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# Trade, Economic and Welfare impacts of the CARICOM-Canada Free Trade Agreement<sup>1</sup>

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**Abstract:** This paper estimates the trade, revenue and welfare effects of the proposed Caribbean Community (CARICOM)-Canada FTA on CARICOM countries using a partial equilibrium model. The welfare analysis also takes into account the Economic Partnership Agreement (EPA) which was signed in 2008 between the CARIFORUM (CARICOM and the Dominican Republic) countries and the EU. The Revealed Comparative Advantage (RCA) index, trade complementarity index and transition probability matrices are employed to examine the dynamics of comparative advantage for CARICOM countries exports to Canada. The results obtained from the partial equilibrium model indicate adverse revenue and welfare effects for CARICOM member states. The results from various trade indices employed do not provide evidence to suggest that a FTA between CARICOM countries and Canada can improve trade outcomes.

**Keywords:** CARICOM-Canada FTA, partial equilibrium model, welfare effects, comparative advantage

**JEL classification codes:** F13, F14, F17

## 1. Introduction

The economic effects of North-South FTAs do seem to outline positive benefits for small developing countries compared to South-South FTAs (Schiff 1997 and El Agra 1999). Indeed, most South-South FTAs involve countries with similar factor endowments and economic constraints which hinder developing countries from realizing the gains from freer trade. Schiff (1997) and Schiff and Winters (2003) have argued that North-South FTAs offer more benefits to developing countries. In particular, Schiff and Winters (2003, 15) noted that:

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‘If a developing country is going to pursue regionalism, it will almost always do better to sign up with a large rich country than with a small poor one. In trade terms, a large rich country is likely to be a more efficient supplier of most goods and a source of greater competition for local producers.’

North-South trade arrangements can facilitate growth in developing countries by providing their south counterparts with access to larger markets, greater transfer of technology and positively influencing total factor productivity in developing countries (Grossman and Helpman 1991, Coe and Hoffmaister 1999, Schiff and Wang 2003).<sup>3</sup> On the other hand, Cernat (2003) noted that trade arrangements among developing countries can be used as a mechanism to assist small countries in the globalization process. Regionalism can facilitate the building of institutional capacity whereby government bureaucrats can learn a significant amount of the ‘tricks of the trade’ required for engaging the multi-lateralization process. However, previous studies have shown that North-South FTAs results in adverse trade, revenue and welfare outcomes for developing countries (Greenaway and Milner 2006 and Nicholls Nicholls and Colthrust 2001). This paper explores this issue by using a partial equilibrium model to estimate the trade, revenue and welfare effects of the proposed CARICOM-Canada FTA on CARICOM countries.

The pending CARICOM-Canada FTA is the second North-South trade arrangement for CARICOM countries, which is expected to replace the existing Caribbean Canada Trade Agreement (CARIBCAN). The main feature of the CARIBCAN is that it offers preferential duty free access to the Canadian market for a broad range of goods produced within the Commonwealth Caribbean region. This non-reciprocal trading relationship between CARICOM and Canada is not compatible with the World Trade Organization (WTO) rules and it is expected to expire in December 2013 (WTO 2013). Thus, in order for the CARICOM countries to obtain duty free access in the Canadian market another trade arrangement that is compatible with WTO rules has to be ratified between both parties (see Table A1 for CARICOM’s trade with the Canada). It is against this backdrop that both countries have agreed to explore the prospects of forming a FTA. The formation of the CARICOM-Canada FTA is likely to create both opportunities and challenges for CARICOM countries. In particular, the FTA would secure duty free access for CARICOM countries merchandise exports to the Canadian market. In addition, the CARICOM-Canada FTA would expand duty free market access to trade in services and provide CARICOM countries with development assistance. The implementation of the CARICOM-Canada FTA will result in liberalization of tariffs on all imports from Canada. The removal of tariff barriers on regional imports is expected to result in adverse implications in terms of declining tariff revenues, regional production and intra-CARICOM trade due to increased competition from Canadian imports (Girvan 2009). The contribution of this paper is twofold; first, to the best of the author’s knowledge this is the first attempt to estimate the trade and welfare outcomes for CARICOM countries associated with the proposed CARICOM-Canada FTA. Second, it provides relevant empirics for policy makers to streamline policies in

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<sup>3</sup> See also Behar and Crivillé (2010), Mayda and Steinberg (2007), Arora and Vamvakidis (2004) and Vamvakidis (1998).

order to benefit from or mitigate any potential losses from the pending FTA. The rest of this paper is structured as follows. Section 2 examines the economic pre-conditions of the proposed CARICOM-Canada FTA. Sections 3 and 4 outline a partial equilibrium model and results, respectively. Section 5 concludes the paper.

## 2. Economic pre-conditions of the proposed CARICOM-Canada FTA

As a country remove barriers to trade with respect to a partner country (or the world); there is likely to be a process of adjustment occurring in the country's production structure. The country should begin to specialize in those sectors in which it has a comparative advantage relative to the trading partner. As a result, an important ingredient for the success of a FTA depends on the prospective members having a strong comparative advantage in different products (Kemal 2004, Pitigala 2005). Recent theoretical work by Schiff (2001) on the natural trading partner hypothesis has established that a high level of trade complementarity among prospective members of a FTA should increase the likelihood that the FTA will be welfare enhancing. Therefore, evaluating the pattern and persistence of comparative advantage and trade complementarity are very important indicators for determining the success of the proposed FTA between CARICOM countries and Canada.

### Revealed Comparative Advantage Index and Transition Probability Matrix

The most popular measure of comparative advantage in the literature was developed by Balassa (1965) and has been used in many studies to determine the comparative advantage structure of countries (for example, Fertő and Hubbard 2003, Hinloopen and van Marrewijk 2004, Bojnec and Fertő 2006, Sinanan and Hosein 2012). The RCA index also known as the Balassa index is outlined as:

$$RCA_{ij} = \frac{X_{ij} / X_{it}}{X_{wj} / X_{wt}}$$

Where:  $RCA_{ij}$  – the RCA index for country  $i$  in commodity  $j$ ,

$X$  – exports,

$w$  – world,

$i$  – country,

$j$  – commodity,

$t$  – a set of countries.

The RCA index compares the share of exports of commodity  $j$  in country  $i$ 's total exports to the share of exports of commodity  $j$  in the world's total exports (world accounts for all other supply sources). The notion is that if the share of exports for commodity  $j$  in country  $i$ 's total exports is

larger than the share of exports for commodity j in world total exports, then country i is considered to have a comparative advantage in commodity j. The RCA index has a theoretical range from a value greater than zero (0) to less than infinity ( $\infty$ ) which is divided into two groups:

- $0 < RCA_j < 1$  – the country has a comparative disadvantage in commodity j,
- $1 < RCA_j < \infty$  – the country has a comparative advantage in the commodity j.

Hinloopen and van Marrewijk (2001) provided a further decomposition of the theoretical range of the RCA index by dividing the latter range into 3 parts. The decomposition of the theoretical range of the RCA index permits the identification of weak, medium and strong comparative advantage for the export industries of a country (Table 1). The persistence or mobility of a country’s comparative advantage over time can be examined by applying a transition probability matrix and Markov chains to the classification of the RCA index (see Proudman and Redding 2000, Brasili, Epifani and Helg 2000, Hinloopen and van Marrewijk 2001, Hosein 2008, Sinanan and Hosein 2012).

<b>Table 1: Categorization of the Balassa Index</b>		
States	Range	Interpretation
Class a	$0 < RCA < 1$	Industries with a comparative disadvantage.
Class b	$1 < RCA < 2$	Industries with a weak comparative advantage.
Class c	$2 < RCA < 4$	Industries with a medium comparative advantage.
Class d	$4 < RCA$	Industries with a strong comparative advantage.

Source: Hinloopen and van Marrewijk (2001).

A discrete time Markov chain is characterized by a finite set of states at discrete time intervals and probabilities ( $p_{ij}$ ) for transition between these states. The transition probability ( $p_{ij}$ ) is the probability of a process being in state i at time t and moving to state j at time t+1. The matrix of probabilities ( $p_{ij}$ ) for all states is usually referred to as the transition probability matrix of the Markov chain. A Markov chain can be formally expressed as:

$$\begin{aligned}
 P\{X_{t+1} = j | X_0 = i_0, \dots, X_{t-1}, X_t = i\}, \\
 = P\{X_{t+1} = j | X_t = i\}
 \end{aligned}$$

In terms of the RCA index, a transition probability matrix can shed light on the evolution of comparative advantage from one time period to another period for an economy. The transition probability matrix determines the probability of a commodity moving from one state (say, comparative disadvantage (a)) to another state (say, strong comparative advantage (d)) from an initial time period (t) to another time period (t+1). The probability of a commodity being in state d in the next time period (t+1) given that it is presently (t) in state a is a one-step transition probability denoted as  $P_{ad}^{t,t+1}$  (see Anderson 2011 and Hunter 2012).

Where:  $P_{ad}^{t,t+1} = P\{X_{t+1} = d | X_t = a\}$

Additionally, the degree of mobility or persistence in the RCA index is summarized by various mobility indices. Shorrocks (1978) developed an index denoted as ( $M_1$ ) which captures the relative magnitude of the diagonal and off-diagonal elements in a transition probability matrix.<sup>4</sup> The index ranges from  $0 \leq M_1 \leq 1$ , where a value of 0 indicates that there is imperfect mobility or total persistence and this occurs when the elements of the leading diagonal of the transition probability matrix are equal to one. When there is perfect mobility the index takes on a value of one and this occurs when the trace of the transition probability matrix is equal to one and all of the elements in the transition probability matrix have the same value. The Shorrocks index is defined as:

$$M_1 = \frac{K - tr(P)}{K - 1}$$

Where:  $K$  – number of classes in the transition probability matrix,  
 $P$  – transition probability matrix,  
 $tr(P)$  – trace of the transition probability matrix.

## Data

The RCA and trade complementarity indices are computed at the Standard International Trade Classification (SITC) 3 digit level for the period 2000-2010 using trade data from the UN Comtrade database. A sample of six CARICOM member's exports to Canada is firstly examined using the RCA index. The RCA index is then used to calculate a transition probability matrix for each CARICOM member's exports to Canada. The inter-temporal changes in the RCA index for each CARICOM member are briefly summarized in the Tables A3-8.

## Evolution of comparative advantage for CARICOM member's exports to Canada

The results from the transition probability matrices indicate that those commodities in the comparative disadvantage class (a) for CARICOM countries exports to Canada have a high probability of persistence. The high probability values in class (a) imply that commodities revealing a comparative disadvantage are likely to remain in a state of comparative disadvantage over time. On the other hand, The Bahamas, Jamaica and Trinidad and Tobago have recorded a relatively high probability of persistence in the strong comparative advantage class (d). Jamaica revealed the highest probability of persistence (0.80) for commodities in class d, followed by Trinidad and Tobago (0.71) and The Bahamas (0.67). These findings mean that commodities with a comparative advantage in The Bahamas, Jamaica and Trinidad and Tobago have a high

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<sup>4</sup> See also Bartholomew (1973) and Sommers and Conlisk (1979).

probability of maintaining their comparative advantage rank over time as compared to other CARICOM countries. The persistence of commodities in class b and c for all the selected CARICOM countries' exports to Canada appear to be very weak, with the exception of Jamaica for the weak comparative advantage class.

The dynamic changes in the comparative advantage structure of an economy is usually observed through the off-diagonal elements of the transition probability matrix, i.e. by comparing the lower triangular to the upper triangular matrix. It is preferred to have a strong upper triangular matrix as it indicates that commodities are migrating from a lower class of comparative advantage to a higher class of comparative advantage. However, from Table 2 there appears to be a relatively weak upper triangular matrix as compared to the lower triangular matrix. The weak upper triangular matrix of the transition probability matrix indicate that the probability of commodities moving from a lower class of comparative advantage to a higher class of comparative advantage is very low for all of the selected CARICOM countries exports to Canada. Furthermore, the probability of losing comparative advantage from the start of the period (2000) to the end of the period (2010) is very high for the selected CARICOM members.

<b>Table 2: Transition probability matrix of the BI for selected CARICOM countries in relation to Canada</b> (From 2000-2002 to 2008-2010).											
<b>Barbados</b>						<b>The Bahamas</b>					
To						To					
From		a	b	c	d	From		a	b	c	d
	a	0.94	0.03	0.00	0.03		a	0.98	0.01	0.00	0.01
	b	0.83	0.17	0.00	0.00		b	1.00	0.00	0.00	0.00
	c	0.43	0.14	0.43	0.00		c	1.00	0.00	0.00	0.00
	d	0.73	0.09	0.09	0.09		d	0.17	0.17	0.00	0.67
M <sub>1</sub>	0.79				M <sub>1</sub>	0.78					
<b>Guyana</b>						<b>Jamaica</b>					
To						To					
From		a	b	c	d	From		a	b	c	d
	a	1.00	0.00	0.00	0.00		a	0.99	0.01	0.00	0.00
	b	0.50	0.00	0.00	0.50		b	0.00	<b>1.00</b>	0.00	0.00
	c	1.00	0.00	0.00	0.00		c	0.00	1.00	0.00	0.00
	d	0.67	0.00	0.00	0.33		d	0.00	0.00	0.20	0.80
M <sub>1</sub>	0.89				M <sub>1</sub>	0.40					
<b>Trinidad and Tobago</b>						<b>St. Vincent and the Grenadines</b>					
To						To					
From		a	b	c	d	From		a	b	c	d
	a	0.99	0.00	0.00	0.00		a	0.94	0.02	0.01	0.03
	b	0.67	0.33	0.00	0.00		b	0.25	0.25	0.50	0.00
	c	1.00	0.00	0.00	0.00		c	0.75	0.00	0.00	0.25
	d	0.14	0.00	0.14	0.71		d	0.50	0.00	0.13	0.38
M <sub>1</sub>	0.65				M <sub>1</sub>	0.81					

Source: own calculations from UN Comtrade (2012).

## Trade complementarity between CARICOM and Canada

The ability for a FTA to improve the economic outcomes of its members can also be determined by an examination of their bilateral trade structures. The more complementary the nature of the trading relationship between the prospective members of a FTA, the greater is the likelihood that the FTA will improve the economic outcomes for its members.<sup>5</sup> The level of trade complementarity between the CARICOM bloc and Canada is evaluated by a trade complementarity index.<sup>6</sup> The main proponents (Michaely 1996 and Yeats 1998) of the trade complementarity index argued that the higher the value of the trade complementarity index the more likely the proposed FTA will succeed (Pitigala 2005). The trade complementarity index has a theoretical range from a value greater than 0 to less than  $\infty$ . If the value of the trade complementarity index is greater than unity then bilateral trade complementarity exists, however, if the value of the index is less than unity then bilateral trade complementarity is not present. Figure 1 shows the results of the trade complementarity index for the CARICOM bloc in relation to Canada, the EU and USA. The trade complementarity index indicates that the level of trade complementarity between CARICOM and Canada is generally low and has been declining over the last two decades. In fact, the level of trade complementarity is much lower for Canada as compared to the EU in the last decade.

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<sup>5</sup> This means that if an importing country's comparative disadvantage is matched by an exporting country's comparative advantage then a FTA between those countries is more likely to improve economic welfare.

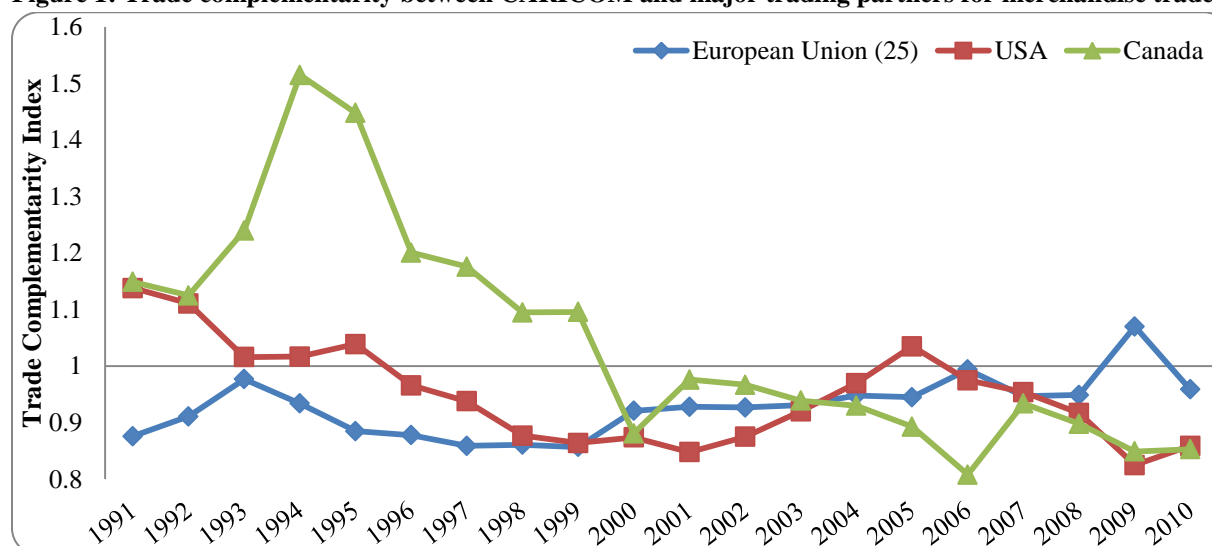
<sup>6</sup> The trade complementarity index is outlined by Drysdale (1967) as:

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

Where:  $C_{ij}$  is a trade complementarity index which relates the comparative advantage of the exporting country to the comparative disadvantage of the importing partner weighted against world trade (which accounts for all other supply sources),  $X$  – exports,  $k$  commodity to the world,  $X_i$  – country  $i$  total exports,  $M_j$  – country  $j$  total imports,  $M_i$  – country  $i$  total imports and  $M_w$  – world imports.



**Figure 1: Trade complementarity between CARICOM and major trading partners for merchandise trade**



Source: Own calculations based on UN Comtrade (2013).<sup>7</sup>

The low level of bilateral trade complementarity between the CARICOM region and Canada implies that bilateral merchandise trade is not likely to improve with the FTA. In this regard, the next section outlines the mechanics of a partial equilibrium model to determine the welfare effects on CARICOM countries from liberalizing tariffs on merchandise imports from Canada.

### 3. Measuring the Welfare Effects of the CARICOM-Canada FTA

Partial equilibrium models have been widely used in the literature to assess the trade and welfare effects of proposed FTAs (see McKay, Milner and Morrissey 2000, Greenaway and Milner 2006, Gasiorek and Winters 2004, Busse, Borrmann and GroBmann 2004, Karingi et al. 2005 and Zouhon-Bi and Nielsen 2007, Busse and Luehje 2007, Hosein 2008, Fontagne, Laborde and Mitaritonna 2011). The major benefits of using a partial equilibrium model include its ability to provide a detailed analysis from a product and country perspective (Lang 2006). A partial equilibrium analysis allows for the identification of commodity groups that are most likely to be affected and the extent of the effect on account of freer trade with a prospective trading partner. Moreover, the partial equilibrium model facilitates the estimation of trade creation, trade diversion, tariff revenues and welfare implications associated with liberalizing trade barriers (see for example, McKay, Milner and Morrissey 2000, Greenaway and Milner 2006, Zouhon-Bi and Nielsen 2007). The literature identifies two branches of the partial equilibrium model, namely, the perfect substitution model and the imperfect substitution model. The perfect substitution model assumes a homogeneous product, perfectly competitive and imported goods are perfect substitutes for domestically produced goods. The perfect substitution model is most applicable in situations where there are specific markets and where the producers are price takers. On the other

<sup>7</sup>The trade complementarity index was applied to SITC 3-digit level data for each country above and then aggregated across 264 SITC 3-digit commodities to derive the country index for each year.

hand, the imperfect substitution model is grounded in the Armington (1969) principle of product differentiation. The imperfect substitution variant is more applicable for industrial markets where product differentiation becomes essential to the analysis. This paper uses the imperfect substitution approach since it allows for the identification of the various trade source substitution effects that arises when a FTA is formed. The remainder of this section outlines a partial equilibrium model to evaluate the trade and welfare effects of the proposed CARICOM-Canada FTA.

### **Imperfect substitution model**

The imperfect substitution model outlined by Greenaway and Milner (2006) defines the trading players in the world as belonging to an intra-regional group (say, CARICOM) and an extra-regional group.

#### **The intra-regional trading partners are:**

HC – Home Country,  
PC – Partner Country,

#### **The extra-regional trading partners are:**

CAN – Canada,  
ROW – Rest of the world, excluding Canada.

The initial trading environment is one that is characterized by a situation where the HC and the PC belongs to a Regional Trade Agreement (RTA). Assume that the RTA imposes a non-discriminatory tariff on imports from all extra-regional import sources. Then the price facing consumers in the HC's market would be  $P_P$ ,  $P_{ROW}(1+t)$  and  $P_{CAN}(1+t)$  from the PC, the ROW and Canada, respectively. The initial volume of imports by the HC is given as  $M_1$ ,  $M_2$  and  $M_3$  from CARICOM (1), the ROW (2) and Canada (3), respectively.

Next, suppose that CARICOM and Canada forms a FTA. The CARICOM-Canada FTA will result in the removal of tariffs on imports from Canada but not for imports from the ROW. This change in relative import prices would alter the trading opportunities for consumers in the HC. For example, as the price of imports from Canada falls, the consumers in the HC would increase their demand for imports from Canada and simultaneously reduce their imports from the ROW and the PC. The overall trade effects associated with the CARICOM-Canada FTA can be disaggregated into three parts. The three trade effects are known as a trade diversion effect, a consumption induced trade creation effect, and a displacement of regional imports effect (Greenaway and Milner 2006). The trade effects are outlined below.

## Trade Creation Effect

The trade creation effect represents the increase in imports from Canada by the HC in the FTA environment. The trade creation effect occurs when the tariff is removed on imports from Canada such that the price of Canadian goods in the HC falls from  $P_{CAN} (1+t)$  to  $P_{CAN}$ , where  $P_{CAN} (1+t) > P_{CAN}$ . This will result in an increase in imports from Canada of the amount  $M_3$  to  $M'_3$  where,  $M'_3 > M_3$ . The change in imports from Canada ( $\Delta M_3$ ) by the HC can be measured empirically by:

$$\Delta M_3 = \left( \frac{-t}{1+t} \right) e_m^d M_3$$

Where:  $\Delta M_3$  - change in imports from Canada,

t - tariff rate,

$e_m^d$  - elasticity of demand for imports,

$M_3$  - amount imported from Canada prior to the formation of the FTA,

$M'_3$  - new imports from Canada.

## Trade Diversion Effect

A switch of imports from one extra-regional partner (ROW) to another extra-regional partner (CAN) in the FTA environment represents the trade diversion effect. Trade diversion occurs when some of the HC's imports from the ROW are diverted to Canada; say the HC's imports from the ROW falls from  $M_2$  to  $M'_2$ , where  $M'_2 < M_2$ . The change in imports from the ROW ( $\Delta M_2$ ) can be measured empirically in a similar way as the change in imports from Canada as:

$$\Delta M_2 = \left( \frac{-t}{1+t} \right) \sigma_{23} M_2$$

Where:  $\Delta M_2$  - change in imports from the ROW,

t - tariff rate,

$\sigma_{23}$  - elasticity of import substitution for CARICOM countries between imports from the ROW and Canada,

$M_2$  - amount imported from the ROW prior to the formation of the FTA,

$M'_2$  - new imports from the ROW.

## Displacement of Regional Imports

The FTA between the RTA (HC + PC) and Canada also results in some of the HC's imports from the PC's market being replaced by imports from Canada, say, from  $M_1$  to  $M'_1$  where  $M'_1 <$

$M_1$ . The change in imports from the PC can be measured in a similar way as the change in imports from Canada and the change in imports from the ROW. The new imports from Canada are determined by the change in the import price, initial imports and the elasticity of import demand:

$$\Delta M_1 = \left( \frac{-t}{1+t} \right) \sigma_{13} M_1$$

Where:  $\Delta M_1$  - change in imports from the PC,

$t$  - tariff rate,

$\sigma_{13}$  - elasticity of import substitution between CARICOM countries and Canada,

$M_1$  - amount imported from the PC prior to the formation of the FTA,

$M'_1$  - new imports from the PC.

### **Revenue and Welfare effects**

The welfare effect for a HC in the CARICOM sphere from the CARICOM-Canada FTA originates from two sources, namely the change in tariff revenues and the change in consumer surplus for the HC. Firstly, the FTA between CARICOM countries and Canada alters the relative import prices for the HC consumers from the various sources of supply (Canada, ROW and CARICOM). As a result, consumers in the HC will benefit from a lower import price with the preferential partner country (Canada). This change results in an increase in imports from the preferential market at a lower price, thus leading to an increase in consumer surplus and impacting positively on the HC's welfare. On the other hand, the HC consumers can substitute imports from the intra-regional partners to the extra-regional partners (CARICOM to Canada) and among the extra-regional partners (ROW to Canada). The substitution of intra-regional imports for extra-regional imports has no effect on tariff revenues as there is an RTA among the intra-regional partners. However, the reallocation of imports among the extra-regional partners (from the ROW to Canada) on account of a FTA will negatively impact the HC's welfare through losses in tariff revenues. The loss in tariff revenues for the HC takes two forms, firstly, the loss in revenues from Canada and secondly, the loss in tariff revenues on the amount of imports diverted from the ROW to Canada. The change in tariff revenues is determined by the difference between the initial revenues ( $R_0$ ) obtained in the pre-FTA environment and the new revenues ( $R_1$ ) obtained in the FTA environment. The basic algebra associated with the change in revenues is sketched below.

$$\Delta R = R_1 - R_0$$

$$R_1 = tM'_2$$

$$R_0 = tM_3 + tM_2$$

$$\Delta R = t\Delta M_2 - tM_3$$

Where:  $t\Delta M_2$  - the tariff revenues associated with a change in imports from the ROW,  
 $tM_3$  - the initial tariff revenues collected from Canadian imports in the pre- FTA environment,  
 $R_1$  - the new tariff revenues for the HC in the FTA environment,  
 $R_0$  - the initial tariff revenues for the HC in the pre-FTA environment,  
 $\Delta R$  - the change in tariff revenues.

Therefore, the change in welfare is a function of the change in consumer surplus and the change in tariff revenues. This is outlined below as:

$$\Delta W = \Delta CS + \Delta R$$

Substituting  $\Delta CS$  and  $\Delta R$  into the  $\Delta W$  yields;

$$\Delta W = \frac{1}{2}t(\Delta M_3) + \Delta R$$

### **Data: Import demand and substitution elasticities**

The estimation of trade creation and trade diversion in an imperfect substitution setting requires knowledge of various elasticities. Specifically, the Greenaway and Milner (2006) model calls for information on the import demand elasticities and the elasticities of substitution between preferred and non-preferred trading partners.

In the literature, several studies have utilized various estimates of import demand and substitution elasticities. For example, Busse and Shams (2005) followed the standard “Dutch” convention, which assumed that the values for import demand elasticity and the elasticity of substitution were 0.5 and 2.0, respectively. According to Busse and Shams (2005), the assumed elasticity values of the standard “Dutch” convention were very similar to the estimates of import demand and substitution elasticities developed by Kee, Olarreaga and Nicita (2004) and Gallaway, McDaniel and Rivera (2003). Another study also conducted by Busse, Borrmann and GroBmann (2004) on the EPA between Economic Community of West African States (ECOWAS) and EU assumed values for the import demand and substitution elasticities respectively since reliable estimates for both import demand and substitution elasticities were not available. In particular, Busse, Borrmann and GroBmann (2004) established three scenarios; a low, a mid and a high. The import demand and elasticity of substitution values were different in

each scenario and were also based on the degree of homogeneity for the products which were differentiated between agricultural products, raw materials and manufactured goods. The elasticity values assumed by Busse, Borrmann and GroBmann (2004) were similar to elasticity values in other developing countries (see Sawyer and Sprinkle 1999, Gallaway, McDaniel and Rivera 2003 and Kee, Olarreaga and Nicita 2004). Greenaway and Milner (2006) used the import demand elasticities based on Stern, Francis and Schumacher (1976) while the relevant import source substitution elasticities were acquired from the Global Trade Analysis Project (GTAP) behavioural parameters file (Hertel et al. 1997). For enhanced comparability with the Greenaway and Milner (2006) study, the experiments conducted in this paper also used the various elasticities employed by Greenaway and Milner (2006).<sup>8</sup>

The Greenaway and Milner (2006) methodology for determining trade and welfare effects is then applied to SITC 2-digit data for a selected group of 11 CARICOM countries for the years 1998 and 2008 (see Table A2 for data sources). Similar to Greenaway and Milner (2006) and Hosein (2008), both the import demand elasticities and the import source substitution elasticities are assumed to be the same across CARICOM countries for a particular product group. Moreover, we assume complete tariff liberalization of Canadian exports into the CARICOM market (see Busse, Borrmann and GroBmann 2004, Greenaway and Milner 2006, Lang 2006 and Hosein 2008 for similar assumptions).

#### **4. Results and Discussion**

This section now turns to the results of the trade and welfare effects of the proposed CARICOM-Canada FTA.<sup>9</sup> It should be noted that this is a static study and will undertake several permutations. Specifically, comparative FTA experiments with CARICOM countries and Canada as well as with other countries for the years 1998 and 2008 are examined. The grounding in 1998 is for comparison with Greenaway and Milner (2006). The remainder of this section is divided into three parts:<sup>10</sup>

- I. Trade effects for full liberalization of tariffs on imports from Canada only, EU only and EU and Canada only.

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<sup>8</sup> The reference to Greenaway and Milner (2006) is to compare trade and welfare effects of CARIFORUM–EU EPA with the proposed CARICOM-Canada.

<sup>9</sup> The trade, revenue and welfare effects computed here are based on the assumption that a FTA is formed between Canada and CARICOM in either 1998 or in 2008 so that tariffs on import originating from Canada (and other prospective preferential trading partners outlined in the various experiments) are eliminated.

<sup>10</sup> The CARIFORUM–EU EPA was signed in October 2008 and thus will therefore not affect the experiments undertaken for liberalizing EU imports or Canada imports.

- II. Revenue effects for full liberalization of tariffs on imports from Canada only, EU only and EU and Canada only.
- III. Welfare effects for full liberalization of tariffs on imports from Canada only, EU only and EU and Canada only.

### **The impact of full liberalization of tariffs on imports from Canada only, EU only and EU and Canada only**

This part considers four issues. Firstly, it examines three trade effects associated with the proposed CARICOM-Canada FTA; secondly it updates the work of Greenaway and Milner (2006) and compares the results of the proposed CARICOM-Canada FTA to the updated results associated with the EPA.<sup>11</sup> Finally an experiment involving the liberalization of tariffs on imports from Canada and the EU is examined. The trade effects for each experiment are aggregated across all SITC 2 digit commodities and are provided in the **Tables** below. In columns 1 and 2, the trade creation on existing imports from the prospective trading partners are reported while in columns 3 and 4 the change in imports from CARICOM countries (displacement of regional imports) are shown and columns 5 and 6 shows the change in extra-regional imports (trade diversion).

### **Trade effects for the proposed CARICOM-Canada FTA**

The first experiment indicates that the percentage increase in trade creation range from 8.4 per cent for Trinidad and Tobago to 17.7 per cent for Grenada. In actual dollars, Jamaica and Trinidad and Tobago are the two CARICOM countries expected to benefit the most from trade creation on existing Canadian imports (see Table 3). Trade creation for Trinidad and Tobago and Jamaica using 2008 data is estimated to be US\$21.79mn and US\$22.11mn, respectively. Belize recorded the least trade creation from liberalizing tariffs on Canadian imports amounting to US\$0.74mn, an increase by 11.2 per cent.

The percentage decline in regional imports ranges from 17.9 per cent for Barbados to 28.12 per cent for Belize. In actual dollars, the displacement of regional imports towards Canada is likely to be the greatest for Jamaica, Barbados and Guyana. The results imply that Jamaica's imports from CARICOM is expected to decrease by US\$303.97mn (18.6 per cent) while for Barbados and Guyana it is likely to fall by US\$79.41mn (17.9 per cent) and US\$78.90mn (22.9 per cent), respectively.<sup>12</sup> Extra-regional trade diversion which measures the switch in import source from the rest of the world towards Canada ranges from 39.6 per cent for Trinidad and Tobago to 64.6

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<sup>11</sup> Greenaway and Milner computed the trade and welfare effects for full liberalization of tariffs on EU imports for 9 CARICOM countries for 1998; this study extends the list to 11 CARICOM countries' and compare the results with similar experiments for 2008.

<sup>12</sup> These values are uniform for all the various experiments. It represents the decline in import from the CARICOM market by each CARICOM member state.

per cent for St. Lucia. Other CARICOM countries to report significant extra-regional trade diversion are Jamaica, The Bahamas, Barbados and Guyana. The extra-regional trade diversion effect represents a significant opportunity for an increase in Canadian exports to the CARICOM market (an estimated total of US\$10,398mn) on account of the relatively lower FTA import price for CARICOM consumers.

<b>Table 3: Trade effects associated with the proposed CARICOM-Canada FTA (US\$mn)</b>						
	<b>Trade Creation on existing CAN imports</b>		<b>Change in CARICOM imports</b>		<b>Change in extra-regional imports</b>	
	CAN (1998)	CAN (2008)	CAN (1998)	CAN (2008)	CAN (1998)	CAN (2008)
BHS	7.12	1.44	-1.49	-8.48	-1009.22	-1522.70
BLZ	0.93	0.74	-2.73	-3.44	-144.06	-308.03
BRB	4.56	5.90	-34.17	-79.41	-492.94	-676.30
DMA	0.45	0.82	-8.87	-15.87	-54.63	-84.36
GRD	1.09	1.78	-13.95	-24.76	-80.28	-138.65
GUY	2.17	2.11	-17.80	-78.90	-197.70	-432.65
JAM	16.16	22.11	-89.73	-303.97	-1580.60	-3000.23
KNA	0.56	1.08	-6.55	-12.30	-67.18	-163.58
LCA	1.71	1.87	-18.32	-47.61	-147.93	-285.26
TTO	16.42	21.79	-25.56	-34.26	-1092.64	-3643.57
VCT	0.65	1.23	-12.25	-23.77	-71.15	-142.95
<b>Percentage change</b>						
BHS	18.68	12.79	-34.9	-20.81	-57.81	-50.24
BLZ	16.01	11.18	-25.8	-28.12	-52.60	-48.93
BRB	11.06	10.20	-21.0	-17.96	-60.51	-54.81
DMA	16.42	13.05	-25.6	-22.33	-56.48	-55.00
GRD	17.25	17.66	-25.1	-22.88	-58.16	-56.66
GUY	13.02	11.71	-23.5	-19.62	-49.11	-46.80
JAM	17.94	16.83	-28.9	-18.59	-63.29	-45.64
KNA	16.71	16.10	-23.6	-22.31	-57.31	-62.30
LCA	14.92	15.85	-26.0	-23.78	-58.79	-64.60
TTO	15.79	8.40	-24.4	-27.93	-39.14	-39.64
VCT	13.65	15.56	-26.0	-23.31	-50.77	-54.37
Source: Own calculations from UN Comtrade (2012).						

### **Trade effects for the EPA with the EU**

With respect to the EU, the percentage increase in trade creation range from 12.6 per cent for Trinidad and Tobago to 19.3 per cent for The Bahamas using 2008 data. For 2008, there was a small increase in trade creation (in actual dollars) for all CARICOM countries except The Bahamas. This is not a surprising trend as one would expect that over time in a rapidly globalizing world economy trade source substitution towards the EU and Canada would increase, albeit a small increase. Trinidad and Tobago and Jamaica recorded the largest increase in trade creation on EU imports from 1998 to 2008 (see Table 4). The decline in extra-regional imports ranged from 40.1 per cent for Trinidad and Tobago to 64.9 per cent for St. Lucia in 2008. There



is a general increase in extra-regional trade diversion (in actual dollars) for all CARICOM countries. Moreover, Trinidad and Tobago recorded the largest increase in trade diversion in actual dollars from the listed CARICOM countries.

<b>Table 4: Trade effects associated with the EPA (US\$mn)</b>						
	<b>Trade Creation on existing EU imports</b>		<b>Change in CARICOM imports</b>		<b>Change in extra-regional imports</b>	
	EU (1998)	EU (2008)	EU (1998)	EU (2008)	EU (1998)	EU (2008)
BHS	13.62	7.61	-1.49	-8.36	-982.56	-1500.49
BLZ	4.30	5.24	-2.73	-3.38	-121.69	-288.00
BRB	26.53	32.83	-34.17	-71.81	-311.22	-589.44
DMA	3.18	3.41	-8.87	-15.72	-41.38	-75.47
GRD	4.44	5.86	-13.95	-24.59	-62.77	-124.95
GUY	10.15	14.94	-17.80	-64.81	-171.50	-412.83
JAM	44.93	85.32	-89.73	-294.12	-1310.64	-2842.30
KNA	2.57	3.40	-6.55	-12.09	-55.23	-154.85
LCA	7.89	9.63	-18.32	-47.30	-112.88	-258.87
TTO	59.51	150.18	-25.56	-32.47	-969.14	-3312.19
VCT	6.03	8.77	-12.25	-23.71	-50.26	-119.85
<b>Percentage change</b>						
BHS	14.6	19.26	-34.9	-20.66	-58.1	-49.97
BLZ	15.7	15.21	-25.8	-27.87	-48.2	-47.86
BRB	15.5	14.25	-21.0	-18.32	-45.5	-53.03
DMA	15.4	15.39	-25.6	-22.34	-52.2	-54.62
GRD	15.5	15.16	-25.1	-22.87	-54.3	-57.65
GUY	13.4	13.69	-23.5	-20.19	-50.5	-45.15
JAM	15.8	16.75	-28.9	-18.22	-56.9	-45.72
KNA	15.0	16.01	-23.6	-22.31	-54.2	-62.18
LCA	15.0	17.47	-26.0	-23.70	-54.9	-64.89
TTO	12.2	12.57	-24.4	-27.66	-39.9	-40.09
VCT	14.7	16.20	-26.0	-23.31	-48.4	-55.26
Source: own calculation from UN Comtrade (2012) and Greenaway and Milner (2006) for 1998 values for EU only.						

### **Trade effects for the proposed CARICOM-Canada FTA and the EPA**

Another relevant experiment is to examine the impact of removing tariffs on imports from both EU and Canada simultaneously on CARICOM countries as this is likely to be the most practical scenario in medium term. This permutation explores the CARICOM-Canada FTA in the context of an already signed EPA with the EU. The results associated with this experiment are provided in Table 5. The impact of full tariff liberalization of EU and Canadian imports on CARICOM countries showed that the increase in trade creation is higher as compared to the two previous individual country cases discussed above. The two major beneficiaries from trade creation are again Trinidad and Tobago and Jamaica. A similar trend was observed for the extra-regional trade diversion. In general, adding Canada to the mix does not create any significant optimism for CARICOM countries, especially the smaller island states. The inclusion of Canada to

CARICOM's list of FTA trading partners although not counter-productive in a dynamic trading environment does not add significant value from a trade creation (diversion) perspective.

**Table 5: Trade effects of the proposed CARICOM-Canada FTA and the EPA (US\$mn)**

	Trade Creation		Displacement in regional imports		Trade diversion	
	CAN+EU (1998)	CAN+EU (2008)	CAN+EU (1998)	CAN+EU (2008)	CAN+EU (1998)	CAN+EU (2008)
BHS	20.73	9.05	-1.49	-8.48	-964.90	-1494.79
BLZ	5.22	5.98	-2.73	-3.44	-129.05	-284.97
BRB	31.56	38.72	-34.17	-79.41	-392.81	-551.30
DMA	3.86	4.23	-8.87	-15.87	-42.27	-71.97
GRD	5.54	7.63	-13.95	-24.76	-64.10	-118.24
GUY	12.32	17.05	-17.80	-78.90	-162.10	-376.82
JAM	62.09	107.43	-89.73	-303.97	-1425.72	-2733.90
KNA	3.16	4.48	-6.55	-12.30	-57.78	-150.29
LCA	10.80	11.50	-18.32	-47.61	-114.78	-249.80
TTO	76.65	171.96	-25.56	-34.26	-916.80	-3226.98
VCT	6.72	10.00	-12.25	-23.77	-51.37	-114.70
<b>Percentage change</b>						
BHS	15.75	17.83	-34.9	-20.81	-58.41	-49.97
BLZ	15.81	14.56	-25.8	-28.12	-52.32	-47.89
BRB	14.76	13.44	-21.0	-17.96	-61.17	-54.95
DMA	15.37	14.87	-25.6	-22.33	-56.82	-54.86
GRD	15.84	15.67	-25.1	-22.88	-58.60	-57.39
GUY	13.35	13.41	-23.5	-19.62	-49.58	-46.22
JAM	16.26	16.76	-28.9	-18.59	-64.64	-45.08
KNA	15.11	16.03	-23.6	-22.31	-57.99	-62.27
LCA	14.45	17.18	-26.0	-23.78	-60.96	-64.64
TTO	12.83	11.83	-24.4	-27.93	-39.89	-40.35
VCT	14.32	16.11	-26.0	-23.31	-52.41	-54.95
Source: Own calculations from UN Comtrade (2012).						

### Comparison of the trade effects for the proposed CARICOM-Canada FTA and the EPA

In the first instance, trade creation in actual dollars recorded for the full liberalization of tariffs on Canadian imports by CARICOM economies is lower than on EU imports for both years in which the experiments are conducted. These results imply that the liberalization of tariffs on EU imports yields significantly greater positive results for CARICOM countries from a trade creation perspective as compared to the liberalization of tariff on imports from Canada.

### CARICOM countries dependence on import duties

Before turning to the tariff revenue effects of the FTAs on CARICOM countries, this section will examine the extent to which CARICOM countries depend on import duties. The dependence on tariff revenues is examined using three indicators; (1) import duties as a share in current

revenues, (2) import duties as a share in tax revenues and (3) import duties as a share in GDP for the period 2000-2011. Nicholls, Nicholls and Colthrust (2001) identified three levels of tariff revenue dependence for an economy. In the first instance, a country is classified as having a low dependence on tariff revenues if import duties account for less than 15 per cent of government revenues, moderate dependence if import duties account for greater than 15 per cent of government revenues but less than 30 per cent of government revenues and high dependence if import duties account for more than 30 per cent of government revenues. The table below shows the level of tariff revenue dependence for a selected group of CARICOM countries for the period 2000-2011. According to the categories of tariff revenue dependence, CARICOM countries are classified as having a low dependence on tariff revenues (see Table 6).

<b>Table 6: Dependence on import duties for selected CARICOM countries (2000-2011)</b>			
	<b>% in Current revenues</b>	<b>% in tax revenues</b>	<b>% in GDP</b>
<b>Selected CARICOM countries<sup>a</sup></b>			
DMA	10.60	12.01	2.67
GRD	11.96	12.90	2.37
JAM	6.50	7.88	2.05
KNA	10.67	14.50	2.84
LCA	13.49	14.60	3.17
TTO	4.97	5.98	1.47
VCT	9.39	10.46	2.29
<b>Other developing countries and the USA</b>			
BOL	3.88	5.41	0.41
BRA	2.35	3.51	0.54
COL	5.77	8.59	0.93
CRI	3.25	5.58	0.27
DOM	8.75	9.66	0.79
GTM	9.50	9.99	1.12
HND	5.05	7.14	0.80
PER	4.66	6.13	0.81
PRY	9.82	14.95	1.51
SLV	5.48	7.60	0.79
URY	4.02	6.07	1.08
USA	1.10	1.89	0.18
Source: Own calculations from World Development Indicators (2013).			
<sup>a</sup> Data for other CARICOM members are not available.			

The share of tariff revenues in tax revenues ranges from 5.98 per cent for Trinidad and Tobago to 14.6 per cent for St. Lucia for the period 2000-2011. Despite the low levels of tariff revenue dependence in general, the OECS countries in Table 6 have a relatively higher dependence on tariff revenues than Trinidad and Tobago and Jamaica.<sup>13</sup> Tariff revenues as a share in tax revenues and current revenues averaged over 10 per cent for OECS members with the highest being observed for St. Lucia and St. Kitts and Nevis at 14.6 and 14.5 per cent, respectively. Additionally, CARICOM countries have a higher level of tariff revenue dependence compared to

<sup>13</sup> Organization of the Eastern Caribbean States (OECS) members are, Anguilla, Antigua and Barbuda, British Virgin Islands, Dominica, Grenada, Montserrat, Saint Lucia, St. Kitts and Nevis and St. Vincent and the Grenadines.

other developing countries in Latin and Central America. In this regard, the removal of tariffs on imports can have adverse implications on CARICOM countries, particularly, the OECS members.

### **Revenue effects of full liberalization of tariff on EU and Canada imports.**

Table 7 reports the revenue effects associated with the full liberalization of tariffs on Canadian imports only, EU imports only, and Canadian and EU imports only. The percentage decline in tariff revenues from liberalizing tariffs on Canadian imports range from 51.4 per cent for Trinidad and Tobago to 72.7 per cent St. Kitts and Nevis. The findings from the three FTA scenarios indicate the smaller economies (Dominica, Grenada St. Kitts and Nevis, St. Lucia and St. Vincent and the Grenadines) are likely to experience a higher percentage decline on tariff revenues than the larger CARICOM countries (see Table 7). The fall in tariff revenues from liberalizing tariffs on EU imports only revealed similar results. On the other hand, the four CARICOM countries expected to experience the most losses in actual dollars from liberalizing tariffs on Canadian imports are Trinidad and Tobago (US\$429mn), Jamaica (US\$411.4mn) and The Bahamas (US\$199.9mn). The revenue losses from the simultaneous removal of tariffs on imports from EU and Canada are obviously higher. Although the tariff revenue losses are higher than the two previous FTA experiments, they are not significantly different, especially for the listed OECS countries.

The loss in tariff revenues would present a greater challenge for the smaller economies since they have a higher dependence on tariff revenues as a source of their total revenues compared to the larger CARICOM countries.

<b>Table 7: Revenue effects associated with the various trade agreements</b>						
	<b>Change in Revenue (US\$mn)</b>					
	<b>CAN (1998)</b>	<b>CAN (2008)</b>	<b>EU (1998)</b>	<b>EU (2008)</b>	<b>CAN+EU (1998)</b>	<b>CAN+EU (2008)</b>
BHS	-132.06	-196.93	-133.21	-197.82	-134.77	-198.16
BLZ	-18.63	-36.84	-19.36	-37.58	-19.60	-37.80
BRB	-64.42	-88.65	-67.50	-94.85	-69.18	-95.25
DMA	-7.44	-11.19	-8.08	-11.82	-8.17	-11.95
GRD	-10.77	-18.89	-11.54	-19.98	-11.75	-20.28
GUY	-24.43	-51.42	-27.38	-57.72	-26.96	-55.36
JAM	-228.91	-411.42	-234.99	-428.74	-237.90	-427.85
KNA	-9.19	-23.39	-9.58	-23.91	-9.79	-24.07
LCA	-21.33	-39.62	-22.35	-41.08	-23.38	-41.35
TTO	-132.63	-429.04	-144.33	-461.89	-147.07	-467.14
VCT	-8.82	-18.81	-10.12	-20.42	-10.30	-20.66
<b>Percentage Change in revenue decline</b>						
BHS	-69.28	-61.87	-69.9	-62.14	-70.70	-62.26
BLZ	-65.38	-59.98	-68.0	-61.16	-68.78	-61.53
BRB	-74.47	-71.28	-78.1	-73.77	-79.97	-76.58
DMA	-69.47	-68.17	-75.1	-71.74	-76.31	-72.83

GRD	-69.39	-67.35	-74.4	-71.07	-75.71	-72.31
GUY	-65.60	-59.49	-71.6	-61.28	-72.40	-64.06
JAM	-74.71	-60.93	-76.7	-63.08	-77.64	-63.37
KNA	-69.19	-72.72	-73.0	-74.13	-73.74	-74.84
LCA	-71.89	-72.06	-76.8	-74.57	-78.78	-75.19
TTO	-57.22	-51.40	-61.8	-55.28	-63.45	-55.97
VCT	-62.75	-66.27	-72.0	-71.84	-73.31	-72.76

Source: Own calculations from UN Comtrade (2012) and Greenaway and Milner (2006) for 1998 values for EU only.

### Impact of revenue decline on the macroeconomy

The impact of a decline in tariffs on tax revenues is expected to be largest for the least developed countries in the CARICOM region. For example, St. Kitts and Nevis and St. Lucia are likely to experience a decline in tax revenue of about 15 per cent (see Table 8). Therefore, while the larger economies in the CARICOM are expected to experience larger tariff revenues losses in actual dollars, the smaller economies are expected to experience more adverse effects on their macroeconomy.

	CAN (2008)		EU (2008)		CAN+EU (2008)	
	Tax revenue (%)	GDP (%)	Tax revenue (%)	GDP (%)	Tax revenue (%)	GDP (%)
DMA	-9.86	-2.42	-10.41	-2.56	-10.53	-2.59
GRD	-11.77	-2.27	-12.46	-2.40	-12.64	-2.44
JAM	-11.55	-3.15	-12.04	-3.28	-12.01	-3.28
KNA	-15.03	-3.16	-15.36	-3.23	-15.47	-3.26
LCA	-14.79	-3.38	-15.33	-3.50	-15.43	-3.52
TTO	-5.20	-1.53	-5.60	-1.65	-5.66	-1.67
VCT	-11.36	-2.69	-12.33	-2.92	-12.47	-2.96

Source: Own calculations from UN Comtrade (2012) and WDI (2012).

### Welfare effects of full liberalization of tariffs on EU and Canada imports only

This part compares the welfare effects of full liberalization of tariffs on EU imports only, Canadian imports only and EU and Canadian imports only. The decline in welfare for CARICOM countries because of the full liberalization of tariffs on EU imports are recorded in Table 9. Jamaica, The Bahamas and Trinidad and Tobago are the three CARICOM countries that are expected to be the most affected while Dominica and St. Vincent and the Grenadines recorded the least negative effects using 1998 data. For 2008, Trinidad and Tobago and Jamaica again stand out as the countries that are expected to experience major declines in welfare. In comparison, the fall in welfare for CARICOM countries because of the full liberalization of tariffs on Canada imports are slightly lower as compared to the EU for each of the listed CARICOM member states (see Table 9). The welfare loss for most CARICOM countries on

account of liberalizing tariffs on EU and Canadian imports are not significantly different from the welfare loss associated with liberalizing tariffs on EU imports.

<b>Table 9: Welfare effects of the various trade agreements</b>						
<b>Change in Welfare (US\$mn)</b>						
	<b>CAN (1998)</b>	<b>CAN (2008)</b>	<b>EU (1998)</b>	<b>EU (2008)</b>	<b>CAN+EU (1998)</b>	<b>CAN+EU (2008)</b>
BHS	-89.66	-146.25	-90.64	-146.89	-91.87	-147.17
BLZ	-12.89	-24.68	-16.10	-25.22	-13.65	-25.42
BRB	-32.12	-50.56	-48.73	-55.83	-36.16	-56.12
DMA	-5.38	-7.73	-5.54	-8.23	-5.94	-8.33
GRD	-7.60	-13.99	-8.08	-14.91	-8.37	-15.11
GUY	-15.23	-36.97	-18.03	-42.21	-17.32	-40.28
JAM	-126.30	-303.44	-203.61	-313.67	-133.01	-315.81
KNA	-6.87	-17.89	-7.54	-18.26	-7.34	-18.38
LCA	-14.79	-24.90	-15.78	-26.10	-16.40	-26.27
TTO	-103.61	-359.63	-108.37	-387.55	-115.78	-392.00
VCT	-6.79	-13.46	-6.05	-14.76	-7.99	-14.92

Source: Own calculations from UN Comtrade (2012) and Greenaway and Milner (2006) for 1998 values for EU only.

### **Impact of welfare decline on the macro economy**

Table 10 shows that the macro economy of the smaller countries in the CARICOM region are likely to be affected the most by a decline in welfare from the CARICOM-Canada FTA.

<b>Table 10: Impact of welfare decline on GDP (%)</b>			
	<b>CAN (2008)</b>	<b>EU (2008)</b>	<b>CAN+EU (2008)</b>
DMA	-1.67	-1.78	-1.80
GRD	-1.68	-1.79	-1.82
JAM	-2.32	-2.40	-2.42
KNA	-2.42	-2.47	-2.49
LCA	-2.12	-2.22	-2.24
TTO	-1.28	-1.38	-1.40
VCT	-1.93	-2.11	-2.14

Source: Own calculations from UN Comtrade and WDI (2012).

## **5. Conclusion and Policy Implications**

The results obtained from the partial equilibrium model shows that while there is likely to be some trade creation from the CARICOM-Canada FTA, the overall revenue and welfare effects from a static perspective will be unfavourable for CARICOM countries. The extent of the impact of the trade creation effects varies considerably among CARICOM countries with the major beneficiaries being members of the MDCs, namely, Trinidad and Tobago and Jamaica. Together,

Trinidad and Tobago and Jamaica account for approximately 72 per cent of the estimated trade creation from the CARICOM-Canada FTA.

The countries expected to least benefit from trade creation are those that belong to the OECS. Comparing trade creation obtained from liberalizing imports from the EU, the trade creation on existing Canadian imports is significantly lower.

The impact of liberalizing tariffs on imports from Canada is expected to have a greater adverse revenue effect on members of the OECS. The members of the OECS are expected to experience considerable customs revenue losses. This tariff revenue loss would be more significant for these countries as they are more dependent on tariffs as a source of fiscal revenue as compared to Trinidad and Tobago and Jamaica. All CARICOM member states experience losses in welfare in each of the three experiments. Notably, the liberalization of tariffs on EU imports only yields the largest losses in welfare as compared to Canadian only and EU and Canada only for both years in which the experiments were conducted.

The room for increased trade between CARICOM countries and Canada also appears to be weak given the results of the revealed comparative advantage index, the transition matrices and the trade complementarity test. In particular, the number of commodities in which the listed CARICOM countries have comparative advantage with Canada dwindles away over the time period for the most part. Furthermore, the inability of at least three of the listed CARICOM countries to maintain strong comparative advantage in relation to Canada over time as well as the lack of trade complementarity between CARICOM countries and Canada does not offer encouraging signs for enhancing merchandise trade.

The findings of the partial equilibrium model, the evolution of comparative advantage and trade complementarity presented in this paper does not provide evidence to suggest that a FTA between CARICOM and Canada will yield considerable positive benefits for CARICOM countries, especially from a merchandise trade perspective. In this regard, the negotiations of the FTA should take a cautious route so as to mitigate the direct and indirect negative effects on CARICOM countries. In particular, CARICOM would need to identify vulnerable product lines that would need provisional protection from the liberalization of tariffs on Canadian imports. The continued protection of such industries would be of significant importance for the region.

Furthermore, a serious look at trade in services may provide a more positive outlook for the FTA. Notably, trade in services is not currently covered by the CARIBCAN trade arrangement. Importantly however, the services sector is the largest sector and contributes the most to GDP for most of the CARICOM economies. Chaitoo (2009, 2013) noted that the services sector in CARICOM has the potential to account for the largest new benefits from the CARICOM-Canada FTA. However, Girvan (2009) warned that even the prospective benefits from trade in services

may be minimal as the services exports that originate from the region presently do not necessarily need a FTA to thrive in the Canadian economy.

Moreover, as the FTA provides greater market access for CARICOM countries, the negotiations should focus on mechanisms that would assist CARICOM countries to take advantage of the opportunities in the Canadian market. In this regard, negotiations from a CARICOM outlook should also place emphasis on Aft and Public Private Partnerships (PPP) among other mechanisms through which greater trade can be nurtured in the FTA.

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## Appendix

<b>Table A1: CARICOM countries trade with Canada (2008-2010)</b>			
CARICOM countries exports to Canada US\$mn			
	2008	2009	2010
ATG	0.00	0.11	0.30
BHS	32.67	22.64	15.19
BLZ	1.13	1.12	0.62
BRB	9.19	9.66	7.61
DMA	0.06	0.06	-
GRD	0.89	-	0.00
GUY	215.12	267.30	356.26
JAM	257.52	125.52	162.02
KNA	0.00	0.00	0.04
LCA	0.38	0.00	0.00
SUR	251.24	375.79	577.42
TTO	192.03	61.18	175.53
VCT	0.06	0.04	0.04
Total	960.29	863.41	1295.03
CARICOM countries imports from Canada US\$mn			

ATG	0.00	9.26	7.36
BHS	11.44	14.03	16.03
BLZ	7.05	6.11	5.46
BRB	58.48	50.95	52.66
DMA	6.31	4.03	4.20
GRD	10.06	7.18	0.00
GUY	18.05	26.00	44.64
JAM	131.58	106.67	91.72
KNA	6.74	4.85	5.47
LCA	11.86	0.00	0.00
SUR	7.11	47.77	11.85
TTO	260.69	149.00	183.98
VCT	7.89	6.85	19.12
Total	537.27	432.68	442.49

Source: World Integrated Trade System (2013).

Table A2: Data sources		
Variable	Description	Source
Partial equilibrium model		
Imports	Value of imports for each of the selected CARICOM member states at the SITC – two digit level (revision 3).	UN Comtrade database. <a href="http://comtrade.un.org/db/">http://comtrade.un.org/db/</a>
Elasticities	Import demand elasticities and elasticities of substitution between preferred and non-preferred trading partners.	Greenaway and Milner (2006)
Tariff	Extra regional tariff (%)	Greenaway and Milner (2006)
Trade indices		
Trade complementarity index	Value of exports to the various destinations in US\$mn.	UN Comtrade database. <a href="http://comtrade.un.org/db">http://comtrade.un.org/db</a>
RCA index.	Value of exports to the various destinations in US\$mn.	UN Comtrade database. <a href="http://comtrade.un.org/db">http://comtrade.un.org/db</a>

Table A3: Inter-temporal changes in The Bahamas RCA with Canada			
SITC	Description	2000-2002	2008-2010
<b>Sectors that lost comparative advantage (7)</b>			
112	Alcoholic beverages	13.89	0.00
516	Organic chemicals, n.e.s.	1.64	0.00
523	Metallic salts and peroxy salts of inorganic acids	1.01	0.00
597	Prepared additives for mineral oils etc.; liquids for hydraulic transmissions; antifreezes and deicing fluids; lubricating preparations	3.92	0.00
635	Wood manufactures, n.e.s.	1.44	0.00
792	Aircraft and associated equipment; spacecraft (including satellites) and spacecraft launch vehicles; and parts thereof	2.41	0.55
896	Works of art, collectors' pieces and antiques	3.81	0.02
<b>Sectors that gained comparative advantage (5)</b>			
282	Ferrous waste and scrap; remelting ingots of iron or steel	0.00	53.79

515	Organic-inorganic compounds, heterocyclic compounds, nucleic acids and their salts	0.14	158.26
676	Iron and steel bars, rods, angles, shapes and sections, including sheet piling	0.00	1.13
699	Manufactures of base metal, n.e.s.	0.08	1.17
749	Nonelectric parts and accessories of machinery, n.e.s.	0.00	2.12
<b>Sectors that retained comparative advantage (5)</b>			
036	Fish, dried, slated or in brine; smoked fish (whether or not cooked before or during the smoking process); flours, meals n pellets r fish, fit f human consumption	353.53	32.90
269	Worn clothing and other worn textile articles; rags	171.45	52.39
278	Crude minerals, n.e.s.	43.29	4.02
291	Crude animal materials, n.e.s.	15.14	4.17
553	Perfumery, cosmetics, or toilet preparations, excluding soaps	9.54	3.61

Source: UN Comtrade (2012) and own calculations.

<b>Table A4: Inter-temporal changes in Barbados' RCA with Canada</b>			
<b>SITC</b>	<b>Description</b>	<b>2000-2002</b>	<b>2008-2010</b>
<b>Sectors that lost comparative advantage (15)</b>			
881	Photographic apparatus and equipment, n.e.s.	61.72	0.38
098	Edible products and preparations, n.e.s.	15.78	0.28
883	Cinematographic film, exposed and developed, whether or not incorporating sound track or consisting only of sound track.	13.08	0.00
091	Margarine and shortening.	12.75	0.16
111	Non-alcoholic beverages, n.e.s.	11.87	0.66
695	Tools for use in the hand or in machines.	8.71	0.74
813	Lighting fixtures and fittings, n.e.s.	7.40	0.01
884	Optical goods, n.e.s.	4.42	0.09
054	Vegetables, fresh, chilled, frozen or simply preserved; roots, tubers and other edible vegetable products, n.e.s., fresh or dried	2.71	0.01
696	Manufactures of base metal, n.e.s.	2.60	0.00
511	Hydrocarbons, n.e.s. and their halogenated, sulfonated, nitrated or nitrosated derivatives	1.59	0.00
581	tubes, pipes and hoses of plastics	1.55	0.00
764	Telecommunications equipment, n.e.s.; and parts, n.e.s., and accessories of apparatus falling within telecommunications, etc.	1.26	0.09
057	Fruit and nuts (not including oil nuts), fresh or dried	1.23	0.02
723	Civil engineering and contractors' plant and equipment	1.09	0.00
<b>Sectors that gained comparative advantage (13)</b>			
897	Jewellery, goldsmiths' and silversmiths' wares, and other articles of precious or semiprecious materials, n.e.s.	0.53	6.74
727	Food-processing machines (excluding domestic)	0.21	1.46
658	Made-up articles, wholly or chiefly of textile materials, n.e.s.	0.18	1.13
699	Manufactures of base metal, n.e.s.	0.02	10.12
899	Miscellaneous manufactured articles, n.e.s.	0.02	5.86
885	Watches and clocks	0.02	8.21
848	Articles of apparel and clothing accessories of other than textile fabrics; headgear of all materials	0.02	1.74
841	Men's or boys' coats, jackets, suits, trousers, shirts, underwear etc. of woven textile fabrics (except swimwear and coated or laminated apparel)	0.00	1.17
831	Trunks, suitcases, vanity cases, binocular and camera cases, handbags, wallets, etc. of leather, etc.; travel sets for personal toilet, sewing, etc.	0.00	2.04
291	Crude animal materials, n.e.s.	0.00	47.42
612	Manufactures of leather or composition leather, n.e.s.; saddlery and harness	0.00	101.28

282	Ferrous waste and scrap; remelting ingots of iron or steel	0.00	38.15
525	Radioactive and associated materials	0.00	8.68
061	Sugars, molasses, and honey	0.00	1.34
<b>Sectors that retained comparative advantage (8)</b>			
112	Alcoholic beverages	97.56	84.46
001	Live animals other than animals of division 03	21.72	2.88
896	Works of art, collectors' pieces and antiques	5.31	1.82
034	Fish, fresh (live or dead), chilled or frozen	3.63	2.33
292	Crude vegetable materials, n.e.s.	3.03	2.07
893	Articles, n.e.s. of plastics	2.58	1.60
792	Aircraft and associated equipment; spacecraft (including satellites) and spacecraft launch vehicles; and parts thereof	2.17	2.17
048	Cereal preparations and preparations of flour or starch of fruits or vegetables	1.86	1.51
Source: UN Comtrade (2012) and own calculations.			

<b>Table A5: Inter-temporal changes in Guyana's RCA with Canada</b>			
SITC	Description	2000-2002	2008-2010
<b>Sectors that lost comparative advantage (2)</b>			
034	Fish, fresh (live or dead), chilled or frozen	3.83	0.69
843	Men's or boys' coats, capes, jackets, suits, blazers, trousers, shirts, etc. (except swimwear or coated apparel), knitted or crocheted textile fabric	1.32	0.00
<b>Sectors that gained comparative advantage (5)</b>			
282	Ferrous waste and scrap; remelting ingots of iron or steel	0.00	53.79
515	Organic-inorganic compounds, heterocyclic compounds, nucleic acids and their salts	0.14	158.26
676	Iron and steel bars, rods, angles, shapes and sections, including sheet piling	0.00	1.13
699	Manufactures of base metal, n.e.s.	0.08	1.17
749	Nonelectric parts and accessories of machinery, n.e.s.	0.00	2.12
<b>Sectors that retained comparative advantage (1)</b>			
285	Aluminium ores and concentrates (including alumina)	10.86	1.44
Source: UN Comtrade (2012) and own calculations.			

<b>Table A6: Inter-temporal changes in Jamaica's RCA with Canada</b>			
SITC	Description	2000-2002	2008-2010
<b>Sectors that lost comparative advantage (4)</b>			
056	Vegetables, roots and tubers, prepared or preserved, n.e.s.	1.11	0.22
074	Tea and mate	1.01	0.53
111	Non-alcoholic beverages, n.e.s.	1.17	0.49
551	Essential oils, perfume and flavour materials	1.29	0.39
<b>Sectors that gained comparative advantage (3)</b>			
045	Cereals, unmilled (other than wheat, rice, barley and maize)	0.00	1.78
057	Fruit and nuts (not including oil nuts), fresh or dried	0.79	1.00
282	Ferrous waste and scrap; remelting ingots of iron or steel	0.03	9.23
<b>Sectors that retained comparative advantage (8)</b>			
024	Cheese and curd	2.25	1.39
048	Cereal preparations and preparations of flour or starch of fruits or vegetables	1.58	1.04
054	Vegetables, fresh, chilled, frozen or simply preserved; roots, tubers and other edible vegetable products, n.e.s., fresh or dried	5.06	3.70
058	Fruit preserved, and fruit preparations (excluding fruit juices)	13.52	7.14
075	Spices	8.85	5.22
098	Edible products and preparations, n.e.s.	2.06	1.17
112	Alcoholic beverages	5.90	9.97

285	Aluminium ores and concentrates (including alumina)	426.68	285.73
Source: UN Comtrade (2012) and own calculations.			

<b>Table A7: Inter-temporal changes in St. Vincent and the Grenadines RCA with Canada</b>			
<b>SITC</b>	<b>Description</b>	<b>2000-2002</b>	<b>2008-2010</b>
<b>Sectors that lost comparative advantage (10)</b>			
635	Wood manufactures, n.e.s.	9.84	0.33
759	Parts and accessories suitable for use solely or principally with office machines or automatic data processing machines	2.93	0.14
898	Musical instruments, parts and accessories thereof; records, tapes and other sound or similar recordings (excluding photographic film, etc.)	1.17	0.01
022	Milk and cream and milk products other than butter or cheese	66.71	0.00
579	Waste, parings and scrap, of plastics	26.79	0.00
112	Alcoholic beverages	8.75	0.00
034	Fish, fresh (live or dead), chilled or frozen	3.49	0.00
036	Crustaceans molluscs, aquatic invertebrates fresh (live/dead) ch sltd etc.; crustaceans in shell ckd by steam blng wtr wh r nt ch fz drd flr mls pllts hum cnsmpr	2.91	0.00
659	Floor coverings, etc.	1.40	0.00
774	Electro-diagnostic apparatus for medical, surgical, dental or veterinary sciences and radiological apparatus	1.11	0.00
<b>Sectors that gained comparative advantage (15)</b>			
883	Cinematographic film, exposed and developed, whether or not incorporating sound track or consisting only of sound track	0.00	438.62
881	Photographic apparatus and equipment, n.e.s.	0.00	61.06
001	Live animals other than animals of division 03	0.00	23.44
273	Stone, sand and gravel	0.00	13.54
282	Ferrous waste and scrap; remelting ingots of iron or steel	0.00	8.78
288	Nonferrous base metal waste and scrap, n.e.s.	0.00	2.72
657	Special yarns, special textile fabrics and related products	0.00	1.79
763	Sound recorders or reproducers; television image and sound recorders or reproducers	0.00	1.77
792	Aircraft and associated equipment; spacecraft (including satellites) and spacecraft launch vehicles; and parts thereof	0.00	3.20
713	Internal combustion piston engines and parts thereof, n.e.s.	0.00	6.17
874	Measuring, checking, analysing and controlling instruments and apparatus, n.e.s.	0.07	1.08
111	Non-alcoholic beverages, n.e.s.	0.26	100.95
764	Telecommunications equipment, n.e.s.; and parts, n.e.s., and accessories of apparatus falling within telecommunications, etc.	0.28	3.04
058	Fruit preserved, and fruit preparations (excluding fruit juices)	0.56	1.75
098	Edible products and preparations, n.e.s.	0.63	1.29
<b>Sectors that retained comparative advantage (8)</b>			
892	Printed matter	1.19	2.01
813	Lighting fixtures and fittings, n.e.s.	1.49	2.72
745	Nonelectrical machinery, tools and mechanical apparatus, and parts thereof, n.e.s.	1.81	1.66
054	Vegetables, fresh, chilled, frozen or simply preserved; roots, tubers and other edible vegetable products, n.e.s., fresh or dried	2.94	5.54
845	Articles of apparel, of textile fabrics, whether or not knitted or crocheted, n.e.s.	6.77	16.25
821	Furniture and parts thereof; bedding, mattresses, mattress supports, cushions	10.22	2.73

	and similar stuffed furnishings		
057	Fruit and nuts (not including oil nuts), fresh or dried	44.15	20.91
075	Spices	1397.42	214.84
Source: UN Comtrade (2012) and own calculations.			

<b>Table A8: Inter-temporal changes in Trinidad and Tobago's RCA with Canada</b>			
<b>SITC</b>	<b>Description</b>	<b>2000-2002</b>	<b>2008-2010</b>
<b>Sectors that lost comparative advantage (6)</b>			
676	Iron and steel bars, rods, angles, shapes and sections, including sheet piling	42.92	0.00
292	Crude vegetable materials, n.e.s.	2.61	0.36
062	Sugars, molasses, and honey	2.53	0.95
016	Meat and edible meat offal, salted, in brine, dried or smoked; edible flours and meals of meat or meat offal	1.45	0.00
112	Alcoholic beverages	1.38	0.97
054	Vegetables, fresh, chilled, frozen or simply preserved; roots, tubers and other edible vegetable products, n.e.s., fresh or dried	1.34	0.67
<b>Sectors that gained comparative advantage (2)</b>			
035	Fish, dried, salted or in brine; smoked fish (whether or not cooked before or during the smoking process); flours, meals or pellets of fish, fit for human consumption	0.47	2.54
343	Natural gas, whether or not liquefied	0.00	18.51
<b>Sectors that retained comparative advantage (6)</b>			
671	Pig iron and spiegeleisen, sponge iron, iron or steel granules and powders and ferroalloys	553.20	210.47
334	Petroleum oils and oils from bituminous minerals (other than crude), and products therefrom containing 70% (by wt) or more of these oils, n.e.s.	24.34	3.47
512	Alcohols, phenols, phenol-alcohols and their halogenated, sulfonated, nitrated or nitrosated derivatives	19.66	202.22
034	Fish, fresh (live or dead), chilled or frozen	15.42	7.06
111	Non-alcoholic beverages, n.e.s.	11.50	4.25
075	Spices	8.88	4.75
Source: UN Comtrade (2012) and own calculations.			