-4.07)***	(-0.84)	(-1.90)*	(-0.84)	(-1.48)

*** Denotes significance at all possible significance of 1%. ** Denotes significance at all possible significance of 5%.* Denotes significance at all possible significance of 10%

Table 5. Summary results of CARICOM Gravity Model with respect to the Log Low Market Exports to the USA for the period 1992 to 2022.

Gravity model:	CARICOM Low Quality Exports to the USA				CARICOM Low Quality Non-Energy Exports to the USA				High and Medium Quality Agriculture Exports			
Method:	Pooled OLS	PPML	Fixed Effects	Random Effects	Pooled OLS	PPML	Fixed Effects	Random Effects	Pooled OLS	PPML	Fixed Effects	Random Effects
Log GDP per capita CARICOM	0.88	0.32	0.88	0.78	0.89	0.34	0.89	0.77	0.86	0.46	0.86	0.79
	(4.46)***	(2.48)***	(4.46)***	(4.18)***	(4.98)***	(2.84)***	(4.98)***	(4.61)***	(4.87)***	(2.91)***	(4.87)***	(4.66)***
Log GDP per capita USA	0.13	-0.09	0.13	-0.04	-0.13	-0.17	-0.13	-0.20	-0.74	-0.54	-0.74	-0.73
	-0.21	(-0.36)	-0.21	(-0.06)	(-0.23)	(-0.82)	(-0.23)	(-0.36)	(-1.33)	(-1.88)*	(-1.33)	(-1.34)

*** Denotes significance at all possible significance of 1%. ** Denotes significance at all possible significance of 5%.* Denotes significance at all possible significance of 10%.

6. Conclusion

This paper assessed the export impact of the USA trade preferences program CBERA on the SIDS of CARICOM and illustrated that the preferential trade agreement positively impacted the region's exports to the USA. However, endogenous and exogenous challenges prevent the region from maximizing export opportunities present in CBERA. Using the gravity model, we identified that there is a negative relationship between USA's GDP per capita and CARICOM's exports to the country. This relationship was also noted with a greater negative coefficient for the region's non-energy exports, suggesting that the region's exports are inferior relative to world exports in the USA market.

We identified the markets in which the CARICOM's exports are inferior and vulnerable to import substitution and market share loss by segmenting the region's exports to the USA into two quality groups, the high and medium quality export segment and one which comprises its low-quality exports. Estimates of the extension of the CMS analysis corroborated the estimates of the price elasticity of demand by the USA for CARICOM's exports as a greater share of the region's high and medium quality exports were displaced in export markets relative to the low-quality exports over the review periods. We then employed the gravity model for the segmented exports of CARICOM and find that for the region's high and medium quality exports, there is a larger negative coefficient for the USA's GDP per capita relative to the results of the aggregated dataset. The results of the gravity model for the segmented markets illustrate that that the negative relationship between CARICOM's exports and the USA's economic growth is more acute in the high and medium quality market relative to the low-quality market and also more negative for non-energy exports relative to total exports. These results corroborated the findings of the aggregated total export models and the estimates of the price elasticity of demand and the CMS analysis, illustrating that CARICOM's high and medium quality exports are vulnerable to market share loss to world exports and import substitution in the USA market. The USA's GDP per capita was not statistically significant for the high and medium quality agriculture exports and the low market export segment.

We argued that the expansion of the USA's energy industries along with the deindustrialization of some of the CARICOM's non-energy sectors are key factors in the negative coefficients of the USA's GDP per capita and negative estimates of price elasticity of demand and corresponding market share losses of CARICOM's exports. These findings are important for CARICOM exporters as the USA is the region's largest market and the country's real GDP growth is projected to outstrip those of CARICOM's major economies, with the exception of Guyana. The IMF's World Economic Outlook April 2024 illustrated that the USA's real GDP growth is projected to be 2.7% in 2024 and 2.1% in 2029. At the CARICOM country level, apart from Guyana, the region's major economies are expected to lag the USA in real GDP growth. T&T's real GDP is projected to be 2.4% in 2024 and 2.8% in 2029; Suriname's is projected at 3.0% over 2024 to 2029; Jamaica's is growth expected to slow from 1.8% in 2024 to 1.6% in 2029; Barbados is expected to slow from 3.7% in 2024 to 2.0% in 2029 and Guyana's real GDP is expected to be 33.9% in 2024 and 11.9% in 2028 as the economy benefits from an energy windfall. Thus, to capitalize on the export opportunities presented in the North-South preferential trade agreement in CBERA, CARICOM countries must implement significant policy and institutional changes to promote the development of its export industries.

Declaration of Interest Statement: The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding Statement: The authors received no financial support for the research, authorship, and/or publication of this article.

Ethical Approval and Informed Consent Statement: There are no human participants in this article and informed consent is not required.

Data Availability Statement: The datasets analyzed in this paper are available from the corresponding author on reasonable request.

References

Ahmadi-Esfahani, F. Z., 2006. Constant market shares analysis: uses, limitations and prospects. *The Australian Journal of Agricultural and Resource Economics, Vol 50,* pp. 510-526.

Anderson, J. E. & van Wincoop, E., 2003. Gravity with Gravitas: A Solution to the Border Puzzle. *The American Economic Review,* 93(1), p. 2003.

Baier, S. L. & Bergstrand, J. H., 2004. Economic determinants of free trade agreements. *Journal of International Economics,* 64(1), pp. 29-63.

Baier, S. L. & Bergstrand, J. H., 2009. Bonus Vetus OLS: A Simple Method for Approximating International Trade–Cost Effects using the Gravity Equation. *Journal of International Economics,* 77(1), p. 77–85.

Balassa, B., 1965. Trade Liberalisation and “Revealed” Comparative Advantage. *Manchester School of Economic and Social Studies,* 33(2), pp. 99-123.

Batista, J. C., 2008. Competition between Brazil and other exporting countries in the US import market: a new extension of constant-market-shares analysis. *Applied Economics 40,* pp. 2477-2487.

Batista, J. C. & Azevedo, J. P., 2002. NAFTA and the Loss of US Market Share by Brazil 1992-2001. *Cepal Review Vol. 78,* pp. 159-173.

Batista, J. C. & Liu, Y., 2017. Export Quality and the Dynamics of North-South Competition. *The World Economy,* 40(1), pp. 207-232.

Baumeister, C. & Peersman, G., 2013. The Role of Time Varying Elasticities in Accounting for Volatility Changes in the Crude Oil Market. *Journal of Applied Econometrics*, 28(7), pp. 1087-1109.

Behar, A. & Cirera-i-Crivillé, L., 2013. Does it Matter Who You Sign With? Comparing the Impacts of North–South and South–South Trade Agreements on Bilateral Trade. *Review of International Economics,* 21(4), p. 765–782.

Bernhardt, T., 2016. South-South trade and South-North trade: Which contributes more to development in Asia and South America? Insights from estimating income elasticities of import demand. *CEPAL Review,* 2016(7), pp. 97-114.

Blecker, R. A., 1996. The new economic integration: Structuralist models of North-South trade and investment liberalization. *Structural Change and Economic Dynamics,* 7(3), pp. 321-345.

Bowen, H. & Pelzman, J., 1984. US export competitiveness: 1962-77. *Applied Economics,* Volume 16, pp. 461-473.

Busse , M., Dary, S. K. & Wüstenfeld, J., 2024. Trade liberalisation and manufacturing employment in developing countries. *Structural Change and Economic Dynamics,* Volume 70, pp. 410-421.

Caglayan, M. & Demir, F., 2019. Exchange rate movements, export sophistication and direction of trade: the development channel and North–South trade flows. *Cambridge Journal of Economics,* 43(6), p. 1623–1652.

Crozet, M. & Erkel-Rousse, H., 2004. Trade Performances, Product Quality Perceptions, and the Estimation of Trade Price Elasticities. *Review of International Economics,* 12(1), pp. 108-129.

Fagerberg, J. & Sollie, G., 1987. The method of constant market shares analysis reconsidered. *Applied Economics, 19,* pp. 1571-1584.

Fan, H., Yao, A. L. & Yeaple, S. R., 2015. Trade Liberalization, Quality, and Export Prices. *The Review of Economics and Statistics,* 97(5), pp. 1033-1051 .

Fontagné, L., Gaulier, G., Zignago, S. & Redding, S., 2008. Specialization across Varieties and North-South Competition. *Economic Policy,* 23(53), pp. 51-91.

Fontagné, L. G., Gaulier, G. & Zignago, S., 2008. Specialization across varieties and North-South competition. *Economic Policy,* 23(53), pp. 51-91.

Fontoura, M. P. & Serodio, P., 2017. The Export Performance of the 2004 EU Enlargement Economies since the 1990s: a Constant Market Share Analysis. *International Advances in Economic Research,* pp. 161-174.

Ganelli, G. & Tervala , J., 2015. Value of WTO trade agreements in a New Keynesian model. *Journal of Macroeconomics,* Volume 15, pp. 347-362.

Gillespie, A., 2019. *Foundations of Economics.* Fifth Edition ed. Oxford: Oxford University Press.

Gwartney, J. D., Sobel, R. S., Stroup, R. L. & Macpherson, D. A., 2017. *Microeconomics: Private and Public Choice.* Sixteenth Edition ed. s.l.:Cengage Learning.

Hausman, J. A., 1978. Specification Tests in Econometrics. *Econometrica,* 46(6), pp. 1251-1271.

Hosein, R., Boodram, L. & Saridakis, G., 2022. Stimulating non-energy exports in Trinidad and Tobago: Evidence from a small petroleum-exporting economy experiencing the Dutch disease. *Journal of Risk and Financial Management,* 15(36), pp. 1-21.

Hummels, D. & Klenow, P., 2005. The Variety and Quality of a Nation's Exports. *The American Economic Review,* 95(3), pp. 704-723.

Kurata, H., Nomura, R. & Suga, N., 2020. Vertical specialization in North–South trade: Industrial relocation, wage and welfare. *Review of International Economics,* 28(1), pp. 119-137.

Landesmann, M. A. & Stöllinger, R., 2019. Structural change, trade and global production networks: An 'appropriate industrial policy' for peripheral and catching-up economies. *Structural Change and Economic Dynamics,* Volume 48, pp. 7-23.

Lederman, D., Olarreaga , M. & Rubiano, E., 2008. Trade Specialization in Latin America: The Impact of China and India. *Review of World Economics*, pp. 248-271.

Manger, M. S. & Shadlen, K. C., 2014. Political Trade Dependence and North–South Trade Agreements. *International Studies Quarterly,* 58(1), pp. 79-91.

McKelvey, C., 2011. Price, unit value, and quality demanded. *Journal of Development Economics*, Volume 95, pp. 157-169.

Parkin, M., Powell, M. & Matthews, K., 2008. *Economics.* Harlow: Addison-Wesley.

Pelzman, J. & Schoepfle, G., 1988. The Impact of the Caribbean Basin Economic Recovery Act on Caribbean Nations' Exports and Development. *Economic Development and Cultural Change, University of Chicago Press*, 36(4), pp. 753-796.

Pose, N., 2019. Economic ideas and North–South preferential trade agreements in the Americas. *Latin American Journal of Trade Policy,* 2(4), p. 34–53.

Ramnath, R., Hosein, R., Deonanan, R. & Saridakis, G., 2024. A vertical index of direct competition in international trade: The case of CHINDIA and CARICOM. *The Journal of International Trade & Economic Development,* pp. 1-25.

Sahakyan, D., 2016. Reassessing North-South relations: the case of North-South preferential trade agreements. *Journal of International Trade Law and Policy,* 15(1), pp. 51-66.

Sahakyan, D., 2016. Reassessing North-South relations: the case of North-South preferential trade agreements. *Journal of International Trade Law & Policy,* 15(1), pp. 51-66.

Santos Silva, J. & Tenreyro, S., 2011. Further simulation evidence on the performance of the Poisson pseudo-maximum likelihood estimator. *Economics Letters,* 112(2), pp. 220-222.

Shadlen, K., 2008. Globalisation, Power and Integration: The Political Economy of Regional and Bilateral Trade Agreements in the Americas. *The Journal of Development Studies,* 44(1), pp. 1-20.

Sheldon, I., 2012. North–South trade and standards: what can general equilibrium analysis tell us?. *World Trade Review,* 11(3), pp. 376-389.

Silva, A. D. B. D. & Hidalgo, Á. B., 2020. Price elasticity in import demand equations considering product quality: Estimates for the Brazilian economy (1996–2013). *EconomiA*, Volume 21, pp. 340-364.

Thrasher, R. & Gallagher, K. P., 2008. *21st Century Trade Agreements: Implications for Long-Run Development Policy.* 2 ed. Boston: Boston University: The Pardee Papers.

Trejo-Nieto, A., 2023. The political economy of a North–South trade agreement and the development prospects for Mexico: from NAFTA to USMCA. *Area Development and Policy,* 8(1), pp. 103-124.

Wenner, M. D., Bollers, E. & Hosein, R., 2018. *The Dutch disease phenomenon and lessons for Guyana: Trinidad and Tobago's experience,* St. Augustine: Inter-American Development Bank.

Wu, H.-L. & Chen, C.-H., 2004. Changes in the foreign market competitiveness of East Asian exports. *Journal of Contemporary Asia,* pp. 503-522 .

Appendices

Appendix 1: Tables

Table A1. Partial Equilibrium Model's Projected vs Actual Trade of CBERA Eligible Products 2000-2022.

	2000 Actual	Projected Export Expansion (Contraction)	2022 Actual	Trade Gain (Loss)
CARICOM Total Exports	$3,013,440.64	$46,262,198.40	$7,833,527.48	($41,442,111.56)
CARICOM Non CBERA Exports	$984,910.26	$131,575,263.79	$2,600,079.35	($129,960,094.70)
CARICOM CBERA Exports	$2,028,530.38	($85,313,065.39)	$5,233,448.13	$ 88,517,983.14
Agriculture	$341,370.06	$1,396,710.38	$442,100.56	($1,295,979.88)
Saturated monohydric alcohols:-- Methanol	$154,881.01	($544,976.78)	$326,973.86	$717,069.64
Energy	$1,346,242.47	($86,199,235.21)	$4,462,968.30	$89,315,961.04
Textile and Apparel	$186,036.84	($268,232,047.35)	$1,405.42	$ 268,047,415.92

Source: Calculated from WITS Data.

Table A2. Export Expansion Model's Projected vs Actual Trade of CBERA Eligible Products 2000-2022.

	2000 Actual	Projected Export Expansion (Contraction)	2022 Actual	Trade Gain (Loss)
CARICOM Total Exports	$3,013,440.64	$4,807,241.66	$7,833,527.48	$12,845.18
CARICOM Non CBERA Exports	$984,910.26	$24,397,090.60	$2,600,079.35	($22,781,921.52)
CARICOM CBERA Exports	$2,028,530.38	($19,589,848.95)	$5,233,448.13	$22,794,766.70
Agriculture	$341,370.06	($1,781,125.06)	$442,100.56	$1,881,855.56
Saturated monohydric alcohols:-- Methanol	$154,881.01	($487,302.85)	$326,973.86	$659,395.71
Energy	$1,346,242.47	($17,720,764.18)	$4,462,968.30	$20,837,490.01
Textile and Apparel	$186,036.84	($47,748,831.50)	$1,405.42	$47,564,200.07

Source: Calculated from WITS Data.

Table A3. Shift Share Analysis – Projected vs Actual Trade of CBERA Eligible Products 2000-2022.

	2000 Actual	Projected Export Expansion (Contraction)	2022 Actual	Trade Gain (Loss)
CARICOM Total Exports	$3,013,440.64	$32,642,433.86	$7,833,527.48	($27,822,347.02)
CARICOM Non CBERA Exports	$984,910.26	$33,107,204.50	$2,600,079.35	(431,492,035.42)
CARICOM CBERA Exports	$2,028,530.38	($464,770.64)	$5,233,448.13	$3,669,688.39
Agriculture	$341,370.06	($46,923.68)	$442,100.56	$147,654.18
Saturated monohydric alcohols:-- Methanol	$154,881.01	$234,377.11	$326,973.86	($62,284.26)
Energy	$1,346,242.47	($479,453.22)	$4,462,968.30	$3,596,179.05
Textile and Apparel	$186,036.84	$24,595,822.27	$1,405.42	($24,780,453.69)

Source: Calculated from WITS Data.

Table A4. CARICOM's CBERA Eligible Exports which have a Comparative Advantage (Number of Products).

	2000	2022
CARICOM Total Exports	238	133
CARICOM Non CBERA Exports	105	55
CARICOM CBERA Exports	133	78
Agriculture	90	75
Saturated monohydric alcohols:-- Methanol	1	1
Energy	6	4
Textile and Apparel	36	2

Source: Calculated from WITS Data.

Table A5. CARICOM's CBERA Eligible Exports which have a Comparative Advantage.

	2000	2022
Agriculture Class A: 0<RCA≤ 1	247	223
Agriculture Class B: 1<RCA≤ 2	17	18
Agriculture Class C: 2<RCA≤ 3	11	11
Agriculture Class D: 3<RCA	62	46
Saturated monohydric alcohols:-- Methanol Class D: 3<RCA	1	1
Energy Class A: 0<RCA≤ 1	5	4
Energy Class B: 1<RCA≤ 2	-	-
Energy Class C: 2<RCA≤ 3	2	-
Energy Class D: 3<RCA	4	4
Textile and Apparel Class A: 0<RCA≤ 1	172	75
Textile and Apparel Class A: 0<RCA≤ 2	10	-
Textile and Apparel Class A: 0<RCA≤ 3	3	-
Textile and Apparel Class A: 0<RCA≤ 4	23	2

Source: Calculated from WITS Data.

Table A6. Summary Statistics for the models estimating CBERA's Influence on CARICOM Exports to the USA.

Variable	Obs.	Mean	Std. Dev.	Min	Max
X_{USAjt} (All Exports)	650	3.948	1.444	0.000	6.850
X_{USAjt} (Non-energy exports)	650	3.781	1.264	0.000	5.963
$GDPPC_{jt}$	650	4.499	0.673	1.189	6.579
$GDPPC_{USAt}$	650	4.657	0.125	4.405	4.883
$NatRes_{jt}$	650	0.399	0.489	0.003	1.540
$Agri_{jt}$	650	0.804	0.339	0.135	1.572
$CBERA$	650	0.500		0	1
GFC	650	0.068		0	1
$COVID$	650	0.068		0	1

Table A7. Summary Statistics for the segmented high and medium quality export models assessing the vulnerability of CARICOM's exports to the USA.

Variable	Obs.	Mean	Std. Dev.	Min	Max
X_{USAjt} (All Exports)	325	4.044	1.393	0.000	6.794
X_{USAjt} (Non-energy exports)	325	4.014	1.203	0.000	5.978
X_{USAjt} (Agriculture exports)	325	3.384	1.231	0.000	5.359
$GDPPC_{jt}$	325	4.499	0.673	1.189	6.579
$GDPPC_{USAt}$	325	4.657	0.125	4.405	4.883
$NatRes_{jt}$	325	0.399	0.489	0.003	1.540
$Agri_{jt}$	325	0.804	0.339	0.135	1.572
GFC	325	0.068		0	1
$COVID$	325	0.068		0	1

Table A8. Summary Statistics for the segmented low quality export models assessing the vulnerability of CARICOM's exports to the USA.

Variable	Obs.	Mean	Std. Dev.	Min	Max
X_{USAjt} (All Exports)	325	3.554	1.621	0.000	6.812
X_{USAjt} (Non-energy exports)	325	3.381	1.297	0.000	5.853
X_{USAjt} (Agriculture exports)	325	2.733	1.404	0.000	5.299
GDPPC	325	4.499	0.673	1.189	6.579
GDPPC	325	4.657	0.125	4.405	4.883
NatRes	325	0.399	0.489	0.003	1.540
Agri	325	0.804	0.339	0.135	1.572
GFC	325	0.068		0	1
COVID	325	0.068		0	1

Table A9. CARICOM Gravity Model with respect to the Log Exports to the USA for the period 1992 to 2022.

Gravity model:	**CARICOM Exports to the USA**				**CARICOM Non-Energy Exports to the USA**			
Method:	**Pooled OLS**	**PPML**	**Fixed Effects**	**Random Effects**	**Pooled OLS**	**PPML**	**Fixed Effects**	**Random Effects**
Log GDP per capita CARICOM	1.05	0.36	1.05	1.08	1.04	0.37	1.04	1.05
	(7.91)***	(4.09)***	(8.61)***	(10.06)***	(8.09)***	(4.69)***	(8.92)***	(10.18)***
Log GDP per capita USA	-1.32	-0.48	-1.32	-1.59	-1.17	-0.47	-1.17	-1.39
	(-3.15)***	(-3.14)***	(-3.43)**	(-4.31)**	(-2.89)***	(-3.23)***	(-3.19)***	(-3.94)***
Log natural resources rents (% of GDP)	0.23	0.06	0.23	0.47	-0.02	0.01	-0.02	0.10
	(0.86)	(0.78)	(0.94)	(2.49)**	(-0.09)	(0.15)	(-0.10)	(0.53)
Log Agriculture, forestry, and fishing, value added (% of GDP)	-0.63	-0.10	-0.63	-1.19	-0.10	0.01	-0.10	-0.65
	(-1.35)	(-0.77)	(-1.46)	(-4.02)***	(-0.22)	(0.08)	(-0.24)	(-2.29)**
Global Financial Crisis	0.02	0.00	0.02	-0.02	0.06	0.01	0.06	0.03
	(0.12)	(0.00)	(0.13)	(-0.18)	(0.45)	(0.57)	(0.49)	(0.25)
COVID-19	0.06	0.20	0.06	0.10	0.02	0.01	0.16	0.04
	(0.43)	(0.45)	(0.47)	(0.74)	(0.11)	(0.19)	(0.13)	(0.33)
CBERA	0.17	0.04		0.16	0.05	0.01		0.03
	(2.56)**	(2.58)***		(0.56)	(0.49)	(0.70)		(0.13)
Trinidad and Tobago	1.50	0.23			0.65	0.07		
	(4.38)***	(2.45)**			(1.91)	(0.78)		
Barbados	0.35	0.09			0.45	0.10		
	(2.08)**	(3.31)***			(2.72)***	(4.05)***		
Guyana	0.01	-0.22			-0.20	-0.29		
	(0.02)	(-0.88)			(-0.32)	(-1.20)		
Jamaica	0.26	-0.09			-0.01	-0.17		
	(0.82)	(-0.70)			(-0.04)	(-1.34)		
Suriname	-0.08	-0.07			-0.19	-0.11		
	(-0.20)	(-0.51)			(-0.46)	(-0.80)		
Belize	0.83	0.21			0.61	0.17		
	(2.89)***	(2.57)***			(2.19)**	(2.00)**		
The Bahamas	0.83	0.20			0.90	0.22		
	(4.24)***	(5.24)***			(4.78)***	(5.63)***		
St. Lucia	Omitted	Omitted			Omitted	Omitted		
Dominica	-0.74	-0.31			-1.00	-0.35		

	(-2.38)**	(-3.62)***			(-3.31)**	(-4.08)		
Grenada	-0.24	-0.14			-0.53	-0.16		
	(-3.14)***	(-2.45)**			(-2.90)***	(-2.81)***		
St. Vincent and the Grenadines	-0.88	-0.33			-1.06	-0.37		
	(-4.03)***	(-5.52)***			(-4.97)***	(-6.01)***		
Constant	5.58	2.03	5.81	7.28	4.71	1.84	4.68	6.06
	(3.11)***	(4.33)***	(3.39)***	(4.67)***	(2.70)***	(3.95)***	(2.85)***	(4.06)***
R Squared	0.66	0.66	0.47	0.54	0.58	0.57	0.34	0.42
Adjusted R Squared	0.65				0.57			
R Squared (Within)			0.14	0.14			0.14	0.14
R Squared (Between)			0.64	0.75			0.47	0.62
F Statistic/Wald Test	F(17,632) = 72.46		F(6,622) = 17.17	$\chi2$ (6) = 149.41	F(17,632) = 51.82	F(6,21) = 13.87	F(6,622) = 17.35	$\chi2$ (6) = 133.67
	Prob > F = 0.0000		Prob > F = 0.0000	Prob > $\chi2$ = 0.0000			Prob > F = 0.0000	Prob > $\chi2$ = 0.0000
Breusch Pagan LM Test (POLS vs Random Effects Models)				$\chi2$ (01) = 1016.97				$\chi2$ (01) = 1192.69
				Prob > $\chi2$ = 0.0000				Prob > $\chi2$ = 0.0000
Hausman Test (Fixed vs Random Effects Models)			χ^2 (6) = 10.03				χ^2 (6) = 6.90	
			Prob > χ^2 = 0.1235				Prob > χ^2 = 0.3304	
RAMSEY RESET Test	F(3, 629) = 2.62	χ^2 (1) = 2.26			F(3, 629) = 2.11	χ^2 (1) = 5.72		
	Prob > F = 0.0500	Prob > χ^2 = 0.1329			Prob > F = 0.0976	Prob > χ^2 = 0.0168		
Observations	650	650	650	650	650	650	650	650

Note that the coefficients are the first value recorded and the associated *t*-statistics are in brackets below their relevant significance levels.
St. Lucia dummy variable was omitted from the estimation in the CARICOM export models the reference category. The country served as the reference category as it is not a major exporter of agricultural products, energy commodities or manufactured products.
We also re-run the model including year dummies and we find that the results are similar for the CARICOM import models, with statistically significant coefficients for the CARICOM and USA GDP per capita variables.
The distance variables were omitted from the import and export models because of collinearity as the bilateral distances between CARICOM countries and the USA were of similar values.
*** Denotes significance at all possible significance of 1%. ** Denotes significance at all possible significance of 5%.* Denotes significance at all possible significance of 10%.

Table A10. CARICOM Gravity Model with respect to the Log High and Medium Market Exports to the USA for the period 1992 to 2022.

Gravity model:	CARICOM High and Medium Quality Exports to the USA				CARICOM High and Medium Quality Non-Energy Exports to the USA				CARICOM High and Medium Quality Agriculture Exports to the USA			
Method:	Pooled OLS	PPML	Fixed Effects	Random Effects	Pooled OLS	PPML	Fixed Effects	Random Effects	Pooled OLS	PPML	Fixed Effects	Random Effects
Log GDP per capita CARICOM	1.20	0.39	1.20	1.18	1.24	0.42	1.24	1.21	0.67	0.36	0.67	0.77
	(5.92)***	(3.04)***	(5.92)***	(7.06)***	(7.22)***	(3.89)***	(7.22)***	(8.29)***	(4.01)***	(3.10)***	(4.01)***	(5.12)***
Log GDP per capita USA	-2.10	-0.68	-2.10	-2.36	-1.94	-0.67	-1.94	-2.06	-0.45	-0.37	-0.45	-0.75
	(-3.27)***	(-2.75)***	(-3.27)**	(-3.99)**	(-3.58)***	(-3.70)***	(-3.58)***	(-4.07)***	(-0.84)	(-1.90)*	(-0.84)	(-1.48)
Log natural resources rents (% of GDP)	-0.08	-0.02	-0.08	0.29	-0.27	-0.05	-0.27	-0.06	-0.43	-0.08	-0.43	-0.28
	(-0.19)	(-0.14)	(-0.19)	(1.07)	(-0.76)	(-0.50)	(-0.76)	(-0.24)	(-1.27)	(-0.65)	(-1.27)	(-1.04)
Log Agriculture, forestry, and fishing, value added (% of GDP)	-0.33	-0.06	-0.33	-1.27	-0.44	-0.09	-0.44	-0.99	-0.26	-0.03	-0.26	-0.58
	(-0.19)	(-0.29)	(-0.46)	(-3.09)***	(-0.72)	(-0.52)	(-0.72)	(-2.60)**	(-0.44)	(-0.17)	(-0.44)	(-1.37)
Global Financial Crisis	0.03	0.00	0.03	-0.02	-0.05	-0.02	-0.05	-0.08	0.04	0.00	0.04	0.01
	(0.16)	(0.16)	(0.16)	(-0.12)	(-0.28)	(-0.74)	(-0.28)	(-0.47)	(0.23)	(0.17)	(0.23)	(0.08)
COVID-19	-0.01	0.00	-0.01	0.04	0.14	0.04	0.14	0.17	0.06	0.03	0.06	0.09
	(0.04)	(0.03)	(-0.04)	(0.19)	(0.74)	(0.64)	(0.74)	(0.89)	(0.32)	(0.42)	(0.32)	(0.48)
Constant	8.50	2.83	8.71	10.67	7.97	2.72	7.96	9.01	2.03	1.18	2.82	4.02
	(3.10)***	(3.66)***	(3.06)***	(4.27)***	(3.44)***	(5.01)***	(3.30)***	(4.20)***	(0.89)	(2.00)**	(1.19)	(1.85)*
Country Dummies	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No
R Squared	0.58	0.58	0.31	0.45	0.60	0.59	0.36	0.44	0.63	0.64	0.34	0.41

Adjusted R Squared	0.56				0.58				0.62			
R Squared (Within)			0.49	0.11			0.17	0.17			0.09	0.09
R Squared (Between)			0.32	0.77			0.55	0.7			0.55	0.68
F Statistic/Wald Test	F(16,308) = 72.46		F(6,308) = 6.70	χ2 (6) = 63.57	F(16,308) = 28.95		F(6,308) = 10.81	χ2 (6) = 82.48	F(16,308) = 33.48		F(6,308) = 5.81	χ2 (6) = 40.73
	Prob > F = 0.0000		Prob > F = 0.0000	Prob > χ2 = 0.0000			Prob > F = 0.0000	Prob > χ2 = 0.0000	Prob > F = 0.0000		Prob > F = 0.0000	Prob > χ2 = 0.0000
Breusch Pagan LM Test (POLS vs Random Effects Models)				χ2 (01) = 92.36				χ2 (01) = 192.12				χ2 (01) = 438.49
				Prob > χ2 = 0.0000				Prob > χ2 = 0.0000				Prob > χ2 = 0.0000
Hausman Test (Fixed vs Random Effects Models)			χ^2 (6) = 6.18				χ^2 (6) = 3.89				χ^2 (6) = 3.96	
			Prob > χ^2 = 0.4030				Prob > χ^2 = 0.6914				Prob > χ^2 = 0.6828	
RAMSEY RESET Test	F(3, 305) = 0.81	χ^2 (1) = 1.55			F(3, 305) = 0.32	χ^2 (1) = 3.12			F(3, 305) = 1.34	χ^2 (1) = 0.40		
	Prob > F = 0.4878	Prob > χ^2 = 0.2130			Prob > F = 0.8117	Prob > χ^2 = 0.0775			Prob > F = 0.2609	Prob > χ^2 = 0.5266		
Observations	325	325	325	325	325	325	325	325	325	325	325	325

Note that the coefficients are the first value recorded and the associated *t*-statistics are in brackets below their relevant significance levels.

St. Lucia dummy variable was omitted from the estimation in the CARICOM export models the reference category. The country served as the reference category as it is not a major exporter of agricultural products, energy commodities or manufactured products.

We also re-run the model including year dummies and we find that the results are similar for the CARICOM import models, with statistically significant coefficients for the CARICOM and USA GDP per capita variables.

The distance variables were omitted from the import and export models because of collinearity as the bilateral distances between CARICOM countries and the USA were of similar values.

*** Denotes significance at all possible significance of 1%. ** Denotes significance at all possible significance of 5%.* Denotes significance at all possible significance of 10%.

Table A11. CARICOM Gravity Model with respect to the Log Low Market Exports to the USA for the period 1992 to 2022.

Gravity model:	CARICOM High and Medium Quality Exports to the USA				CARICOM High and Medium Quality Non-Energy Exports to the USA				CARICOM High and Medium Quality Agriculture Exports to the USA			
Method:	Pooled OLS	PPML	Fixed Effects	Random Effects	Pooled OLS	PPML	Fixed Effects	Random Effects	Pooled OLS	PPML	Fixed Effects	Random Effects
Log GDP per capita CARICOM	0.88	0.32	0.88	0.78	0.89	0.34	0.89	0.77	0.86	0.46	0.86	0.79
	(4.46)***	(2.48)***	(4.46)***	(4.18)***	(4.98)***	(2.84)***	(4.98)***	(4.61)***	(4.87)***	(2.91)***	(4.87)***	(4.66)***
Log GDP per capita USA	0.13	-0.09	0.13	-0.04	-0.13	-0.17	-0.13	-0.20	-0.74	-0.54	-0.74	-0.73
	(0.21)	(-0.36)	(0.21)	(-0.06)	(-0.23)	(-0.82)	(-0.23)	(-0.36)	(-1.33)	(-1.88)*	(-1.33)	(-1.34)
Log natural resources rents (% of GDP)	0.48	0.12	0.48	0.36	0.31	0.09	0.31	0.11	-0.13	-0.02	-0.13	-0.20
	(1.18)	(1.10)	(1.18)	(1.03)	(0.86)	(0.78)	(0.86)	(0.37)	(-0.37)	(-0.13)	(-0.37)	(-0.64)
Log Agriculture, forestry, and fishing, value added (% of GDP)	0.30	0.08	0.30	-0.72	0.20	0.02	0.20	-0.64	-0.63	-0.37	-0.63	-1.02
	(0.43)	(0.33)	(0.43)	(-1.25)	(0.32)	(0.11)	(0.32)	(-1.25)	(-1.02)	(-1.20)	(-1.02)	(-1.94)*
Global Financial Crisis	0.18	0.04	0.18	0.16	0.23	0.06	0.23	0.22	-0.03	-0.03	-0.03	-0.04
	(0.90)	(1.01)	(0.90)	(0.77)	(1.26)	(1.39)	(1.26)	(1.18)	(-0.17)	(-0.50)	(-0.17)	(-0.21)
COVID-19	-0.16	-0.03	-0.16	-0.14	-0.04	0.00	-0.04	-0.03	0.11	0.06	0.11	0.11
	(-0.72)	(-0.43)	(-0.72)	(-0.63)	(-0.19)	(-0.02)	(-0.19)	(-0.15)	(0.58)	(0.17)	(0.58)	(0.59)
Constant	-1.68	0.05	-1.46	0.62	0.23	0.44	-0.30	1.28	2.34	1.52	2.90	3.51
	(-0.63)	(0.07)	(-0.52)	(0.23)	(-0.09)	(0.65)	(-0.12)	(0.54)	(0.98)	(1.61)	(1.17)	(1.47)
Country Dummies	Yes	Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	No
R Squared	0.71	0.71	0.04	0.20	0.63	0.63	0.01	0.13	0.69	0.68	0.05	0.09
Adjusted R Squared	0.69				0.61				0.67			
R Squared (Within)			0.12	0.11			0.13	0.13			0.12	0.12

R Squared (Between)			0.01	0.20			0.00	0.10			0.02	0.08
F Statistic/Wald Test	F(16,308) = 72.46		F(6,308) = 6.93	χ2 (6) = 41.80	F(16,308) = 32.30		F(6,308) = 7.97	χ2 (6) = 46.37	F(16,308) = 42.90		F(6,308) = 6.94	χ2 (6) = 41.72
	Prob > F = 0.0000		Prob > F = 0.0000	Prob > χ2 = 0.0000	Prob > F = 0.0000		Prob > F = 0.0000	Prob > χ2 = 0.0000	Prob > F = 0.0000		Prob > F = 0.0000	Prob > χ2 = 0.0000
Breusch Pagan LM Test (POLS vs Random Effects Models)				χ2 (01) = 1011.42				χ2 (01) = 885.46				χ2 (01) = 1550.28
				Prob > χ2 = 0.0000				Prob > χ2 = 0.0000				Prob > χ2 = 0.0000
Hausman Test (Fixed vs Random Effects Models)			χ^2 (6) = 7.77				χ^2 (6) = 6.09				χ^2 (6) = 2.27	
			Prob > χ^2 = 0.2554				Prob > χ^2 = 0.4133				Prob > χ^2 = 0.8931	
RAMSEY RESET Test	F(3, 305) = 3.42	χ2 (1) = 0.07			F(3, 305) = 3.03	χ2 (1) = 0.01			F(3, 305) = 1.41	χ^2 (1) = 11.51		
	Prob > F = 0.0178	Prob > χ2 = 0.7945			Prob > F = 0.0298	Prob > χ2 = 0.9286			Prob > F = 0.2394	Prob > χ^2 = 0.0007		
Observations	325	325	325	325	325	325	325	325	325	325	325	325

Note that the coefficients are the first value recorded and the associated *t*-statistics are in brackets below their relevant significance levels.

St. Lucia dummy variable was omitted from the estimation in the CARICOM export models the reference category. The country served as the reference category as it is not a major exporter of agricultural products, energy commodities or manufactured products.

We also re-run the model including year dummies and we find that the results are similar for the CARICOM import models, with statistically significant coefficients for the CARICOM and USA GDP per capita variables.

The distance variables were omitted from the import and export models because of collinearity as the bilateral distances between CARICOM countries and the USA were of similar values.

*** Denotes significance at all possible significance of 1%. ** Denotes significance at all possible significance of 5%.* Denotes significance at all possible significance of 10%.

Appendix 2: Market Segmentation of CARICOM's exports to the USA

The segmentation method is illustrated below, where $r_{CARICOM,j}$ is the unit value of product *j* exported by CARICOM relative to the unit value of product *j* of exported by the World to the partner market:

$$r^{t+1}_{CARICOM,j} = p^{t+1}_{CARICOM,j} \Big/ p^{t+1}_{World,j} \quad \text{(A 1.1)}$$

If $r_{hj} = 1$, then CARICOM's exports of product *j* is classified as being of medium-quality. If $r_{CARICOMj} > 1$, then CARICOM's exports of product *j* to the partner market is divided into the medium and high-quality ranges. The share of CARICOM's exports of product *j* in the high-quality range is calculated:

$$[1 - 1/(r_{CARICOM,j})^{\propto}] > 0.1 \quad \text{(A 1.2)}$$

as $r_{CARICOMj} > 1, 0 < [1 - 1/(r_{CARICOM,j})^{\propto}] < 1$, with values on the lower end of the range representing relative export prices which are close to 1, i.e. $r_{CARICOM,j} \sim 1$. The share of CARICOM's exports of product *j* in the medium-quality range is calculated:

$$[1 - 1/(r_{CARICOM,j})^{\propto}] < 0.1 \quad \text{(A 1.3)}$$

If $r_{CARICOMj} < 1$, then CARICOM's exports of product j to the partner market is divided into the low and medium quality ranges. Specifically: The share of CARICOM's exports of product *j* in the low-quality range is calculated:

$$\left[1 - \left(r_{CARICOM,j}\right)^{\propto}\right] > 0.1 \quad \text{(A 1.4)}$$

As $r_{CARICOMj} < 1,\ 0 < [1 - (r_{CARICOM,j})^{\propto}] < 1$, with values on the lower end of the range representing relative export prices which are close to 1, $r_{CARICOM,j} \sim 1$. Also, the share of CARICOM's exports of product *j* in the medium-quality range is calculated:

$$[1 - (r_{CARICOM,j})^{\propto}] < 0.1 \quad \text{(A 1.5}$$

As the $0 < [1 - (r_{CARICOM,j})^{\propto}] < 1$, the value of 0.1 is again applied as the threshold when classifying low-quality and medium-quality exports. Values < 0.1 are classified as exports within the medium quality range, as values under this threshold represent relative export prices which are close to 1, $r_{CARICOM,j} \sim 1$, as in the case of anhydrous ammonia for $\alpha = 2$.

Increasing the threshold from 0.1 to 0.2 leads to a greater share of CARICOM's exports being classified in the medium quality range and a corresponding decrease in export share classified in the high-quality range.

Fontagné et al. (2008) applied the α parameter to regulate the smoothness of the market segmentation allocation function, with the aim of allocating a similar ratio, on average, for each quality range of exports. Changes in α impacts the quality classification of exports, where a lower value of α leads to a greater share of exports in the medium quality range, decreasing shares classified in the high- and low-quality ranges. Conversely, a higher value of α leads to a smaller share of exports in the medium quality range, increasing the shares classified in the high and low ranges.

Fontagné, et al. (2008) used $\alpha = 4$ and Batista & Liu (2017) experimented with $\alpha = 3\ to\ 5$ in their examination of Japan's import market. Batista & Liu (2017) experimented with variances in α and found that setting $\alpha = 3$ increases the relative size of the medium quality market segment and setting $\alpha = 5$ does the opposite. They concluded that changing $\alpha = 3\ to\ 5$ had little impact on the market dynamics of the estimates and did not change the conclusions. In this paper we utilize $\alpha = 4$.