

The Role of Trade Complementarity in CARICOM's Extra-Regional Trade

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Introduction

- This paper examines the extent to which CARICOM's extra-regional trade is influenced by trade complementarity.
- The motivation for this study is the expansion of North – South trade agreements that CARICOM has embarked on in recent years with the EU and Canada. These North - South FTAs can open new avenues for growth in trade for small developing countries but simultaneously undermine the present comparative base of CARICOM products through competition from more efficient third countries.
- In this regard, many theorists have argued that the level of trade complementarity between trade partners is an important factor in boosting the trade outcomes from free trade agreements.
- In particular, Schiff (2001) in a seminal paper on the natural trading partner hypothesis argued that countries which are characterized by a strong level of complementarity in their trade structure are more likely to benefit the most from FTAs and in that sense can be defined as “natural trading partners.”

Trade Complementarity Index

- The trade complementarity index is an empirical technique that can be used to assess the extent to which the export specialization and the import specialization of trade partners complement each other in relation to world trade.
- Drysdale and Garnaut (1982) noted that the trade complementarity index defined by Drysdale (1967) is an appropriate measure to incorporate in the gravity equation to capture the trade structure of countries as it compares the trade structure of both countries in relation to world trade (Armstrong 2007, 4).
- The trade complementarity index outlined by Drysdale (1967) is defined as:

$$TCI_{ij} = \sum_k \left(\frac{X_i^k}{X_i} * \frac{M_w^k - M_i^k}{M_w^k - M_i^k} * \frac{M_j^k}{M_j} \right)$$

The main proponents (Michaely, 1996; Yeats, 1998) of the TCI argue that the higher the value of the TCI the more likely the proposed FTA will succeed.

Trade complementarity and CARICOM's major trade partners

Table 1: Trade Complementarity Index for CARICOM member states and EU Countries (average 1999-2008)

	<u>AUT</u>	<u>BEL</u>	<u>DEU</u>	<u>DNK</u>	<u>ESP</u>	<u>FIN</u>	<u>FRA</u>	<u>GBR</u>	<u>GRC</u>	<u>IRL</u>	<u>ITA</u>	<u>NLD</u>	<u>POL</u>	<u>SWE</u>
<u>BHS</u>	0.85	1.15	0.76	1.47	1.74	0.85	1.05	0.87	1.31	0.92	1.34	0.80	1.10	0.89
<u>BLZ</u>	1.08	1.29	1.06	1.31	1.33	0.86	1.07	1.49	1.10	1.19	1.16	1.89	0.76	0.89
<u>BRB</u>	1.17	1.30	0.94	1.43	1.12	1.15	1.16	1.21	1.34	1.37	0.91	1.08	1.04	1.04
<u>DMA</u>	1.29	1.61	1.21	1.50	1.20	1.21	1.52	1.42	1.92	1.51	1.15	1.38	1.85	1.32
<u>GRD</u>	1.00	0.93	0.88	1.98	1.27	0.80	1.17	0.94	1.28	1.40	0.72	1.38	1.31	1.11
<u>GUY</u>	0.77	1.16	0.58	1.09	1.10	0.59	0.73	0.92	0.81	0.81	1.33	0.61	0.49	0.57
<u>JAM</u>	0.54	0.64	0.75	0.57	0.87	0.57	0.83	0.67	0.77	1.60	0.70	0.91	0.68	0.73
<u>LCA</u>	1.11	1.36	1.22	1.52	1.10	1.15	1.22	1.56	1.31	1.21	0.91	1.31	1.19	1.27
<u>SUR</u>	0.43	0.34	2.02	0.74	0.34	0.72	0.18	2.08	0.28	1.89	1.64	3.34	0.55	1.01
<u>TTO</u>	0.93	1.32	1.08	0.77	1.17	1.19	1.15	0.65	1.24	0.82	0.74	1.05	1.04	0.88
<u>VCT</u>	1.01	1.35	1.18	1.81	1.02	0.91	1.26	1.28	1.36	1.35	0.87	1.49	1.31	1.11

Source: own computations based on UN Comtrade (2011).

Trade complementarity and CARICOM's major trade partners

Table 2: Trade Complementarity Index for CARICOM member states and other countries (1999-2008)

	Latin American countries					NAFTA			Asian countries			
	<u>ARG</u>	<u>BRA</u>	<u>COL</u>	<u>ECU</u>	<u>PER</u>	<u>CAN</u>	<u>MEX</u>	<u>USA</u>	<u>CHN</u>	<u>IND</u>	<u>JPN</u>	<u>THA</u>
<u>BHS</u>	0.91	1.00	0.79	0.90	0.97	0.96	0.86	1.01	1.59	0.57	1.52	0.98
<u>BLZ</u>	0.35	0.46	0.62	0.70	0.89	1.04	0.42	1.09	0.42	0.86	1.49	0.53
<u>BRB</u>	0.94	1.11	1.13	1.61	1.72	1.01	0.93	0.98	0.62	0.79	0.92	0.8
<u>DMA</u>	1.70	0.91	1.53	2.14	1.50	1.43	0.73	0.60	0.48	0.75	0.77	0.79
<u>GRD</u>	0.93	1.23	1.06	1.47	1.36	0.95	1.10	0.93	0.54	1.07	1.19	1.22
<u>GUY</u>	0.69	0.49	0.60	0.45	1.50	1.19	0.50	0.79	0.65	4.64	1.13	1.08
<u>JAM</u>	3.93	0.49	0.57	0.71	0.53	2.58	0.43	0.80	2.18	0.57	0.57	0.42
<u>LCA</u>	0.84	0.75	0.94	1.16	0.90	1.22	0.88	1.08	0.49	0.77	0.92	0.52
<u>SUR</u>	0.52	0.41	0.33	0.34	0.64	0.82	0.66	1.13	0.34	0.47	0.59	0.31
<u>TTO</u>	0.83	1.63	0.75	2.07	1.22	0.66	0.82	1.03	0.88	1.98	1.68	1.12
<u>VCT</u>	0.67	1.26	1.07	1.14	1.18	1.12	0.75	0.74	0.42	0.81	0.83	0.65

Source: own computations based on UN Comtrade (2011).

Augmented Gravity Equation

- From the preliminary results using the trade complementarity index it is difficult to gauge whether CARICOM's extra-regional trade is increasing in an external environment that is characterized by strong and rising trade structure complementarities.
- An appropriate way to ascertain this relationship is through a gravity equation.
- However a major limitation of the standard gravity model of international trade is that it does not treat with the most fundamental theory of international trade by excluding the comparative advantage profiles of countries from the analysis (Helmers and Pasteels 2005; Ciuriak and Kinjo 2006).
- This paper augments the standard gravity model by incorporating a measure of trade complementarity (TCI) as well as other variables such as the population size of the respective countries and a dummy variable representing trade preferences to determine the role of trade complementarity in CARICOM's pattern of extra-regional trade.

Augmented Gravity Equation

- The augmented gravity model to be estimated is:

$$\ln T_{ij} = \beta_0 + \beta_1 \ln Y_i^t + \beta_2 \ln Y_j^t + \beta_3 POP_i^t + \beta_4 \ln POP_j^t + \beta_5 \ln TCI_{ij}^t + \beta_6 \ln D_{ij} + \beta_7 \ln PTA_{ij} + \varepsilon_{it}$$

Table 3: Interpretation of the trade complementarity index coefficient

	$\beta < 0$	Decreasing trade complementarity structures
TCI (β)	$\beta > 0$	Increasing trade complementarity structures
	$\beta = 0$	Indeterminate

Data and Methodology

- The dataset used in this paper includes 37 countries from CARICOM, NAFTA, EU, Asia and Latin America for the period 1999-2008.
- The trade complementarity index for the relevant countries are computed at the SITC 3-digit commodity level and summed over 264 products using data derived from the United Nations Commercial Trade Database.
- A balanced panel dataset of the variables is constructed using data from various sources for the period 1998-2008.
- The data for the dependent variable (total trade) is obtained from the International Monetary Fund and the United Nations Commercial Trade Statistics.
- Data for GDP and population are derived from the World Development Indicators while data on the distance variable is obtained from CEPII.

Estimation Procedure

- A range of panel data econometric techniques were employed to obtain the most reliable results including pooled OLS, fixed effects, random effects, Hausman and Taylor method and the FEVD.
- Several diagnostics tests such as the test for individual effects, random effects and fixed effects are performed.
- In particular, both the Breusch-Pagan LM test and the F-test indicate that the POLS method is to be rejected against the FEM and the REM.
- The Hausman test is then used to compare the FEM and the REM.
- The Hausman test reports a high chi-squared statistic which indicates that some of the explanatory variables are correlated with the unobserved effects and the most appropriate method in this case is the FEM.
- Since the FEM eliminates the time invariant variable, the Hausman and Taylor method and FEVD technique appears to provide more robust results.

Empirical findings

Table 4. Estimated coefficients of CARICOM extra- regional trade

Dependent variable: total trade	Pooled OLS	REM	FEM	HT	FEVD
An exporters GDP	0.90 (24.19)***	0.72 (10.67)***	0.58 (5.13)***	0.59 (5.41)***	0.58 (5.13)***
An importers GDP	1.36 (36.55)***	1.10 (18.16)***	0.79 (7.39)***	0.94 (10.16)***	0.79 (7.39)***
An exporters population	0.26 (5.69)***	0.43 (4.74)***	2.76 (4.10)***	0.85 (3.34)***	2.76 (4.10)***
An importers population	-0.11 (2.87)***	0.11 (1.41)	2.07 (2.35)**	1.39 (2.48)**	2.07 (2.35)**
Trade complementarity index	0.01 (0.18)	-0.10 (1.75)*	-0.18 (2.72)**	-0.17 (2.74)***	-0.18 (2.72)**
Geographic Distance	-0.73 (14.16)***	-0.75 (5.92)***	Omitted	-1.98 (2.64)**	-1.80 (2.92)***
PTA _{ij}	-0.53 (5.47)***	-0.02 (0.11)	Omitted	6.56 (2.13)**	3.32 (2.22)**
Constant	-15.33 (24.51)***	-11.44 (9.36)***	-17.46 (5.71)***	-5.18 (1.25)	-3.69 (1.03)
Number of obs.	2860	2860	2860	2860	2860
Number of groups		286	286	286	
R-squared	0.70		0.22		0.88
adj. R-squared	0.70		0.13		0.86
Breusch-Pagan test (POLS vs. REM)	$\chi^2(1) = 3705.84$ (p-value = 0.000)				
Hausman test (FEM vs. REM)	$\chi^2(5) = 46.65$ (p-value = 0.000)				
F test (F) (POLS vs. FEM)	F(285, 2569) = 13.39 (p-value = 0.000)				
	Wald $\chi^2(7) = 775.19$ (p-value = 0.000)				

*denotes significance at 10%, **denotes significance at 5%, ***denotes significance at 1%.

Discussion and concluding remarks

- From the empirical evidence presented in this paper it can be argued that most of these non-reciprocal trade preferences accounted for a large share of total trade volume between CARICOM states and its extra-regional trade partners (namely the EU, Canada and the USA).
- This means that CARICOM's extra-regional trade is mostly explained by non-reciprocal trade preferences and other factors rather than strong natural trade complementarity.
- Notably, for several decades the region has been allowed duty free access into the markets of several developed countries which would have facilitated the expansion of trade from a relatively inefficient production system.
- In this context, the rapid erosion of trade preferences in important markets would naturally create a challenge for small developing countries such as the CARICOM in terms of realizing the benefits from trade liberalization.

Discussion and concluding remarks

- In particular, the speed at which the region is integrating into the world economy through EPAs and FTAs with major developed economies where strong trade complementarity do not exist would itself result in the marginalization of their participation in the global economy.
- The empirical evidence provided in this paper did not establish a strong natural trade partner for the CARICOM region but noted that at the very least there exists considerable scope for improving the structure of complementarity for CARICOM countries in relation to its major trade partners.

Discussion and concluding remarks

- Building trade complementarity for CARICOM countries in relation to major economies in the world is therefore essential to removing some of the fragilities that presently exists for Caribbean economies.
- Most of CARICOM countries output structure and production capabilities are concentrated in few areas of economic activities where these existing knowledge of production techniques is insufficient to develop comparative advantage in new product lines and hence develop a greater level of trade complementarity.
- CARICOM countries would need to identify new areas of economic activities which have the greatest scope for realizing comparative advantage based not only on natural factor endowment but on its ability to expand existing production capabilities by acquiring and mastering new production techniques and hence improving trade complementarity.

Discussion and concluding remarks

- In particular world hegemony appears to be shifting away from CARICOM's traditional trading partners (North America and EU) towards countries such as Brazil, Russia, India and China (BRICs) and the region would certainly have to take stock of these changes in reshaping its production and trade agenda to build a greater level of trade complementarity and capitalize on these dynamic changes in the global economy.

Thank you for your attention