Establishing CARICOM's Real Natural Trading Partner

R. Hosein and J. Khadan

Introduction

The Caribbean community (CARICOM) was established almost four decades ago to facilitate economic integration, functional cooperation and foreign policy coordination among member states[1]. The regional body evolved into the Caribbean Single Market and Economy (CSME) in 2006 and this further strengthened the integration movement by allowing the free movement of factors of production among member states. However, since its formation in 1973 the regional group has recorded limited success in improving intra-regional merchandise trade among its members. Notably, after 37 years of CARICOM intra-regional trade is still roughly 5% of total CARICOM trade.

Many commentators in the region have inquired about the rationale and success of economic integration among Caribbean countries in relation to its potential to improve intra regional merchandise trade. Farrell (2001) noted that "our basic motivation (for integration) is not economic at all … I believe that subconsciously we chose our partners first and then … began to worry consciously about the economics of the relationship" (p. 11-12). The integration efforts among Caribbean countries have largely been centered on market driven integration. In fact, CARICOM was initially intended to be an intra-regional free trade area with the implementation of a Common External Tariff (CET). It is for this reason that Wint (2005) noted that CARICOM is "doomed to be a low impact activity" (p. 138). Wint (2005) also noted that a major obstacle to increasing intra-regional trade flows is the "lack of trade complementarity of CARICOM economies" (p. 137). Worrell (2001, p. 435-436) also supported this notion arguing that "…There are few complementarities that would make for intra-regional trade (in CARICOM), and efforts to develop them have not been successful. Such intra-regional trade as there is has resulted, not from language affinity or tariff policy, but from cheap transport and cost differential between neighbours".

The primary objective of forming preferential trade arrangements is to improve the economic outcomes of its members. The success of preferential trade arrangements in promoting intra-regional trade is most realizable in an environment that is characterised by "situations where member states have comparative advantage in diverse products and exhibit strong trade complementarities" (Kemal, 2003). There are approximately 421 Regional Trade Arrangements (RTA) notified to the World Trade Organization (WTO) and the General Agreement on Tariffs and Trade (GATT) up until December 2008 and all signs are that these PTA's are here to stay. Therefore, given the dependence of CARICOM countries on trade for growth and development and in the context of the enormous expansion of globalization it may become pragmatic for small developing countries such as CARICOM to seek out their real natural trading partner.

This paper therefore assesses the real natural trading partner of selected CARICOM member states bilaterally and with four extra regional trade partners, China, Canada, the United States of

[1] CARICOM members are Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Grenada, Guyana, Haiti, Jamaica, Monserrat, Trinidad and Tobago, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, and Suriname.

America (USA) and the United Kingdom (UK). The rest of this paper is organised as follows. The next section discusses the natural trading partner hypothesis in relation to PTA's. Section 2 outlines a measure for trade complementarity and the following section provides some quantitative results for complementarity among selected CARICOM and non-CARICOM countries. Section 4 concludes the paper with recommendations for further research.

Section 1: The "Natural Trading Partner Hypothesis" and Preferential Trade Arrangements

The "natural trading partners" hypothesis and the notion that PTA among natural trading partners is more likely to improve welfare originated in Wonnacott and Lutz (1989), (Bhagwati and Panagariya 1996). There are various criteria that are identified by several studies for establishing a country's real natural trading partner. Prominent among them are the volume of trade, geographic proximity and trade complementarity. The notion that an initial high volume of trade between prospective members of a PTA will increase welfare outcomes originates with Lipsey (1960). Lipsey (1960) asserted that "...the larger are purchases of domestic commodities and the smaller are purchases from the outside world, the more likely it is that the union will bring gain." Wonnacott and Lutz (1989) also noted that if the prospective members of a preferential trade arrangement are initially important trading partners then the formation of a PTA among them "…will be reinforcing natural trading patterns, not artificially diverting them" (p. 69). Summers (1991) also supported the volume of trade criterion by arguing that if "blocs are created between countries that already trade disproportionately, the risk of large amounts of trade diversion is reduced". Park (1995) also noted that "the smaller intra-regional trade shares in total trade … the more likely the blocs would become trade diverting."

Wonnacott and Lutz (1989) also identified geographic proximity as another important criterion for identifying a natural trading partner[2]. Krugman (1993) also noted that there is a strong tendency for countries to trade with each other due to transportation and communication costs. Deardorff and Stern (1994) also asserted that if countries are located close to each other then the formation of a regional trade arrangement among those countries will raise economic outcomes as economies can benefit from low transportation and communication costs.

However, Bhagwati (1993) and Bhagwati and Panagariya (1996) comprehensively critique both criteria for defining a natural trading partner[3]. This paved the way for Schiff (2001) to redefine the natural trading partner hypothesis in terms of trade complementarity. Schiff (2001) asserted that trading partners are natural if their trading structure is characterised by complementarity. That is, if one country tends to import what their prospective partner exports.

[2] Wonnacott and Lutz (1989) also identified trade complementarity and the level of economic development as important criteria.
[3] See Bhagwati and Panagariya (1996) for a systematic critique of the volume of trade and the geographic criteria.

Testing the volume of trade criterion in relation to the

"Natural Trading Partner" hypothesis.

The following model below is developed to evaluate the volume of trade criterion and is built on the work of Schiff (1997). The model consists of a Home Country (HC), a Partner Country (PC) and the Rest of the World (ROW)[4]. It examines the welfare effect of forming a PTA between the HC and the PC at two different levels of the initial volume of trade between the HC and the PC. The HC's import demand is represented by D_A while the supply curves for the PC and the ROW is represented by S_B^0 and S_W^0 respectively. In a free trade environment, the HC's total import demand is defined as OM_4. The welfare for the HC is therefore equal to its consumer surplus (HLE), i.e. W_{FT} = HLE.

Assume that the HC imposes an MFN tariff on imports, then the supply curves for the PC and the ROW shifts leftward to S_B^1 and S_W^1 respectively. In this scenario, the HC's total imports falls to OM_3 of which OM_1 is sourced from the PC and M_1M_3 originates from the ROW. In this environment, the HC's welfare is made up of tariff revenues and consumer surplus. In particular, the HC's welfare is given by the area HKVE. HKVE is further decomposed into consumer surplus (HKF) and tariff revenues (FKVE). The tariff revenues accruing to the HC can also be further separated into tariff revenues on imports from the PC (FQJE) and the ROW (QKVJ). The associated welfare loss to the HC from imposing tariff barriers is given by the triangle KVL. Welfare for the HC in the MFN environment is therefore given as: W_{MFN} = HKVE, where $W_{FT} > W_{MFN.}$

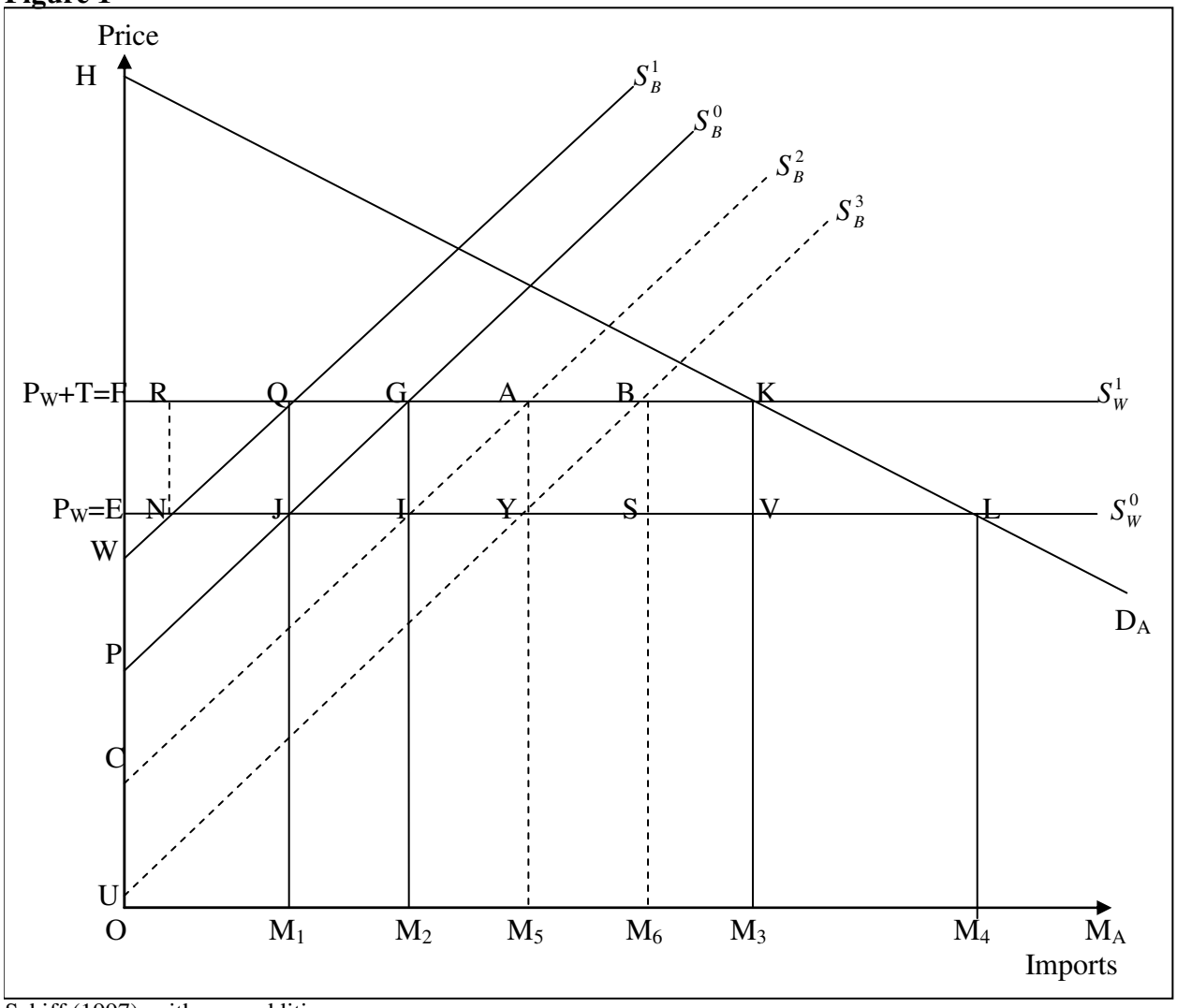
Next, assume that the HC proceed to form a PTA with the PC. The formation of this PTA will result in the removal of tariff barriers on imports from the PC. Tariffs on imports from the ROW are still maintained. In this environment, the PC's supply curve shifts to S_B^0 and the ROW supply curve is unchanged. The HC's total imports as compared to the MFN environment remains the same, but the HC imports of M_1M_2 is diverted from the ROW to the PC. The HC's welfare in this environment changes to HKF+GKVI, where consumer surplus remains the same as in the MFN scenario but since the HC removes tariff barriers on the PC they lose tariff on imports OM_2 of the amount FGIE. Welfare for the HC in the PTA environment is therefore given as: W_{PTA} = HKF+GKVI, where $W_{FT} > W_{MFN>} W_{PTA.}$ Also, since the PC's producer surplus is defined by the area FGJE then the welfare loss for the PTA as a whole is GIJ.

The natural trading partner hypothesis based on the volume of trade asserts that if initially there is a high intensity of bilateral trade between the HC and the PC, then formation of a PTA between those two countries will improve economic outcomes. Therefore, introducing a new supply curve for the PC in a pre-PTA environment such as S_B^2 at a higher level trade (M_5) would provide some insights into the welfare impact of forming the PTA between at a higher level of trade M_5. Assume that the HC and the PC forms a PTA at a higher volume of trade such as M_5 (as compared to M_1), then its supply curve will shift to S_B^3. In this situation, the welfare for the HC is now defined as HKF+BKVS and is less than welfare at a lower level of trade (M_2) as the

[4] The ROW is larger than the HC and the PC, and the HC is smaller than the ROW but is larger than the PC.

HC loses tariff revenues FBSE. Furthermore, assuming that the slope of the supply curve for the PC is constant, and the PC's producer surplus is now FBYE then GIJ is equal to BYS and the welfare loss to the PTA as a whole does not fall as asserted by the volume of trade argument for determining a real natural trading partner. See **Table** 1 for a summary.

Figure 1



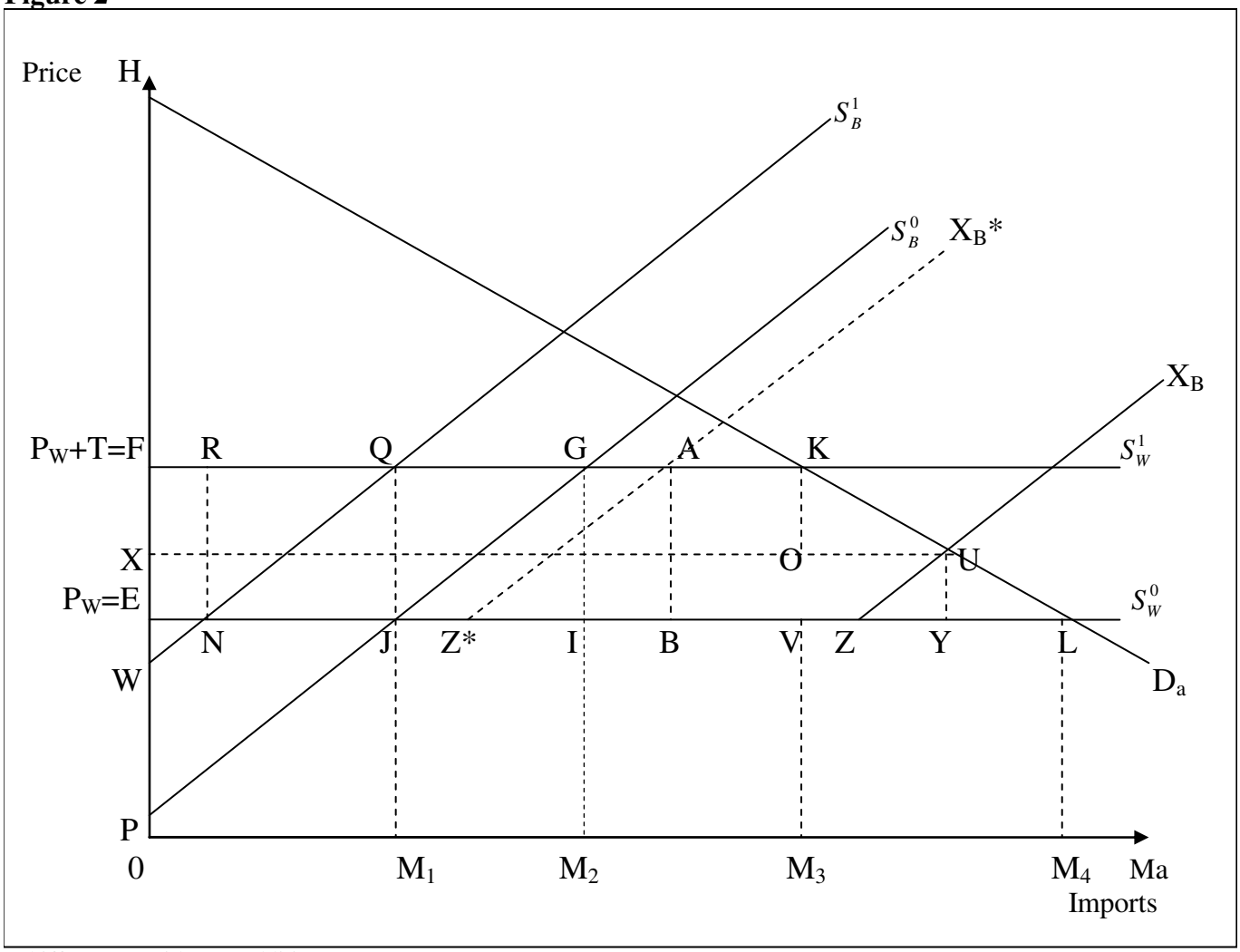
Schiff (1997), with own additions

Table 1: The impact of the volume of trade (at different levels of imports) in the PTA environment.		
The effects of forming a PTA between the HC and the PC	HC's initial imports from the PC in pre-PTA is M_1 while its import level in the PTA environment is M_2	HC's initial imports from the PC in pre-PTA increase to M_5 while its import level in the PTA environment is M_6
HC losses in tariff revenues	FGIE	FBSE, an increase by GBSI
PC gains in producer surplus	FGJE	FBYE
Loss to the PTA as a whole	GIJ	BSY and (GIJ = BSY)

Trade complementarity and the "Natural Trading Partner" hypothesis

A major limitation associated with the previous standard analysis is that it ignores the relationship between the PC and the ROW. Schiff (2001) introduces this relationship to the trading situation and shows that in this new environment the pre-PTA volume of trade has no implications for determining the welfare of a prospective PTA. The same three countries are considered in this new model.

Figure 2



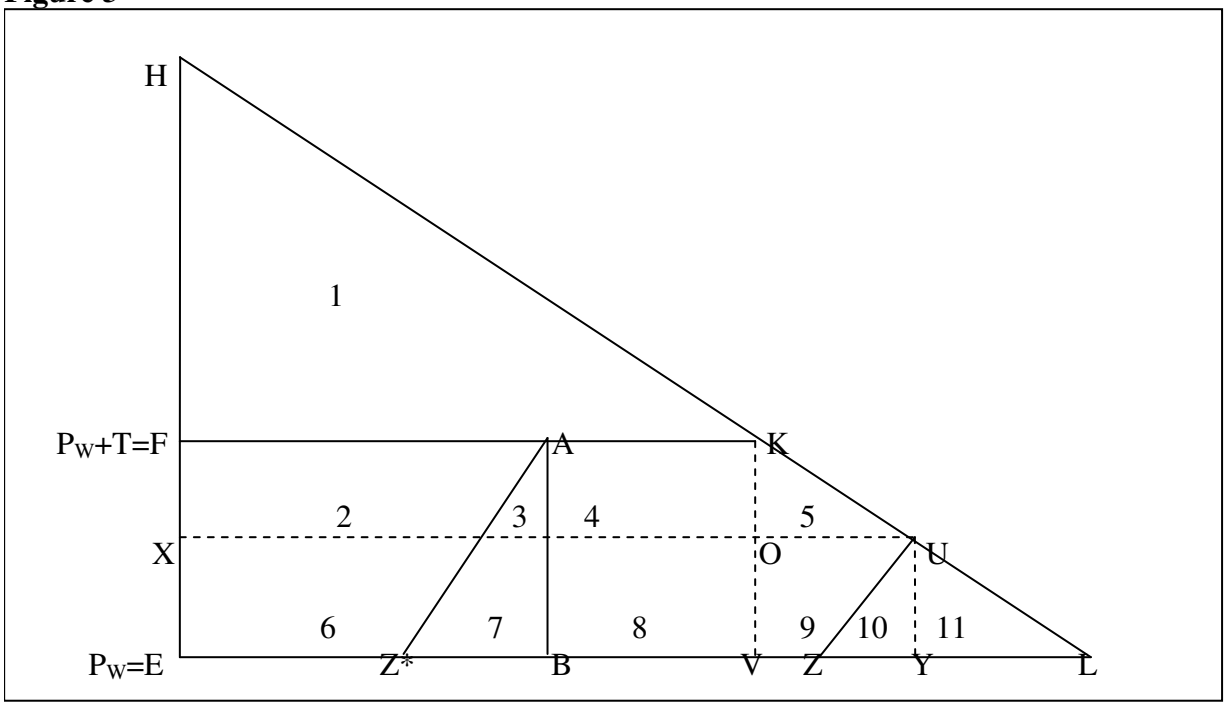
Schiff (2001), with own additions

In a situation where the PC exports to the ROW, the export supply curve of the PC to the HC is determined by the relative prices that the PC exporters receive in the two markets[5]. Specifically, when the price in the HC's market is less than the price in the ROW's market, the PC will supply all its export to the ROW and none to the HC. This segment of the PC's supply curve to the HC is thus defined as the vertical section 0E. The second segment of the PC supply curve to the HC

[5] See Schiff (2001) for a discussion on the situation where the PC imports from the ROW.

is defined as the horizontal segment from point E to (say) point Z[6]. This segment refers to a situation where there is equality in the price that the PC exporters receive in both markets, when this equality arises the PC exporters are indifferent in terms of the price they receive in the two markets and thus the volume of exports from the PC to the HC is indeterminate. The third segment of the PC's export supply curve to the HC is determined when the price in the HC's market is greater than the price in the ROW's market. This section is given by the upward sloping segment from (say) point Z to X_B. Therefore, the PC's export supply curve to the HC's market is X_B and not S_B^0.

Figure 3



Assume an initial environment where the HC imposes an MFN tariff on imports. In this environment, the PC exporters receive the world price on its export to the ROW's market. The PC exporters will also receive the world price on its exports to the HC as the tariff revenues on all imports entering the HC remain in the HC. Therefore, the PC is indifferent in terms of the price it receives in both markets. As such in the pre-PTA environment the volume of trade between the HC and the PC is indeterminate and cannot provide a basis on which to analyse the welfare effects from forming a PTA between the HC and the PC.

Next, assume that the HC and the PC forms a PTA. As in the standard analysis the HC imports from the PC increases by M_1M_2 at a price P_W+T. Prior to the formation of the PTA, the PC

[6] The PC's export supply curve begins it upward slope at various locations in the PTA environment. In particular, the PC's export supply curve can begin its upward slope between K and L (say) at point U (as illustrated in the figure 2), at point L or to the right of L and it can also begin its upward slope to intersect the horizontal segment FK to the left of point K. Where the PC's export supply curve begins its upward slope will be determined by its export capacity.

exporters receives P_W on it exports to the HC's and the ROW's market. But when the PTA between the HC and the PC is formed, the PC exporters can now obtain P_W+T in the HC's market. Thus, the PC exporters will shift all of its exports to the HC's market. In this environment, the PC's export supply curve to the HC will be identical to S_W^0 up to the point where all exports originating from the PC are sold in the HC's market and none in the ROW's market or exports equal to M_4. That is, at such a point the PC's export supply curve will begin its upward slope and this point will be important for determining welfare for the HC and the PC in the PTA environment.

The possibility that the price in the HC's market will remain at P_W+T or change will be determined by the export capacity of the PC to satisfy the HC's import demand in the PTA environment[7]. This will have an impact on the welfare outcomes.

In this regard, three permutations are possible.

1. The PC export supply curve intersects the HC's import demand curve at point L or to the right of L.
2. The PC export supply curve intersects the HC's import demand curve at point U between points K and L.
3. The PC export supply curve intersects the HC's import demand curve on the horizontal segment FK to the left of point K.

The first permutation is described at the most desirable situation and is analogous to free trade in terms of the welfare gains for the HC. In this scenario, the PC's export supply curve will begin its upward slope at point L and the PC is able to satisfy the HC's import demand at the world price (P_W). The HC's pre-PTA welfare is defined by the area 1+2+3+4+6+7+8 of which area 1 is consumer surplus and area 2+3+4+6+7+8 is total tariff revenues on imports from the PC and the ROW[8]. In this permutation of the PTA, the HC initially loses the area 2+3+4+6+7+8 in tariff revenues as it imports OM_4 from the PC where no tariffs are imposed. However, the HC recoups the area 2+3+4+6+7+8 as part of the consumer surplus in this permutation (read from figure 3). Furthermore, the HC gains the area KLV (5+9+10+11) as part of its consumer surplus due to an increase in imports (VL) at a lower price P_W. Thus, the HC's total welfare equals its consumer surplus HLE. The PC's welfare remains the same, since its exporters continue to reap the same price (P_W) in the PTA environment as they did in the pre-PTA environment.

The second permutation occurs when the PC's export supply curve intersects the HC's import demand curve between point K and L (say) at point U. In this permutation, the PC is also able to satisfy more than the HC's pre-PTA imports demand so that the HC initially loses tariff revenues amounting to 2+3+4+6+7+8 on account of the PTA. However, the price facing consumers in the HC's market falls from P_W+T to X (figure 2). This means that the HC's consumer's surplus will

[7] The higher price in the HC's market following integration is what motivates the PC exporters to switch its exports from the ROW's market to the HC's market. Therefore, the PC exporters will shift all its exports to the HC's market for prices in the HC's greater than or equal to P_W following integration.

[8] Since the pre-PTA volume of trade between the HC and the PC cannot be determined then there is no way to determine how much of the tariff revenues (2+3+4+6+7+8) originates from either the PC or the ROW.

increase by 2+3+4+5. Therefore, the impact on the HC's welfare is ambiguous and is determined by the difference in the HC's losses in tariff revenues and its gains in consumer surplus. According to Schiff (2001), this results in both a net gain and a net loss[9]. The net gain is given by area 5 and is due to the increase imports from V to Y on account of a lower price X. The net loss is given by area 6+7+8 and is due to the loss in tariff revenues (2+3+4+6+7+8 of which 2+3+4 is recouped by the HC) on imports from E to V. In the PTA environment, under this second permutation the PC exporters receive a higher price X as compared to the pre-PTA price (P_W). Consequently, the PC gains producer surplus amounting to 6+7+8+9 and the PTA as a whole gains 5+9, (read from figure 3).

The third permutation is the least desirable case and occurs where the PC's export supply curve intersects the horizontal segment of FK to the left of point K (figure 2). In this situation, the PC is unable to at least meet the HC's pre-PTA import demand. In this permutation, the price facing the HC consumers will continue to be P_W+T. To illustrate the welfare effects in this permutation, consider a hypothetical situation where the PC's export supply curve (X_B*) begins its upward slope at Z* and intersects the horizontal section FK at point A. The HC will lose tariff revenues of the amount (2+3+6+7) on imports EB from the PC. If the HC were to satisfy its pre-PTA import demand ($0M_3$), it will have to import BV from the ROW and will collect 4+8 in tariff revenues. The producer surplus to the PC will also increase by 2+6 due to the relatively higher price its exporters receive (read from figure 3). Assuming that the PC's export supply curve in the standard analysis S_B^0 (in figure 1) is parallel to the PC's export supply curve in Schiff's analysis (X_B, in figure 2), then the loss to the PTA as a whole will be equal in both analyses, this is given as GIJ (figure 1). The welfare implications for the PTA in this scenario will be negative since the PTA loses from trade diversion. The **Table 2** below provides a summary of the analysis.

Table 2: Welfare implications of a PTA between HC and PC with the PC having export capacity to the ROW.

	Pre-PTA (MFN) Environment	Permutation 1	Permutation 2	Permutation 3
Price to the consumer in HC	P_W+T	P_W	X	P_W+T
Price to the consumer in ROW	P_W	P_W	P_W	P_W
Price PC exporters receive from the HC	P_W	P_W	X	P_W+T
Price PC exporters receive from the ROW	P_W	P_W	P_W	P_W
Tariff revenues for the HC	2+3+4+6+7+8	(2+3+4+6+7+8)	(2+3+4+6+7+8)	4+8
Consumer surplus for the HC	1	1+2+3+4+5+6+7+8+9+10+11	1+2+3+4+5	1
Gains to the HC		5+9+10+11	2+3+4+5	
Losses to the HC			2+3+4+6+7+8	2+3+6+7
Gains to the PC			6+7+8+9	2+6
Losses to the PC				
PC exports to HC	Indeterminate	M_4	M_3 to M_4 (Y)	Less than M_3 (B)
Welfare Implication		Positive and equal to KLV	Increasingly Positive	Negative

The preceding discussion therefore establishes that a PTA between countries that have complementarity in their trading structure is more likely to be welfare enhancing as in

[9] The net loss or net gain depends on where X_B is located ($M_3 < X_B < M_4$), Schiff suggested that the closer it is located to L the more the HC gains and vice versa.

permutation 1 and permutation 2. Therefore, trade complementarity appears to be a more robust criterion for defining a country's real natural trade partner. An empirical methodology to measure trade complementarity between countries is outlined in the following section.

Section 2: Measuring trade complementarity

A measure of trade complementarity can be obtained by decomposing the trade intensity index into a trade complementarity index and a trade bias index. The trade intensity index takes into account all the factors influencing the intensity of trade between two countries. However, Drysdale and Garnaut (1982, p. 68), noted that a major limitation associated with the value of the trade intensity index in its aggregated form is that, "it fails to make allowance for the varying commodity composition of countries' foreign trade. Where commodities are not substitutable for each other, opportunities for bilateral trade are limited by the degree of complementarity in the commodity composition of one country's exports and the other's imports."

Drysdale (1967) noted that the trade intensity index can be separated into a trade complementarity index which measures the traditional trade determining factors and the trade bias index which accounts for all the other factors influencing trade. As (Yamazawa, 1970) explains,

"High trade intensity reflects such various factors as the strong complementarity in comparative advantage structures between the pair of countries, smaller geographical and psychic distances, and mutually favourable trade agreements between them, and low intensity the contrary situations…Various factors mentioned above are reflected in the value of intensity of trade. If the effects on trade intensity of the degree of complementarity in comparative advantage structures are separated from the effects of other factors, it enables us to identify traditional trade-determining factors and their overtime changes", (pg. 62-63).

A trade intensity index (I_{ij}) can be shown as the product of a trade complementarity index (C_{ij}) and a trade bias index (B_{ij}).

$$I_{ij} = C_{ij} * B_{ij}$$

The trade intensity index of country *i's* export trade with country *j* takes the following form:

$$(I_{ij}) = \frac{X_{ij}}{X_{iw}} / \frac{X_{wj}}{X_{ww}} \quad \text{---------- (1)}$$

Where X_{ij} - refers to country i exports going to country j

X_{wj} - refers to world exports going to country j

X_{iw} - refers to country i's export to the world

X_{ww} - refers to world trade.

The trade intensity index has a theoretical range of zero to infinity. A trade intensity index greater than unity indicates that trade is becoming more intensive between the two countries while the opposite holds when the trade intensity index takes on a value less than unity.

The trade intensity index is decomposed below into a trade complementarity index and a trade bias index following Yamazawa (1970). Yamazawa (1970, p. 63-64) noted that trade among countries in the world are largely determined by the structure of comparative advantage and disadvantage of those countries in relation to the world. That is, a country will tend to export those commodities it has a comparative advantage in producing and import those commodities it has a comparative disadvantage in producing. Assume a homogenous product *k* for which there is negligible transport costs and trade impediments in its trade between country i and country j. Further assume that country i export commodity *k* to country j. Then on the basis of comparative advantage, the export of commodity *k* from country i to country j is expected to be determined by the product of country j's total imports of *k* from the world, and the share of country i's exports of *k* in world exports of *k*.

It is expressed as follows:

$$\overline{X}^{K}{}_{ij} \equiv \left(\frac{X^{K}{}_{iw} * X^{K}{}_{wj}}{X^{K}{}_{ww}} \right) \text{ ---------- (2)}$$

Where:

$X^{k}{}_{iw}$ - is country i's export of commodity *k* to the world,
$X^{k}{}_{wj}$ - is the world exports of commodity *k* going to country j,
$X^{k}{}_{ww}$ - is total world exports of commodity *k*.

Summing across the expected value of all *k* commodities, yields the expected value of total exports of country i going to country j as:

$$\overline{X}_{ij} = \sum_{K} \overline{X}^{K}{}_{ij} \text{ ---------- (3)}$$

The trade complementarity index is then obtained by substituting the expected value of trade ($\overline{X}_{ij}$) for the actual one (X_{ij}) in the trade intensity index, which yields the trade complementarity index as:

$$C_{ij} = \frac{\overline{X}_{ij}}{X_{iw}} / \frac{X_{wj}}{X_{ww}} \text{ ---------- (4)}$$

This can be further simplified as follows.

Substituting for $\overline{X}^{K}{}_{ij} \equiv \left(\frac{X^{K}{}_{iw} * X^{K}{}_{wj}}{X^{K}{}_{ww}} \right)$ in equation (4) and simplifying we get;

$$C_{ij} = \sum_K \left(\frac{X^K{}_{ww}}{X_{ww}} \right) * \left(\frac{X^K{}_{iw}}{X_{iw}} / \frac{X^K{}_{ww}}{X_{ww}} \right) * \left(\frac{X^K{}_{wj}}{X_{wj}} / \frac{X^K{}_{ww}}{X_{ww}} \right)$$

The trade complementarity index for a product *k* of an exporting country i and an importing country j is therefore defined by the sum of the products of country i's export specialization, country j's import specialization and the share of commodity *k* in world exports. The export specialization for country i has the form of the Balassa's revealed comparative advantage index and country j's import specialization also takes on a similar structure.

The trade complementarity index also has a theoretical range from zero to infinity. A value of the trade complementarity index greater than unity indicates that country i's export specialization closely matches country j's import specialization. A value less than unity indicate that they match poorly.

The other influences affecting the intensity of trade between country i and country j is captured by the special country bias index. This index takes into account factors such as language differences, tastes and preferences, policy of the trading partner, transport cost and product differentiation. It is obtained as follows:

Given that $(I_{ij}) = (C_{ij}) * (B_{ij})$, then $B_{ij} = \frac{I_{ij}}{C_{ij}}$ ---------- (5)

Substituting for I_{ij} and C_{ij} in (5) above and simplifying we get:

$$B_{ij} = \left[\frac{\left(\frac{X_{ij}}{X_{iw}} / \frac{X_{wj}}{X_{ww}} \right)}{\left(\frac{\overline{X}_{ij}}{X_{iw}} / \frac{X_{wj}}{X_{ww}} \right)} \right] = \left(\frac{X_{ij}/X_{iw}}{X_{wj}/X_{ww}} \right) * \left(\frac{X_{wj}/X_{ww}}{\overline{X}_{ij}/X_{iw}} \right) = \left(\frac{X_{ij}/X_{iw}}{\overline{X}_{ij}/X_{iw}} \right) = \left(\frac{X_{ij}}{X_{iw}} \right) * \left(\frac{X_{iw}}{\overline{X}_{ij}} \right) = \frac{X_{ij}}{\overline{X}_{ij}} \quad \text{-------- (6)}$$

In this context, the degree of special country bias is defined as the divergence between the expected value of trade and the actual value of trade.

$$B_{ij} \equiv \frac{X_{ij}}{\overline{X}_{ij}} = \frac{X_{ij}}{\sum_K \overline{X_{ij}}^K} = 1 / \sum_K \left(\frac{X^K{}_{ij}}{X_{ij}} \right) * \frac{1}{B^K{}_{ij}} \quad \text{---------- (7)}$$

The trade bias index also has a theoretical range from zero to infinity. A value of the trade bias index greater than unity indicates that country *i* has a special country bias towards country *j*. A summary of these three indices are provided in the **Table** below.

Table 3: Various Trade Related Indices			
Index	Formula	Theoretical range	Interpretation
Trade intensity	$I_{ij} = \frac{X_{ij}}{X_{iw}} / \frac{X_{wj}}{X_{ww}}$	$0 < I_{ij} < \infty$	$I_{ij} > 1$ - Trade is becoming more intensive. $I_{ij} < 1$ - Trade is becoming less intensive.
Trade complementarity	$C_{ij} = \sum (\frac{X_{ww}^{k}}{X_{ww}}) * (\frac{X_{iw}^{k}}{X_{iw}} / \frac{X_{ww}^{k}}{X_{ww}}) * (\frac{X_{wj}^{k}}{X_{wj}} / \frac{X_{ww}^{k}}{X_{ww}})$	$0 < C_{ij} < \infty$	$C_{ij} > 1$ - Country i's export specialization matches country j's import specialization closely. $C_{ij} < 1$ - Country i's export specialization matches country j's import specialization poorly.
Trade bias	$B_{ij} \equiv \frac{X_{ij}}{\overline{X}_{ij}} = \frac{X_{ij}}{\sum_{K} \overline{X_{ij}}^{K}} = 1 / \sum_{K} \left(\frac{X^{K}_{ij}}{X_{ij}} \right) * \frac{1}{B^{K}_{ij}}$	$0 < B_{ij} < \infty$	$B_{ij} > 1$ - Country i has a special country bias towards country j. $B_{ij} < 1$ - Country i does not have a special country bias towards country j.

Section 3: Trade complementarity among CARICOM and non-CARICOM countries

This section provides some quantitative insights into the pattern of trade among CARICOM and non- CARICOM countries.

Table 4: Trade intensity index for selected CARICOM and extra-CARICOM countries, (2000, 2005 and 2008).

Exports from \ Exports to	Trinidad and Tobago	Jamaica	Barbados	Guyana	St. Lucia	China	Canada	USA	UK
Trinidad and Tobago		171.08 182.66 156.88	361.88 333.26 225.22	344.83 404.25 219.46	249.21 134.77 29.61	0.00 0.01 0.02	0.36 0.37 0.42	2.52 3.82 3.76	0.32 0.16 0.42
Jamaica	35.83 26.77 19.49		44.55 49.13 33.29	34.38 23.96 37.03	34.92 40.03 7.16	0.09 1.51 0.02	2.78 6.58 4.31	2.12 1.67 3.29	2.16 2.28 2.18
Barbados	288.55 263.35 196.73	153.63 141.02 91.57		394.67 244.61 387.72	965.77 951.59 201.31	0.01 0.05 0.07	0.55 0.61 0.92	0.85 0.88 1.72	2.49 1.87 2.14
Guyana	94.90 134.30 81.14	117.66 167.18 125.12	131.49 279.33 154.23		103.18 122.02 17.93	0.04 0.19 0.35	5.95 5.41 10.52	1.69 1.01 1.14	3.59 4.16 3.99
St. Lucia	35.91 547.58 482.52	0.55 2.02 9.53	825.95 776.56 651.70	119.82 199.48 130.80		0.02 0.05 0.14	0.18 0.11 0.14	1.00 0.91 2.78	9.62 5.52 3.57

Source: UN Comtrade (2010) and own calculations.

The data in **Table** 4 above shows that the listed CARICOM member states, Trinidad and Tobago, Barbados, Guyana and St. Lucia have extremely high trade intensities with each other. Although Jamaica's trade intensity with the other listed CARICOM states is relatively lower the other CARICOM economies in the Table it is still everywhere above unity. Jamaica and Guyana amongst the listed CARICOM countries had trade intensities above unity with Canada and basically all the listed CARICOM member states had trade intensity scores above unity with the USA and UK with the exception of Trinidad and Tobago in the case of the UK.

Extremely high trade intensity values can be misleading and from a natural trading partner perspective one has to look at trade complementarity. A reference to the trade complementarity indices reveal that for the snapshot years 2000, 2005 and 2008 that CARICOM economies appears to generally have trade complementarity with each other, but these are only marginal. The strongest set of trade complementarities occur between Trinidad and Tobago and Jamaica, Barbados, Guyana and St. Lucia. This is not surprising as these economies have very different structures of production. Table 5 below provides some information on the structure and composition of CARICOM economies for 2005-2009.

Table 5: Productive structure and composition, 2005-2009, (Percentage in local currency at constant prices)

	Agriculture [a]	Mining, quarrying and hydrocarbons	Manufacturing [b]	Construction	Services [c]
Trinidad and Tobago	0.5	40.5	8.1	7.8	43.3
Jamaica	5.0	4.0	8.7	8.5	73.7
Barbados	4.5	0.8	5.6	8.8	80.2
Guyana	30.1	6.8	6.1	10.4	44.8
St. Lucia	3.5	0.5	6.2	7.5	82.4

Source: UNECLAC (2010).
[a] Includes hunting, forestry and fishing.
[b] In Belize includes oil production.
[c] Includes electricity, gas and water; wholesale and retail trade; transport and communication; finance; communal, personal and social services; and general government.

Regarding trade complementarity with the listed extra-regional trading partners, these were not impressive. Certainly as concerns the listed intra-regional trading partners and China no existing trade complementarity seems to exist. As concerns Canada the figures are a little more encouraging. Specifically, Trinidad and Tobago and Barbados trade complementarity with Canada although less than unity seems upwardly mobile, whilst Jamaica's averaged 2.13 between 2005 and 2008. Both Guyana and St. Lucia have trade complementarity indices with Canada that are in excess of unity. Barbados, Guyana and St. Lucia also have trade complemenatrity with the UK. Surprisingly, although very close to unity the average trade complementarity index value of each listed CARICOM member state with the USA is less than unity.

Table 6: Trade complementarity index for selected CARICOM and extra-CARICOM countries, (2000, 2005 and 2008).

Exports to / Exports from	Trinidad and Tobago	Jamaica	Barbados	Guyana	St. Lucia	China	Canada	USA	UK

Trinidad and Tobago		3.67 3.89 3.34	3.19 2.87 2.56	2.33 2.90 1.83	3.13 3.62 1.86	0.78 0.75 0.85	0.49 0.58 0.67	0.83 1.08 0.99	0.62 0.73 0.84
Jamaica	0.36 0.55 0.89		0.76 1.02 1.82	0.72 1.07 1.29	0.65 1.13 0.26	0.44 1.17 0.80	1.55 2.17 2.08	0.75 0.55 0.68	0.79 0.75 0.73
Barbados	1.13 1.41 1.26	3.21 3.26 2.30		3.18 3.61 2.25	3.28 4.27 1.20	0.67 0.53 0.52	0.85 0.80 0.94	0.73 0.92 0.95	1.00 1.14 1.19
Guyana	0.90 1.82 1.06	2.47 2.54 2.19	1.51 1.86 1.38		1.53 1.34 0.22	0.52 0.54 0.47	0.87 1.04 1.41	0.66 0.79 0.67	1.51 1.43 1.73
St. Lucia	0.60 1.20 1.12	1.00 1.93 1.86	1.66 2.55 2.81	0.95 2.41 1.87		0.64 0.52 0.59	1.20 1.17 1.14	1.06 0.98 0.94	1.44 1.37 1.24
Source: UN Comtrade (2010) and own calculations.									

Not surprisingly the trade bias index was very high as regards CARICOM member states trade with each other, except in the case of bilateral trade between St. Lucia and Jamaica, and even here it was above unity in 2005 and in 2008. With the extra-regional market the trade bias with CARICOM is negligible whilst that with the USA, Canada and UK is strong in most cases.

Table 7: Trade bias index for selected CARICOM and extra-CARICOM countries, (2000, 2005 and 2008).

Exports to / Exports from	Trinidad and Tobago	Jamaica	Barbados	Guyana	St. Lucia	China	Canada	USA	UK
Trinidad and Tobago		46.60 46.92 46.98	113.29 115.94 87.98	147.95 139.56 119.87	79.60 37.19 15.88	0.00 0.01 0.02	0.73 0.63 0.62	3.02 3.55 3.78	0.51 0.22 0.50
Jamaica	98.47 49.03 21.85		58.49 48.25 18.32	47.64 22.37 28.80	53.66 35.55 27.04	0.20 1.28 0.02	1.79 3.03 2.07	2.81 3.03 4.84	2.74 3.05 2.98
Barbados	255.13 187.01 155.79	47.87 43.28 39.89		123.99 67.68 172.08	294.52 222.82 167.09	0.02 0.09 0.14	0.65 0.76 0.98	1.17 0.96 1.80	2.50 1.64 1.80
Guyana	104.98 73.93 76.52	47.68 65.87 57.15	86.97 150.55 111.42		67.51 90.95 82.34	0.07 0.34 0.75	6.84 5.22 7.45	2.57 1.28 1.71	2.38 2.91 2.31
St. Lucia	60.29 456.52 429.16	0.55 1.05 5.11	497.70 304.85 231.79	126.00 82.67 69.82		0.03 0.10 0.23	0.15 0.10 0.12	0.94 0.94 2.95	6.68 4.02 2.89
Source: UN Comtrade (2010) and own calculations.									

Section 4: Conclusion

Efficient resource utilization requires that economies export those commodities intensive in the use of their abundant factor of production and import those commodities which call for factor proportions in the opposite direction. In this regard, and following the material developed in the paper, trade complementarity emerged as the cornerstone argument for determining the real natural trading partner for an economy.

This paper established that even when the trade bias is excluded, CARICOM economies have moderately high degree of trade complementarity. In the context of the rapidly globalizing world characterized by tumbling tariffs, CARICOM economies would need to ascertain their real natural trading partner. In this regard follow up work to this paper would need to have a much broader empirical base perhaps extending to all CARICOM countries and some of the Latin American and African countries as extra-regional partners.

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