

Part 6: Partial equilibrium modelling of the EPA  
process

**Michael Gasiorek**

**Jedrzej Chwiejczak**

**January 2006**

Part of a final report, funded by the EC-PREP programme, submitted by the Poverty Research Unit, Sussex University to DFID entitled “The impact of the Cotonou Agreement on trade, production and poverty alleviation in the Caribbean region”

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## 6.1 Introduction

In this part of the report, we explore more formally the possible impact on goods trade of an EPA on the Caribbean economies. As discussed earlier in the report, in terms of goods trade, the main implications of signing an EPA is the move from the current asymmetric trading arrangements to the symmetric liberalisation of “substantially all” trade. The Caribbean economies already largely have tariff free access to the EU market, with trade in certain key products, notably sugar and bananas, being governed by specific protocols. There are substantial changes currently taking place and still being negotiated in both the sugar and banana regimes, which will, of course, have a substantial impact on many of the Caribbean islands. The focus of this report, however, is not on the changing access for the Caribbean economies in the EU market, but on the implications for the Caribbean of opening up their market to EU exports. It is precisely this issue which this part of the report addresses.

The methodology we employ involves the partial equilibrium modelling of Caribbean trade at a very detailed level of product disaggregation. We run the model for each of the Cariforum countries for which data was available. We also run several different variants of the model in order to explore the sensitivity of the results to different assumptions. Hence, we allow for both perfect and imperfect competition, we allow for the use of different underlying elasticities, and different levels of aggregation, and finally we explore the implications of different liberalisation scenarios.

The structure of this part of the report is as follows. The first section provides some relevant background information on the Caribbean economies and their trade flows. In the second section, we detail the modelling structure including a discussion of the underlying data and the assumptions made. In the third section, we explore the consequence for trade and welfare of the liberalisation of trade with the EU. Here we distinguish between two variants of the model where we assume respectively both perfect competition and then imperfect competition. We also explore the sensitivity of the results to different underlying assumptions regarding both the elasticities used, and with respect to the level of aggregation of the data.

The fourth section of this part of the report addresses the issue of substantially all trade. Here we use our model to explore the sensitivity of the results to allowing substantially all trade to be liberalised as opposed to all trade. In addition to this, we use the results from our model to consider how difficult it might be for the Caribbean region to achieve agreement with respect to which industries should / could be included in substantially all trade. We do this by considering the degree of natural overlap between the Cariforum economies for different specifications of the notion of substantially all. Inevitably, also, this leads on to a discussion of the possibility and merits and demerits of special and differential treatment in and for the region.

Finally, in the fifth section we explore the impact on trade and welfare of two alternative trade liberalisation scenarios. First, we consider the impact of MFN liberalisation. The aim here is to assess the extent to which the relatively small welfare gains the EPA based liberalisation appear to bring can be increased through more widespread liberalisation. Secondly, an EPA based liberalisation leads to significant losses of tariff revenue. In order to compensate for this the Caribbean region will need, at least in part, to seek alternative sources of revenue. We therefore assess the implications of replacing the lost tariff revenue through the imposition of a flat rate consumption tax – which is then levied on all imports.

## **6.2 Geographical, Social and Economic background**

### **6.2.1 An economic overview**

The countries of CARIFORUM are a diverse group. The smallest of them (Grenada), is six hundred times smaller than the largest (Guyana). We can divide the Caribbean islands into three separate groups according to land size. The first group consists of small island states on the eastern rim of the Caribbean Sea, the second group consists of a group of larger islands in the north; Belize, mainland Guyana and Suriname form the remaining third group, which is by far the largest of them all:



**Table 6.1 The Caribbean countries 2003: Some basic data**

	<i>Land area (sq km):</i>	<i>Population ('000)</i>	<i>GDP Per Capita (\$ current prices)</i>
<i>Small Islands:</i>			
<b>Antigua and Barbuda</b>	440	78.58	10769.66
<b>Barbados</b>	430	270.58	9978.65
<b>Dominica</b>	750	71.21	3553.71
<b>Grenada</b>	340	104.60	4278.72
<b>St. Kitts and Nevis</b>	360	46.71	8843.17
<b>St. Lucia</b>	620	160.59	3933.96
<b>St. Vincent and the Grenadines</b>	390	109.16	3329.43
<i>Medium Countries:</i>			
<b>Bahamas, The</b>	13880	317.41	16866.24
<b>Belize</b>	22960	273.70	3831.14
<b>Dominican Republic</b>	48730	8738.64	1838.95
<b>Haiti</b>	27750	8439.80	346.86
<b>Jamaica</b>	10990	2642.63	3002.95
<b>Trinidad and Tobago</b>	5130	1312.66	8224.70
<i>Mainland states:</i>			
<b>Guyana</b>	214970	768.89	991.80
<b>Suriname</b>	163270	438.10	2241.52

Source: *World Development Indicators*, World Bank.

Haiti is the poorest country in the sample with a GDP per capita of 346 US\$. The richest island is The Bahamas with a GDP per capita of 16866 US\$. The largest country in terms of GDP is the Dominican Republic with a GDP equal to 16 billion US\$, followed by Trinidad & Tobago with GDP of 10.5 billion US\$. The bulk of economic activity in the region, is concentrated on the medium islands which account for 86% of total CARIFORUM GDP in 2003.

Economic performance over the 2000-2003 period varied considerably among different countries. Excluding Trinidad & Tobago and Belize, the GDP growth was small with a mean value of 1.3% per annum. Dominica, Haiti and St. Lucia have even experienced negative growth during that period, while Belize, and Trinidad and Tobago economies rose at a much more substantial 7.8% per annum while keeping inflation under control. Dominica, Haiti and Suriname have all had annual rates of inflation exceeding 10% indicating a more volatile economic environment.

**Table 6.2 The Caribbean countries 2003: Economic performance**

	<i>GDP (billion \$, current prices)</i>	<i>Average growth of GDP per annum (00-03, constant prices)</i>	<i>Average Inflation (00-03)</i>
<b>Antigua and Barbuda</b>	0.759	3.2	0.4
<b>Bahamas, The</b>	5.237	0.9	2.1
<b>Barbados</b>	2.698	0.2	1.7
<b>Belize</b>	0.988	7.7	1.6
<b>Dominica</b>	0.255	-1.9	-1.0
<b>Dominican Republic</b>	16.090	3.6	12.3
<b>Grenada</b>	0.437	2.0	1.8
<b>Guyana</b>	0.745	0.4	5.1
<b>Haiti</b>	2.921	-0.1	17.4
<b>Jamaica</b>	8.008	1.4	8.8
<b>St. Kitts and Nevis</b>	0.369	2.7	2.2
<b>St. Lucia</b>	0.688	-0.5	1.6
<b>St. Vincent and the Grenadines</b>	0.373	1.4	0.6
<b>Suriname</b>	1.020	3.2	34.3
<b>Trinidad and Tobago</b>	10.545	7.9	4.3
<b>Unweighted average:</b>	3.409	2.1	6.2

Source: International Monetary Fund, World Economic Outlook Database, April 2005

Looking at the structure of economic activity, we see the service sector forming the largest part of GDP, only in Guyana does it accounts for less than half of GDP, with the largest share in Barbados where it forms 82% of GDP. The most important parts of services in the Caribbean are banking and tourism. While it is not within the scope of this report to deal with the issue of services and services trade the importance of this sector does need to be underlined. The issue of services is also then an important part of the EPA negotiations, and signing an EPA may well serve to positively impact on tourism flows. (Arlene, 2005). Equally, it is likely that further and deeper regional integration would serve to boost the amount of regional tourism.

The agricultural sector forms a considerable part of GDP in mainland Guyana (46%) and Belize (24%). In Dominica, the Dominican Republic, St. Lucia, Haiti and Suriname it accounts for more than 10% of GDP, while in the remaining seven countries its contribution is much smaller. The manufacturing sector forms over one fifth of GDP only in Trinidad & Tobago, and it is the second most important sector for an additional four countries. Mining & Quarrying is dependent on the availability of natural deposits, and forms important part of GDP in Guyana (20%) and Trinidad & Tobago (10%).

**Table 6.3 Breakdown of Economic Activity by Sector 2001:**

	<i>Agriculture</i>	<i>Manufacturing</i>	<i>Construction</i>	<i>Services</i>	<i>Mining &amp; Quarrying</i>
<b>Antigua and Barbuda</b>	3.5	2.32	13.34	79.09	1.74
<b>Barbados</b>	5.44	5.54	6.06	82.34	0.62
<b>Belize</b>	24.13	13.14	6.8	55.31	0.63
<b>Dominica</b>	14.64	6.5	7.49	70.64	0.73
<b>Dominican Republic</b>	10.7	31.5	-	57.8	-
<b>Grenada</b>	7.44	7.72	9.09	74.92	0.84
<b>Guyana</b>	46.21	3.24	4.71	26.51	19.33
<b>Haiti</b>	18.86	16.93	11.18	52.91	0.12
<b>Jamaica</b>	7.51	15.09	10.62	58.9	7.88
<b>St. Kitts and Nevis</b>	4.55	10.78	17.31	66.99	0.37
<b>St. Lucia</b>	10.07	6.14	10.36	73.19	0.24
<b>St. Vincent and the Grenadines</b>	6.62	7.81	10.41	74.52	0.64
<b>Suriname</b>	15.96	15.43	2.46	56.99	9.16
<b>Trinidad and Tobago</b>	1.27	22.55	11.12	54.51	10.55

Note: Suriname data refer to 1995; Dominican Republic Manufacturing is not broken down into sectors.

Source: Gasiorok and Winters 2004

## 6.2.2 Caribbean Trade Relations

The typical Caribbean country is highly integrated with the world economy. The unweighted average of trade in goods and services to GDP is 105%, with a current account deficit around 10 % of GDP.

The high dependency on the world economy is a consequence of the small size of the Caribbean countries. Having limited amounts of capital, labour and land, they are more dependant on import of manufacturing goods. A lack of minerals and fuels further increases their trade deficit. The tropical climate gives them particular advantages in some agricultural products such as the production of sugar cane or bananas, but makes them dependent on other agricultural imports. All of this is visible in the large current account deficits in almost all of the region countries, with the sole exception of Trinidad and Tobago, which exports petroleum and natural gas.

**Table 6.4 Caribbean Economies 2002: Trade Indicators**

	<i>Trade as Per Cent of GDP</i>	<i>Exports as Per Cent of GDP</i>	<i>Imports as Per Cent of GDP</i>	<i>Current Account as Per Cent of GDP</i>	<i>Current Account as Per Cent of GDP (average 00-03)</i>
<b>Antigua and Barbuda</b>	128.9	60.5	68.5	-15.2	-12.0
<b>Bahamas, The</b>	-	-	-	-6.8	-9.3
<b>Barbados</b>	107.5	52.2	55.3	-6.6	-5.9
<b>Belize</b>	119.2	52.6	66.6	-20.2	-20.7
<b>Dominica</b>	116.7	54.4	62.3	-15.0	-17.7
<b>Dominican Republic</b>	84.5	37.8	46.7	-3.7	-1.5
<b>Grenada</b>	104.5	47.4	57.2	-32.3	-28.4
<b>Guyana</b>	199.0	93.0	106.0	-14.8	-15.0
<b>Haiti</b>	50.1	12.9	37.2	-1.0	-1.0
<b>Jamaica</b>	92.4	36.2	56.3	-14.9	-10.1
<b>St. Kitts and Nevis</b>	117.2	46.0	71.2	-36.8	-28.8
<b>St. Lucia</b>	98.5	46.3	52.2	-12.7	-13.3
<b>St. Vincent and the Grenadines</b>	109.5	49.2	60.3	-11.8	-11.1
<b>Suriname</b>	66.2	21.3	44.9	-6.3	-9.8
<b>Trinidad and Tobago</b>	96.5	50.4	46.1	0.9	6.3
<b>Unweighted Average</b>	106.5	47.2	59.3	-13.1	-11.9

Sources: Current Account Balance: International Monetary Fund, World Economic Outlook database, April 2005; Trade Data: World Development Indicators, World Bank.

### A) Main Trading Partners

The USA remains the main trading partner for the Caribbean countries, accounting for 44% of CARIFORUM imports and 35% of exports. It is followed by intra-CARIFORUM trade and trade with the EU, each of them accounting for roughly 20% of total trade. The EU accounts for 26% of Caribbean exports, which can be viewed, as a consequence of the Lome agreements which gave the Caribbean, and more generally the ACP countries, preferential access to the EU markets.

The importance of the three main trading partners is reflected by the preferential trading agreements in force. Caribbean-EU trade relations arise from the Lomé conventions, and more recently the Cotonou agreement. Relations with US arise under the Caribbean Basin Initiative (CBI), while intra-regional integration is a consequence largely of CARICOM, the Organisation for Eastern Caribbean States (OECS) and to some extent Free Trade Area of The Americas (FTAA). While the latter has certain elements of deeper integration, the former are largely shallow integration arrangements.

**Table 6.5 Destinations of Caribbean Exports 2000-2003**

	<i>US</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>World</i>
<b>Antigua and Barbuda</b>	19.03	36.46	23.31	21.19
<b>Bahamas, The</b>	77.93	0.36	13.60	8.11
<b>Barbados</b>	15.37	43.96	16.03	24.64
<b>Belize</b>	50.24	6.73	29.87	13.17
<b>Dominica</b>	7.28	59.10	28.79	4.83
<b>Dominican Republic</b>	40.22	11.12	18.84	29.81
<b>Grenada</b>	38.34	23.53	33.97	4.16
<b>Guyana</b>	33.26	22.93	35.87	7.93
<b>Jamaica</b>	33.80	4.76	29.98	31.45
<b>St. Kitts and Nevis</b>	78.52	3.46	14.46	3.57
<b>St. Lucia</b>	19.19	35.13	42.58	3.10
<b>St. Vincent and the Grenadines</b>	5.52	50.41	39.39	4.67
<b>Suriname</b>	22.03	5.72	29.95	42.29
<b>Trinidad and Tobago</b>	48.06	24.13	9.29	18.52
<b>Unweighted average</b>	34.91	23.42	26.14	15.53

Note: World means Rest of the World. The Table was assembled by averaging export flows for 2000-2003. For some of the countries not all years have been available, for Haiti not a single year has been available.

Source: UN COMTRADE Database, accessed through WITS.

**Table 6.6 Origin of Caribbean Imports 2000-2003**

	<i>US</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>World</i>
<b>Antigua and Barbuda</b>	49.28	12.57	11.11	27.04
<b>Bahamas, The</b>	85.62	0.67	2.13	11.58
<b>Barbados</b>	41.27	20.44	16.46	21.84
<b>Belize</b>	43.53	3.49	7.86	45.11
<b>Dominica</b>	36.87	29.45	14.33	19.35
<b>Dominican Republic</b>	44.81	1.10	10.65	43.44
<b>Grenada</b>	44.34	24.88	14.08	16.70
<b>Guyana</b>	35.65	21.14	12.27	30.94
<b>Jamaica</b>	44.59	12.13	9.80	33.48
<b>St. Kitts and Nevis</b>	53.79	17.58	9.43	19.20
<b>St. Lucia</b>	43.18	22.11	16.68	18.04
<b>St. Vincent and the Grenadines</b>	38.87	28.84	16.15	16.14
<b>Suriname</b>	26.31	20.06	27.67	25.96
<b>Trinidad and Tobago</b>	33.32	3.18	15.94	47.55
<b>Unweighted average</b>	44.39	15.55	13.18	26.88

Note: See preceding table

## B) Trade Structure

Analysing the trade structure of the Caribbean states is complicated for two reasons. First, Caribbean trade, particularly for certain countries, tends to experience considerable yearly fluctuations. The second problem lies in the small volume of trade for

some of the smaller countries in the region. A single large government transaction can substantially influence the visible structure in a given year. In order to partially compensate for those effects we take have taken the last four years of available data (2000-2003), and then taken averages. However, due to the lack of data availability, this is not possible for each country and Haiti had to be entirely dropped.

Looking at the trade structure obtained by this process, we find machinery and transport equipment, as the most significant import products. It is in first place for all of the fourteen economies for which the data was available and accounts for one fourth of total imports. For six countries, the second most important category of imports are manufactured goods. This is followed by: Mineral Fuels for four countries and food where the imports are important for Antigua, St. Kitts & Nevis and St. Lucia.

The most important in terms of exports are agricultural products accounting for one third of total CARIFORUM exports and being the most important product for six countries. Chemicals are the biggest exporting product for Suriname, Jamaica, Dominica and Bahamas. Mineral fuels are important exports for Barbados and Trinidad & Tobago.

EU-Caribbean trade structure is on the whole similar to what was observed for the total Caribbean trade. The only difference is the smaller diversification in traded goods. Half of Caribbean exports to EU are agricultural goods and half of the imports from EU are various products of manufacturing. Antigua and Barbuda strongly stands out from the rest of the region, having largely two-way trade in machinery and transport equipment.

Overall, the pattern visible in the Caribbean trade reinforces the early impression of strong dependence on the world economy. It is somehow typical for developing region with large imports of capital intensive goods and large exports of food. However, there is also some visible two-way trade in light manufacturing products and chemicals. The structure of trade reflects well the diversity of individual states forming CARIFORUM.

Table 6.7. Share of Total Trade by Product 2000-2003

	Food and Live Animals	Beverages and Tobacco	Crude Materials	Mineral Fuels	Animal and vegetable oils and fats	Chemicals	Manufactured Goods	Machinery Transport Equipment	Misc. Manufactures	Commodities n.e.c.
<b>Imports</b>										
Antigua and Barbuda	17.24	3.95	2.92	16.32	0.46	6.31	13.76	27.38	11.56	0.10
Bahamas, The	14.06	2.86	2.74	12.73	0.18	8.05	16.84	26.16	14.78	1.61
Barbados	13.13	2.96	3.20	11.39	0.45	10.49	15.81	26.37	15.90	0.30
Belize	12.26	1.22	0.90	14.43	0.24	8.53	15.30	23.49	9.36	14.25
Dominica	17.62	2.75	2.05	9.95	2.37	11.68	18.02	23.36	12.18	0.02
Dominican Republic	8.97	0.75	3.41	22.56	1.12	10.96	15.60	29.38	7.17	0.09
Grenada	16.95	2.13	2.63	8.54	0.28	7.74	17.81	29.08	14.82	0.01
Guyana	12.39	1.91	1.09	22.80	0.52	11.63	16.30	24.49	8.72	0.15
Jamaica	13.77	0.95	1.55	18.08	0.59	10.57	13.58	26.11	12.42	2.40
St. Kitts and Nevis	14.05	2.50	3.04	6.92	0.36	7.13	20.93	28.68	16.37	0.02
St. Lucia	20.31	3.70	2.64	10.15	0.16	7.80	17.11	23.73	14.36	0.03
St. Vincent	21.15	2.29	3.09	9.29	0.36	9.39	18.94	21.50	13.97	0.02
Suriname	13.73	2.46	1.39	11.73	1.19	9.73	16.73	33.84	8.88	0.33
Trinidad and Tobago	7.56	0.63	2.74	27.41	0.30	7.66	13.02	34.69	5.50	0.48
Unweighted average	14.51	2.22	2.38	14.45	0.61	9.12	16.41	27.02	11.85	1.42
<b>Exports</b>										
Antigua and Barbuda	2.07	3.12	2.42	2.43	0.21	6.17	11.29	61.45	10.75	0.10
Bahamas, The	18.27	7.89	6.08	16.40	0.00	23.11	3.80	20.23	4.21	0.00
Barbados	20.32	8.53	0.48	20.44	0.40	13.64	13.52	12.97	8.02	1.67
Belize	61.70	0.06	1.10	0.64	0.00	0.23	0.39	1.75	5.46	28.67
Dominica	35.82	1.28	4.23	0.00	0.00	53.81	0.99	2.72	1.14	0.00
Dominican Republic	32.65	8.05	3.02	15.81	0.10	6.05	21.24	1.38	5.82	5.87
Grenada	45.57	0.51	0.04	0.04	0.00	3.06	5.72	41.47	3.58	0.00
Guyana	57.13	2.32	19.25	0.01	0.15	1.29	11.04	3.02	5.33	0.46
Jamaica	17.79	4.52	7.35	1.32	0.01	58.76	0.80	1.46	7.98	0.00
St. Kitts and Nevis	14.32	1.87	0.30	0.03	0.00	0.28	1.96	76.65	4.46	0.12
St. Lucia	41.19	17.35	0.54	4.96	0.04	1.61	6.97	15.92	10.53	0.90
St. Vincent	73.80	3.47	0.25	0.04	0.01	0.94	6.97	11.02	3.50	0.00
Suriname	15.58	0.74	1.15	4.50	0.16	73.91	0.60	2.27	0.42	0.66
Trinidad and Tobago	2.99	1.96	0.19	57.81	0.10	20.22	8.80	6.48	1.42	0.04
Unweighted average	31.37	4.41	3.31	8.89	0.08	18.79	6.72	18.48	5.19	2.75

Source: UN COMTRADE Database, accessed through WITS

## 6.2 Modelling structure and methodology

In this section, we introduce and discuss the underlying methodology used for the simulations. There are two principal modelling structures we employ here – an Armington perfectly competitive model, and an imperfectly competitive model. Here we detail the key features of both these models as well as discussing the welfare measures used in the modelling exercise.

### 6.2.1 The Benchmark Model – Algebra

The model that forms the basis of the analysis is a slightly modified version of Francois & Hall (1997). This model follows the Armington (1969) assumption that we have well behaved preferences over a weakly separable product category that has similar, but not identical products. The products are differentiated by their place of origin and a constant elasticity of substitution is assumed among different products in the same class. The imperfect substitutes approach was preferred over perfect one, because the Caribbean imports are mainly manufacturing goods and thus they are similar but not identical. The model is specified as a non-linear system of equations and numerical methods are used for solving. The GAUSS programming language was used to implement the model.

We begin by firmly grounding the model in standard consumer theory.

Consider a market with  $n$  products from different countries:  $X_1, \dots, X_n$ . We can introduce composite good made from all of the competing products:  $X = u(X_1, \dots, X_n)$ . This gives us a quantity-index of consumption in given market, which can be viewed as a utility function of a representative consumer. We assume that  $u$  has generalized CES form:

$$X = u(X_1, \dots, X_n) = \left( a_1 X_1^\rho + \dots + a_n X_n^\rho \right)^{\frac{1}{\rho}} \quad (1.1)$$

where  $a_n$  are called CES weights and  $\rho$  is a constant less than one. If we combine it with budget constraint  $Y = \sum_{i=1}^n P_i X_i$ , we can set up a dual-viewing consumer as choosing a consumption bundle that minimises the level of expenditures while retaining specific level of utility. The problem then becomes:



$$\min_{X_1, \dots, X_n} Y = \sum_{i=1}^n P_i X_i \quad \text{s.t.} \quad u(X_1, \dots, X_n) = X \quad (1.2)$$

To solve it we set up Lagrangian:

$$L(X_1, \dots, X_n, \lambda) = \sum_{i=1}^n P_i X_i + \lambda (u(X_1, \dots, X_n) - X) \quad (1.3)$$

Differentiating the above expression, we can obtain the conditions for an optimal solution:

$$\frac{\frac{\partial u}{\partial X_j}}{\frac{\partial u}{\partial X_k}} = \frac{P_j}{P_k}, \quad k = 1, \dots, n \quad (1.4)$$

This means that the marginal rate of substitution between two goods equals their price ratio. In our case, the marginal utility for good  $X_i$  equals:

$$\frac{\partial u}{\partial X_i} = a_i X_i^{\rho-1} (a_1 X_1^\rho + \dots + a_n X_n^\rho)^{\frac{1}{\rho}-1} \quad (1.5)$$

Which combined with **Error! Reference source not found.** gives us:

$$\frac{\frac{\partial u}{\partial X_j}}{\frac{\partial u}{\partial X_k}} = \left( \frac{a_j}{a_k} \right) \left( \frac{X_j}{X_k} \right)^{\rho-1} = \frac{P_j}{P_k}, \quad k = 1, \dots, n \quad (1.6)$$

Solving for  $X_k$  we obtain:

$$X_k = \left( \frac{a_j P_k}{a_k P_j} \right)^{\frac{1}{\rho-1}} X_j, \quad k = 1, \dots, n \quad (1.7)$$

Before moving any further, some simplifications can be made. By rearranging, **Error! Reference source not found.** we can see that the elasticity of substitution between  $X_k$  and any other product competing in the market is constant and equal to  $\frac{1}{\rho-1}$ :

$$\frac{X_k}{X_j} = \left( \frac{a_j}{a_k} \right)^{\frac{1}{\rho-1}} \left( \frac{P_k}{P_j} \right)^{\frac{1}{\rho-1}}, \quad k = 1, \dots, n \quad (1.8)$$

Following the traditional notation we assume  $\sigma = \frac{1}{\rho-1}$ , then

**Error! Reference source not found.** simplifies to:

$$X_k = \left( \frac{a_j P_k}{a_k P_j} \right)^\sigma X_j, \quad k = 1, \dots, n \quad (1.9)$$

We can now use the final equation arising from using Lagrange method:

$$\frac{\partial L}{\partial \lambda} = X - u(X_1, \dots, X_n) = 0 \quad (1.10)$$

Substituting using **Error! Reference source not found.** gives us:

$$X = \left[ \sum_{k=1}^n a_k \left( X_j \left( \frac{a_j P_k}{a_k P_j} \right)^\sigma \right)^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}} = X_j a_j^{-\sigma} \left[ \sum_{k=1}^n a_k^\sigma \left( \frac{P_k}{P_j} \right)^{\sigma-1} \right]^{\frac{\sigma}{\sigma-1}} \quad (1.11)$$

Solving for the  $X_j$  we obtain Hicksian demands:

$$X_j = X \cdot a_j^\sigma \left[ \sum_{k=1}^n a_k^\sigma \left( \frac{P_k}{P_j} \right)^{\sigma-1} \right]^{\frac{\sigma}{1-\sigma}} \quad (1.12)$$

We could now continue with the model implementation, but it is much better to simplify the obtained expression using property arising from Armington (1969) assumptions:

$$P = P_1 / \frac{\partial u}{\partial X_1} = \dots = P_n / \frac{\partial u}{\partial X_n} \quad (1.13)$$

where  $P$  is an exact price index corresponding to the cost of a unit of utility. Substituting the relevant derivatives leads to:

$$P = P_j a_j^{-1} X_j^{\frac{1}{\sigma}} X^{-\frac{1}{\sigma}}, \quad j = 1, \dots, n \quad (1.14)$$

Substituting for  $X_j$  from **Error! Reference source not found.** and rearranging we end with:

$$\left( \frac{P}{P_j} \right)^\sigma = \left[ \sum_{k=1}^n a_k^\sigma \left( \frac{P_k}{P_j} \right)^{\sigma-1} \right]^{\frac{\sigma}{1-\sigma}} \quad (1.15)$$

That along with the linear homogeneity of the utility function permits us to write the demand in a more compact form:

$$X_j = X \cdot a_j^\sigma \left( \frac{P}{P_j} \right)^\sigma = \left( \frac{a_j}{P_j} \right)^\sigma Y \cdot P^{\sigma-1}, \quad j = 1, \dots, n \quad (1.16)$$

To obtain the price index  $P$  we need to calculate the expenditure function for a unit of utility:

$$PX = e(p, X) = \left( \sum_{i=1}^n P_i^{1-\sigma} a_i^\sigma \right) P^\sigma X, \quad X \geq 1 \quad (1.17)$$

$$P = \left( \sum_{i=1}^n P_i^{1-\sigma} a_i^\sigma \right)^{\frac{1}{1-\sigma}} \quad (1.18)$$

Now if we make assumption about functional form of demand for composite good and supply functions for different goods, we can specify the model used for analysis. Assuming supply function with constant supply elasticity, we obtain excess demand conditions for each of the products:

$$\left( \frac{a_1}{P_1} \right)^\sigma Y \cdot P^{\sigma-1} - k_1 \left( \frac{P_1}{(1+t_1)} \right)^{\varepsilon_1} = 0 \quad (1.19)$$

$$\left( \frac{a_n}{P_n} \right)^\sigma Y \cdot P^{\sigma-1} - k_n \left( \frac{P_n}{(1+t_n)} \right)^{\varepsilon_n} = 0$$

where:  $k_i$  are supply constants,  $t_i$  are aggregated trade barriers and  $\varepsilon_i$  are supply elasticities. Adding the excess demand condition for composite good:

$$Y - k_a P^{1-NA} = 0 \quad (1.20)$$

and price index equation:

$$P - \left( \sum_{i=1}^n P_i^{1-\sigma} a_i^\sigma \right)^{\frac{1}{1-\sigma}} = 0 \quad (1.21)$$

we obtain a model ready for implementation. The model can be summarised in a simple table:

**Table 6.8 Model Summary**

Variables:	$P_1, \dots, P_n$ - product prices, $Y$ - total expenditure, $P$ - composite good price index
Parameters (calibrated):	$a_1, \dots, a_n$ - CES weights, $k_1, \dots, k_n$ - supply constants, $k_a$ - demand for composite constant
Parameters (data):	$X_1, \dots, X_n$ - base trade flows, $t_1, \dots, t_n$ - base tariffs
Parameters (assumed):	$\sigma$ - elasticity of substitution, $NA$ - composite elasticity of demand, $\varepsilon_1, \dots, \varepsilon_n$ - elasticities of supply

## 6.2.2 The Imperfectly Competitive Model – Algebra

### 6.2.3 Behaviour of the Model

The adopted model allows us to compute the impact of changing aggregated trade barriers for a given product, on price system. Using new prices, we can obtain new trade flows, which in turn allow us to compute change in welfare measures. The exercise is a fairly standard comparative static one. The model parameters: CES weights, constants in supply functions and constant in demand for composite good are calibrated to replicate the base data.

When conducting an experiment, in which we reduce tariff barriers, two qualitative outcomes are possible. In the first one, due to the reduction in the domestic price of a given product, consumers are better off and with the money saved on one product, they want to consume more of every other product in the market. This behaviour is purely trade creating and most of the change is driven by the income effect. In the other case, the same fall in price induces consumers to switch from the other products, to the one that has become cheaper. This scenario is in principle trade diverting and is more likely to lead to a welfare loss, as it switches from the most efficient sources in the world to the one which price fell. In the case of the CARIFORUM countries, this supply switching could lead to a welfare increase if switching from preferentially treated regional suppliers, to the most efficient suppliers in the joint CARIFORUM-EU market. This is known as trade reorientation.

Because the products are imperfectly substitutable, the reallocation never leads to extreme cases, such as completely stopping the consumption of a given product. The magnitude of changes depends strongly on the exact values of model parameters, the most important of them being: the elasticity of substitution  $\sigma$  and elasticity of demand for composite good -  $\eta$ . It can be shown (De Melo, 1992) that the welfare outcomes depends on the ratio of these elasticities. If the former is greater, then the latter, then trade diverting scenario will dominate, if it is the opposite case then we will observe trade creation. When both are equal, the consumption of a good which price fell will rise and consumption of other goods remains constant. Given the importance of both elasticities, one would expect that in the literature there is a good understanding as to their

approximate values. However, this is not the case. Different models often use quite different elasticities, and thus the conclusions arising from partial and general equilibrium models need to be treated with some caution (Laird, 1992, Hertel, 2004). For our modelling exercise, we adopt a fairly standard set of elasticities and then conduct sensitivity analysis around these. Generally, also, it seems more plausible that the elasticity of substitution will be greater than the composite elasticity of demand, and this is incorporated in our modelling.

## 6.2.4 The Welfare Measures

Three different measures of welfare are computed, when comparing the base solution with the simulation outcome. The first one is the change in tariff revenue, it is computed as:

$$\sum_{j=1}^n \left( X_{j,sim} P_{j,sim}^* \cdot t_{j,sim} - X_{j,base} P_{j,base}^* \cdot t_{j,base} \right) \quad (1.22)$$

where  $P_j^*$  is equal to the world price. The second one is the change in consumer surplus:

$$\sum_{j=1}^n \left( (P_{j,base} - P_{j,sim}) X_{j,base} + \frac{1}{2} (P_{j,base} - P_{j,sim}) (X_{j,sim} - X_{j,base}) \right) \quad (1.23)$$

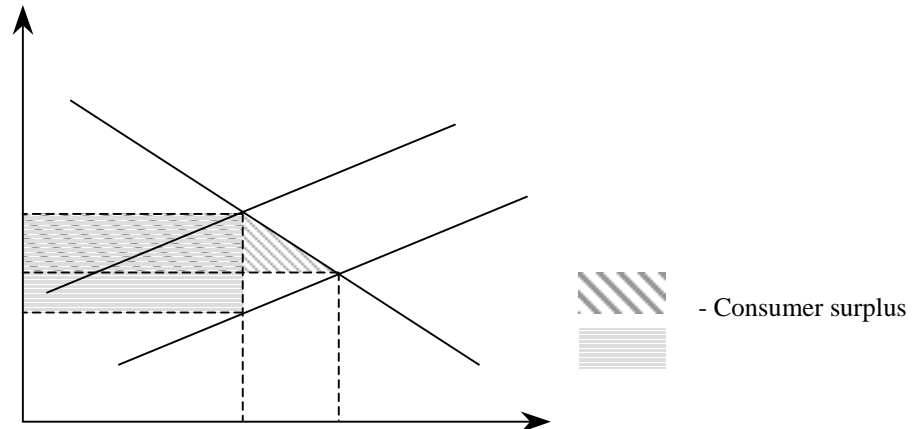
This can only be computed if the driving force behind the changes is mainly attributed to the shifting supply schedule:  $P_{j,base} > P_{j,sim}$  and  $X_{j,base} < X_{j,sim}$  or  $P_{j,base} < P_{j,sim}$  and  $X_{j,base} > X_{j,sim}$ . In practice, it means that the computations are possible for those products where trade has changed as a direct effect of tariff rise or fall. Both of the effects can be seen in Figure 6.1 below:

In Figure 6.1, the supply schedules are upward sloping. This is for expositional purposes. In reality, the Caribbean economies are small countries and it would be hard to see any effect on the world prices due to local change in demand. Hence in the modelling exercise the parameters governing slope of supply functions are chosen such that they are almost horizontal. Only the supply from other Caribbean countries is allowed to differ from horizontal schedule. With non-horizontal supply schedules, a given country can have some influence on the world price, hence we can compute a terms-of-trade effect, which

should be negligible for all products except Caribbean, for which it should nevertheless remain small:

$$\sum_{j=1}^n (P_{j,base}^* - P_{j,sim}^*) X_{j,base} \quad (1.24)$$

**Figure 6.1: Understanding the welfare measures**



### 6.2.5 Data

The developed model was implemented for fourteen countries. Haiti had to be excluded due to lack of relevant trade statistics. The data availability is summarised in Table 6.9 below.

As the model tries to capture the underlying structure of the economy, where possible the trade flows were averaged over the available period. The tariffs used come from the latest available period out of the years covered. The relevant trade flows are imports reported by the receiving country at the HS 1996 6-digit level, covering approximately 5000 different products. The trade flows were obtained from UN COMTRADE database that was accessed using World Integrated Trade Solution (WITS). The tariff data comes from United Nations Conference on Trade and Development (UNCTAD). The data are assembled into Trade Analysis and Information System database (TRAINS), which is accessible using WITS. Some tariff fitting had to be done, as tariffs are still classified using H0 (1988 revision of HS), while the trade flows are already revised in H1 nomenclature. The report contains this data also at the 4-digit level and 2-digit level.

**Table 6.9 Data availability**

	<i>Imports averaged over:</i>	<i>Tariffs:</i>
<b>Antigua and Barbuda</b>	2000	2003
<b>Bahamas, The</b>	2000-2001	2002
<b>Barbados</b>	2000-2003	2003
<b>Belize</b>	2000-2003	2003
<b>Dominica</b>	2000-2003	2003
<b>Dominican Republic</b>	2001	2004
<b>Grenada</b>	2000-2003	2003
<b>Guyana</b>	2000-2003	2003
<b>Haiti</b>	...	...
<b>Jamaica</b>	2000-2002	2003
<b>St. Kitts and Nevis</b>	2000-2003	2003
<b>St. Lucia</b>	2000-2003	2003
<b>St. Vincent and the Grenadines</b>	2000-2003	2003
<b>Suriname</b>	2000-2001	2000
<b>Trinidad and Tobago</b>	2000-2003	2003

Sources: Imports UN COMTRADE, Tariffs TRAINS, both accessed through WITS.

### 6.3 Simulating the impact of EPA induced liberalisation

The general model developed in the previous section, was scaled down, to deal with four principal sources of supply competing in a given Caribbean market. As there are no detailed data on production in the Caribbean, domestic Caribbean production was excluded from the model. This decision is made in all of the partial equilibrium papers that analyse the same topic. The common justification for making it is that the Caribbean countries produce little amounts of their main imports (Greenaway & Milner, 2003). The supply sources used are: US, ECC15, CARIFORUM and World<sup>1</sup>. The model is coded in the GAUSS programming language<sup>2</sup>.

<sup>1</sup> World here means rest of the world.

<sup>2</sup> Note that a single run of the whole model, can take from 5 minutes to 3 hours depending on the amount of products covered in each country. Computations were done on a Intel Celeron 2.8 Ghz, with 512 Mb RAM and Windows version of GAUSS 6.0. When conducting sensitivity analysis of more than one variable, the required number of runs rises exponentially. Hence, a code provided will take anywhere between 1 and 16 hours to obtain solutions, with intervals for a wide range of possible parameters. For ease of use and ability to modify the data, we decided to do all of the input and output in Excel, which is then integrated into the GAUSS code.

The remainder of this section details our results under different modelling scenarios. First, and as a benchmark case we consider the liberalisation of all trade with the EU, under the Armington perfectly competitive modelling assumptions. This serves as the benchmark both with regard to the product coverage and with regard to the underlying modelling assumptions. Subsequently we explore the consequences of changing these assumptions. Hence we are interested in seeing how sensitive the results may be to a switch from a perfectly to an imperfectly competitive model, how sensitive the results may be to different levels of aggregation, and how sensitive they may be to different liberalisation scenarios. Two issues are important here. The first is concerned with the extent to which the Caribbean liberalised only with the EU, or also with respect to other countries. This issue is explored directly in this section. The second is concerned with the fact that it is clearly unlikely that all trade with the EU will be liberalised under a future EPA. Important here is the issue of definitions of substantially all trade. This matter is discussed in the subsequent section of this part of the report.

### **6.3.1 Benchmark Results**

The benchmark scenario simulates the upper bound for the likely effects of trade liberalization between Caribbean countries and EU. It assumes that all of the tariffs on goods imported from the EU are completely reduced and that products are imperfect substitutes as in Armington (1969). It is simulated at the most detailed level of aggregation the HS 1996 classification at the six digits, which typically covers around four thousand products for each country. Among those, the trade with the EU covers, on average, approximately two thousand product categories. We run the simulations for each of the Cariforum group of countries for which data was available. As discussed earlier we have chosen mid-range values for the underlying elasticities but then engage in extensive sensitivity analysis. We have also assigned three separate groups of elasticities depending on the product group. Hence, we differentiate between agricultural goods, raw materials and manufactured goods, as can be seen from the table below.



**Table 6.10 Set of Benchmark Elasticities**

<i>Products (HS 1996)</i>	<i>Import demand elasticity</i>	<i>Elasticity of Substitution</i>
Agriculture (01-24)	-1.75	-4.2
Raw Materials (25-27)	-2.25	-9.0
Manufactured goods (28-97)	-2.75	-6.0

For each of our simulations we present three separate sets of results. First, we describe the changes in the composition of the trade between the country in question and its most important import sources, where the base is the level of imports from each source. There are three main sources of imports for the Caribbean country: the United States, other Caribbean countries, and the European Union. The remaining imports are added up to form the World category. The values reported are percentage changes where the base is the level imports coming from a given source – we call this Base 1. The first table for the benchmark run is presented below:

**Table 6.11 Full liberalisation of EU imports – Changes in trade flows (Base 1)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	-3.6	-2.5	59.6	-3.0	1166
<b>Bahamas, The</b>	-2.7	-3.5	195.2	-1.9	1071
<b>Barbados</b>	-7.7	-4.8	72.3	-5.0	2946
<b>Belize</b>	-3.5	-2.8	54.6	-1.5	1117
<b>Dominica</b>	-3.7	-3.5	48.4	-2.5	1460
<b>Dominican Republic</b>	-2.1	-0.7	45.3	-2.4	2640
<b>Grenada</b>	-3.8	-2.8	47.7	-3.3	1799
<b>Guyana</b>	-2.7	-1.6	37.6	-2.4	2001
<b>Jamaica</b>	-3.0	-2.4	50.5	-2.1	2558
<b>St. Kitts and Nevis</b>	-3.6	-2.0	55.2	-2.2	1368
<b>St. Lucia</b>	-5.1	-3.7	53.1	-4.2	2035
<b>St. Vincent and the Grenadines</b>	-3.8	-2.8	49.4	-3.6	1654
<b>Suriname</b>	-2.6	-3.6	26.3	-2.4	1818
<b>Trinidad and Tobago</b>	-1.6	-2.3	25.1	-1.5	2876
<b>Unweighted average</b>	-3.5	-2.8	58.6	-2.7	1893
<b>OECS average</b>	-3.9	-2.9	52.2	-3.1	1580

Note: Percentage change; Base is total imports from a given source  
Source: Own calculations

Hence if we take the first row of the results for Antigua and Barbuda we see that exports by the EU to Antigua and Barbuda have increased by 59.6% (relative to base EU exports), whereas the exports of the World, other Cariforum countries, and the US have each declined by between 2.5-3.6%. From the table we see that on average the Caribbean countries increase their trade with the EU by about just over 58%. There is direct evidence

of trade diversion, which typically more pronounced strongly for the OECS countries. The presence of trade diversion can be seen in the decline in imports from the US and the rest of the World. There is also some trade reorientation: which is the results of source of supply shifting from less efficient CARICOM suppliers which had been favoured by the previous trade agreement to the EU. As discussed earlier, trade diversion is welfare decreasing while trade reorientation is welfare increasing.

The biggest change can be seen for Bahamas where imports from the EU increase by almost 200%. This substantial increase is due to the high initial tariffs and very low imports from the EU at the base which form 2.1% of Bahamas' total imports. Barbados appears to have the most scope for possible trade diversion which is caused by the strong competition in its import markets at a very fine level. However, one has to be very careful in making welfare interpretations from this table. It is important to bear in mind that the imports coming from EU form roughly 15% of the total imports of Caribbean countries. This is three times less than imports from the US, which are typically around 45% of trade. So each percentage point in the US column is roughly three times more important than the same point in the EU column. This way of presenting the data really shows the changes in each individual source, but as we described it can be hard to assess changes between two different sources. Table 6.12 below, is based on the same simulation but this time with total imports from *all* sources as the base – we call this Base 2:

**Table 6.12 Full liberalisation of EU imports – Changes in trade flows (Base 2)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	-0.6	-0.3	7.8	-1.7	1166
<b>Bahamas, The</b>	-0.2	0.0	4.8	-1.7	1071
<b>Barbados</b>	-1.9	-0.5	13.4	-2.3	2946
<b>Belize</b>	-1.1	-0.1	5.1	-0.8	1117
<b>Dominica</b>	-0.8	-0.8	7.6	-1.0	1460
<b>Dominican Republic</b>	-0.8	0.0	5.6	-1.2	2640
<b>Grenada</b>	-0.7	-0.5	7.2	-1.6	1799
<b>Guyana</b>	-0.6	-0.3	5.8	-1.0	2001
<b>Jamaica</b>	-1.1	-0.1	5.6	-1.0	2558
<b>St. Kitts and Nevis</b>	-0.7	-0.2	6.0	-1.2	1368
<b>St. Lucia</b>	-1.0	-0.7	9.7	-1.8	2035
<b>St. Vincent and the Grenadines</b>	-0.7	-0.6	8.7	-1.5	1654
<b>Suriname</b>	-0.6	-0.6	8.1	-0.7	1818
<b>Trinidad and Tobago</b>	-0.8	-0.1	3.7	-0.5	2876
<b>Unweighted average</b>	-0.8	-0.4	7.1	-1.3	1893
<b>OECS average</b>	-0.8	-0.5	7.9	-1.5	1580

Note: Percentage change; Base is total imports from all sources  
Source: Own calculations

The table indicates that the CARIFORUM countries increase their imports by 4.3% on average. The extent of trade reorientation is much smaller than the extent of trade diversion. The liberalization of tariffs with the EU causes increases in its' import market share from 15% on average to 20% on average. The changes in the OECS countries trade flows from all sources tend to be slightly more pronounced on average than the rest of the Cariforum countries.

The third and final table for this simulation summarises the effects of the changes in trade flows on our different measures or indicators of welfare.

**Table 6.13 Full liberalisation of EU imports - Welfare and Tariff Revenue**

	<i>Change in Tariff Rev. (% of base TR)</i>	<i>Change in Tariff Rev.</i>	<i>Change in Consumer Surp.</i>	<i>Change in Welfare</i>	<i>Welfare (% of tot. imports)</i>
<b>Antigua and Barbuda</b>	-19.06	-4.85	5.55	0.67	0.24
<b>Bahamas, The</b>	-4.38	-14.59	16.61	1.99	0.12
<b>Barbados</b>	-25.56	-25.64	29.52	3.36	0.34
<b>Belize</b>	-13.16	-3.97	4.36	0.32	0.09
<b>Dominica</b>	-23.68	-1.76	2.24	0.43	0.37
<b>Dominican Republic</b>	-18.34	-58.87	63.27	4.03	0.09
<b>Grenada</b>	-21.61	-3.08	3.44	0.36	0.17
<b>Guyana</b>	-20.32	-5.87	6.71	0.77	0.17
<b>Jamaica</b>	-16.02	-32.14	35.82	3.58	0.12
<b>St. Kitts and Nevis</b>	-13.36	-2.22	2.49	0.26	0.14
<b>St. Lucia</b>	-25.45	-5.87	7.06	1.17	0.39
<b>St. Vincent</b>	-26.70	-2.97	3.49	0.51	0.30
<b>Suriname</b>	-63.11	-8.61	11.02	2.37	0.55
<b>Trinidad and Tobago</b>	-21.81	-21.23	23.55	2.21	0.08
<b>Unweighted average</b>	-22.32	-13.69	15.37	1.57	0.23
<b>OECS average</b>	-21.64	-3.46	4.04	0.57	0.27

Note: First and last column are percentage changes; All other values are expressed in millions of US\$  
Source: Own calculations

The first and second columns of this table give information on the impact of the simulation on tariff revenues. The first column gives the notional percentage change in tariff revenue for each country, and the second column gives the actual amount in millions of US\$. The biggest impact is for Suriname which sees a decline of over 60% in its' tariff revenue and the smallest change is for The Bahamas where tariff revenue declines by under 5%. These differential changes in tariff revenue are of course driven by the differences in the importance of the EU as a supplier to the respective markets. What is clear, however, from this column is that the changes in notional tariff revenue are quite substantial. As

discussed elsewhere for many of the Caribbean economies tariff revenue is an important source of government revenue, and hence reductions of this magnitude are clearly non-trivial. Clearly, such changes in and of themselves would lead to a significant worsening of governments' budget balance which would then require some form of compensating policy – either increases in alternative forms of taxation, or decreases in expenditure. Later in this part of the report, we explore the implications of replacing the tariff revenue with a consumption tax.

The third column of the table gives the change in consumer surplus. Here we see that the change in consumer surplus slightly exceeds the loss in tariff revenue. The difference between both is on average equal to one and a half million of US dollars. The final two columns summarise the net welfare implications of the simulations. In particular, the last column gives the welfare change as a proportion of the total value of imports for each country. Two aspects, which are striking about this column. The first is that all the welfare changes are positive, and the second is that although the welfare changes are positive the orders of magnitude are extremely small. For all the countries the average change in welfare is equal to 0.23% of the value of base imports, and for the OECS economies, this figure is slightly higher at 0.27%. The countries experiencing the biggest welfare changes are Suriname (0.55%), St Lucia (0.39%) and Dominica (0.37%). The smallest welfare increase is for The Bahamas (0.12%). The reason for the very small increases in welfare can be seen with reference to Table 6.12. The proposed liberalisation here essentially leads to some trade creation, some trade reorientation, and a substantial degree of trade diversion. It is the presence of trade diversion which diminishes the size of the welfare gains.

### **6.3.2 Simulating trade liberalisation under imperfect competition**

The alternative possible specification of the model we utilise, assumes that each industry is imperfectly competitive. Here we assumed that the suppliers from different sources compete with each other in Cournot style. Thus, all of the firms simultaneously chose the quantity that they wish to supply to the Caribbean. The firms in this specification will have some degree of market power depending mainly on their share of market. This should lead to a smaller change than in the benchmark scenario as the firms have some influence on the price, so they keep the output lower to retain higher prices. Of

course, we do not have detailed information on the number of firms and therefore on the extent of competitive interaction at this detailed level of disaggregation for the countries in our model. In reality, it is quite possible that the sectors may be characterised by a large number of competing firms. It may also be the case that manufacturing is more imperfectly competitive with more differentiated products than agriculture. As we do not have the underlying information, we have assumed that there is a single firm in each country supplying the Caribbean market. It is likely that for a number of industries that this may overstate the degree of monopoly power exercise by each firm. We have investigated the sensitivity of the results to alternative specifications and the results are broadly similar. Nevertheless, the results should thus be taken as being fairly highly stylised and as giving an upper bound of the likely effects.

Where there is monopoly power, then there is the possibility of monopoly profits. Changes in tariffs will of course induce monopolists to adjust their price and output accordingly, and thence impact on profits. There is an important issue to be addressed as to who receives those profits. Essentially, there are two possible extreme outcomes. The first is that the monopoly profits are received by the exporting firm/country. To the extent that this is the case, this does not impact directly on Caribbean welfare. However, most of the Caribbean countries are relatively small and often also have only one firm (distributor), who imports the goods from European Union and then sells them to local entrepreneurs. This, of course, suggests that the monopoly power may in fact reside with the domestic distributor as opposed to the foreign exporter. At the limit, then, the domestic distributor could capture all of the available profits. Hence, in calculating the welfare impact of the proposed change in tariffs we need to bear each of these possible outcomes in mind – in the former the profits are attributed to the exporting country, in the latter the profits are attributed to the importing Caribbean country. In reporting on the welfare outcomes then we distinguish between these two cases. First, however, and as earlier we present the changes in trade flows.

On average, and in comparison to the preceding simulation, the increase in imports coming from the EU is smaller by 10%. The scope for trade diversion and trade reorientation also appears smaller. This is in line with expectations as the firms have more market power and hence the price changes are more muted. The pattern of changes across countries is also very similar to that reported earlier with the biggest percentage increase in exports by the EU being experienced by The Bahamas, and the smallest by Suriname.

**Table 6.14 Full liberalisation of EU imports – % changes in trade flows under imperfect competition (Base 1)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	-1.3	-1.4	48.1	-0.6	1166
<b>Bahamas, The</b>	-2.8	-3.6	164.7	0.0	1071
<b>Barbados</b>	-3.2	-1.4	60.7	-1.7	2946
<b>Belize</b>	-0.7	-1.8	39.6	-0.4	1117
<b>Dominica</b>	-1.4	-1.2	44.9	-1.2	1460
<b>Dominican Republic</b>	-0.9	-0.6	35.9	-0.8	2640
<b>Grenada</b>	-1.7	-1.3	37.0	-1.0	1799
<b>Guyana</b>	-1.1	-0.7	30.4	-0.7	2001
<b>Jamaica</b>	-0.8	-1.0	38.5	-0.7	2558
<b>St. Kitts and Nevis</b>	-1.5	-1.3	43.6	-0.6	1368
<b>St. Lucia</b>	-2.2	-1.5	39.2	-1.4	2035
<b>St. Vincent and the Grenadines</b>	-1.8	-1.2	38.5	-1.2	1654
<b>Suriname</b>	-1.3	-1.2	20.2	-1.3	1818
<b>Trinidad and Tobago</b>	-0.5	-1.5	19.1	-0.5	2876
<b>Unweighted average</b>	-1.5	-1.4	47.2	-0.9	1893
<b>OECS average</b>	-1.7	-1.3	41.9	-1.0	1580

Note: Percentage change; Base is total imports from a given source

Source: Own calculations

Table 6.15 then gives the percentage changes in trade flows by source, where the base is now the total level of imports by country. Here we see that the increase in imports from EU is lower by roughly 2%, but the fall in imports from other sources is also considerably lower. This makes the increase in the total value of imports equal to 4.9%, which is slightly larger than in the benchmark model. The largest percentage change in imports is for Barbados and the smallest for Trinidad and Tobago.

Table 6.16 gives the changes in welfare arising from this simulation. As before, the change in tariff revenue is mainly driven by the initial loss of the tariffs levied on the EU imports. However, there are also some secondary losses, which are caused by the trade structure shifting towards EU imported goods. Those effects are generally much smaller. Here the change in tariff revenue is smaller by 2% than in the benchmark model, this is entirely due to the lower secondary losses. In addition as discussed above, if there is a single firm/distributor, which imports the goods from abroad it can capture a part of profits or even whole profits of the supplier from abroad. This is because it is controlling the access to the market of a country in question. If this is the case, then any rise in profits arising from the change in tariffs may well be captured by the domestic distributor.

**Table 6.15 Full liberalisation of EU imports – Changes in trade flows under imperfect competition (Base 2)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	-0.2	-0.2	6.3	-0.3	1166
<b>Bahamas, The</b>	-0.2	0.0	4.0	0.0	1071
<b>Barbados</b>	-0.8	-0.2	11.2	-0.8	2946
<b>Belize</b>	-0.2	-0.1	3.7	-0.2	1117
<b>Dominica</b>	-0.3	-0.3	7.1	-0.5	1460
<b>Dominican Republic</b>	-0.4	0.0	4.5	-0.4	2640
<b>Grenada</b>	-0.3	-0.3	5.6	-0.5	1799
<b>Guyana</b>	-0.3	-0.1	4.7	-0.3	2001
<b>Jamaica</b>	-0.3	-0.1	4.3	-0.3	2558
<b>St. Kitts and Nevis</b>	-0.3	-0.2	4.7	-0.3	1368
<b>St. Lucia</b>	-0.4	-0.3	7.2	-0.6	2035
<b>St. Vincent and the Grenadines</b>	-0.3	-0.3	6.8	-0.5	1654
<b>Suriname</b>	-0.3	-0.2	6.2	-0.4	1818
<b>Trinidad and Tobago</b>	-0.2	0.0	2.8	-0.2	2876
<b>Unweighted average</b>	-0.3	-0.1	5.7	-0.4	1894
<b>OECS average</b>	-0.3	-0.2	6.3	-0.5	1580

Note: Percentage change; Base is total imports from all sources

Source: Own calculations

This is captured in the last column of the table, which gives the change in welfare where we have attributed the change in profits to the domestic economy. The fourth column of results then gives the welfare changes where the change in profits goes to the firm in the exporting country. The former clearly gives an upper bound on the possible welfare impact, while the latter a lower bound. What emerges clearly from the table is that the welfare impact where the domestic economy captures the monopoly profits is substantially higher – indeed, on average, the welfare increase is effectively quadrupled. In turn, this implies that welfare is about ten times greater than in the Armington scenario. What is also interesting is that the relative ranking across countries also changes across the two welfare measures. It is important also to underline here that while welfare is in aggregate much higher when the profits are captured domestically, in principle that increase arises from the change in profits, which accrues to the domestic importer/distributor. This means that the welfare gains are largely concentrated and experienced by this firm.

**Table 6.16 Full liberalisation of EU imports - Welfare & Tariff Revenue under imperfect competition**

	<i>Change in Tariff Rev. (% of base TR)</i>	<i>Change in Tariff Rev.</i>	<i>Change in Consumer Surp.</i>	<i>Welfare (% of tot. imports)</i>	<i>Welfare + Profits (% of tot. imports)</i>
<b>Antigua and Barbuda</b>	-16.81	-4.28	5.28	0.63	2.36
<b>Bahamas, The</b>	-2.84	-9.47	20.48	0.99	1.67
<b>Barbados</b>	-21.95	-22.01	29.30	1.18	3.84
<b>Belize</b>	-11.08	-3.34	3.58	0.21	1.29
<b>Dominica</b>	-21.87	-1.63	2.37	0.90	2.64
<b>Dominican Republic</b>	-16.62	-53.36	53.42	0.12	1.36
<b>Grenada</b>	-19.42	-2.77	2.97	0.31	1.80
<b>Guyana</b>	-18.65	-5.38	5.98	0.26	1.63
<b>Jamaica</b>	-13.05	-26.19	30.62	0.37	1.40
<b>St. Kitts and Nevis</b>	-11.40	-1.89	2.19	0.36	1.52
<b>St. Lucia</b>	-22.07	-5.09	5.49	0.35	2.29
<b>St. Vincent</b>	-24.38	-2.71	2.96	0.31	2.19
<b>Suriname</b>	-60.84	-8.30	9.02	0.10	2.35
<b>Trinidad and Tobago</b>	-19.02	-18.52	19.59	0.13	0.90
<b>Unweighted average</b>	-20.00	-11.78	13.80	0.45	1.95
<b>OECS average</b>	-19.32	-3.06	3.54	0.48	2.13

Note: First, fourth and fifth column are percentage changes; All other values are expressed in millions of US\$  
Source: Own calculations

### 6.3.3. Sensitivity Analysis

The experiments run earlier give us the likely outcomes of trade liberalization with the European Union. However, it is important to assess the extent to which these results depend on the assumptions made about the model and the data which we have used. We can test two propositions. First, what would be the outcome of the simulations if we doubled or halved the benchmark elasticities. Second, how much does the level of the aggregation of the data influence the results. We can explore both of these issues using either the benchmark Armington version of the model or the imperfectly competitive model.

#### A) Changing the underlying elasticities

We begin the sensitivity analysis by exploring the effects of assigning different elasticities. We either double or half both the import demand elasticity and the elasticity of substitution. This gives us an interval for the demand elasticity from 0.875 to 5.5 and for



the elasticity of substitution from 2.1 to 18. Those intervals cover all of the values typically found in the literature. First, in Table 6.17, we look at the impact of the elasticities on the trade flows. The table is divided into two panels – in the top panel, we give the percentage change in trade flows where as earlier the base is the total imports by each source (Base 1); and the second panel gives the change in trade flows where the base (Base 2) is equal to total imports from all sources. Within each panel, we give the summary average results first for all the Cariforum countries in our sample, and then the average for the OECS economies.

**Table 6.17 Full liberalisation of EU imports: % Changes in trade flows with different elasticities**

	Base 1 (= total imports from a given source)				
<i>Elasticities</i>	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
Half elasticities	-1.5	-1.2	23.3	-1.2	1894
Benchmark elasticities	-3.5	-2.8	58.6	-2.7	1894
Double elasticities	-9.0	-7.4	193.9	-6.6	1894
Half OECS	-1.7	-1.3	21.9	-1.4	1580
Benchmark OECS	-3.9	-2.9	52.2	-3.1	1580
Double OECS	-10.0	-7.1	149.1	-7.4	1580
Note: Percentage change; Source: Own calculations					
	Base 2 (= total imports from all sources)				
<i>Elasticities</i>	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
Half elasticities	-0.4	-0.2	3.0	-0.6	1894
Benchmark elasticities	-0.8	-0.4	7.1	-1.3	1894
Double elasticities	-2.0	-0.9	20.7	-3.2	1894
Half OECS	-0.3	-0.2	3.3	-0.7	1580
Benchmark OECS	-0.8	-0.5	7.9	-1.5	1580
Double OECS	-1.9	-1.3	22.4	-3.5	1580
Note: Percentage change; Source: Own calculations					

In both panels of the table, we see a strong non-linear response to the changes in the elasticities. The impacts on trade from the benchmark run are typically twice as big as those where the elasticities are halved; while the simulation where the benchmark elasticities are doubled produces a tripling of the impact on trade. The high elasticity version can perhaps be seen as a long run approximation where more substitution between products originating in different countries occurs. However, it is important to bear in mind that the partial equilibrium modelling here gives the impact effects of the proposed trade

policies, but it does not have enough structure to model the real long run effects which will be driven by more complicated mechanisms.

**Table 6.18 Full liberalisation of EU imports: Welfare and tariff revenue – with different elasticities**

<i>Elasticities</i>	<i>Change in Tariff Rev. (% of base TR)</i>	<i>Change in Tariff Rev.</i>	<i>Change in Consumer Surp.</i>	<i>Change in Welfare</i>	<i>Welfare (% of tot. imports)</i>
Half elasticities	-19.61	-11.52	12.07	0.46	0.07
Standard elasticities	-22.32	-13.69	15.37	1.57	0.23
Double elasticities	-29.47	-20.15	27.92	7.72	0.99
Half OECS	-18.89	-3.00	3.22	0.20	0.09
Standard OECS	-21.64	-3.46	4.04	0.57	0.27
Double OECS	-28.91	-4.66	6.84	2.18	1.05

Note: First and last column are percentage changes; All other values are expressed in millions of US\$  
Source: Own calculations

The welfare measures are interesting because they exhibit a slightly different behaviour to the trade flows. The changes in tariff revenue and consumer surplus are both non-linear. The first increase of elasticities causes the rise of both values around one fifth but the second one multiplies them by 1.5. At the same time the changes in welfare are linear, each increase in the elasticities approximately quadruples the welfare values. We also see that the liberalization of trade between the Caribbean countries and European Union is welfare enhancing, no matter which elasticities we choose but that the level of welfare gain is sensitive to the underlying elasticity. These results suggest that for the Cariforum group of countries as a whole the welfare gain ranges from between 0.07 of base imports to 0.99%; while for the OECS economies it ranges from between 0.09% of base imports to 1.05%. It should, however, be pointed out that even at the upper end of the estimates the overall welfare gains are still very small.

We now turn to exploring whether changing the underlying assumptions about the structure of competition, changes the conclusions reached above. In order to do so we run the same experiment but with Cournot competing firms. The results are given in Table 6.19.

Here we see that the same qualitative conclusions can be drawn, although as in the earlier experiments there are quantitative differences. The changes in trade flows are generally lower than in the Armington case and this arises because of the greater market power that firms have which thus impacts on their pricing decision. In changing the

elasticities, we obtain a similar non-linear set of changes. The first increase in the elasticities tends to double the changes while second triples them.

**Table 6.19 Full liberalisation of EU imports: Changes in trade flows – Different elasticities under imperfect competition**

Base = total imports from a given source					
<i>Elasticities</i>	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
Half elasticities	-0.6	-0.3	22.6	-0.3	1894
Standard elasticities	-1.5	-1.4	47.2	-0.9	1894
Double elasticities	-4.6	-4.4	160.6	-2.6	1894
Half OECS	-0.7	-0.3	21.1	-0.3	1580
Standard OECS	-1.7	-1.3	41.9	-1.0	1580
Double OECS	-4.7	-3.8	127.2	-3.0	1580

Note: Percentage change;  
Source: Own calculations

Base = total imports from all sources					
<i>Elasticities</i>	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
Half elasticities	-0.1	0.0	2.8	-0.1	1894
Standard elasticities	-0.3	-0.1	5.7	-0.4	1894
Double elasticities	-1.0	-0.5	17.5	-1.2	1894
Half OECS	-0.1	0.0	3.2	-0.1	1580
Standard OECS	-0.3	-0.2	6.3	-0.5	1580
Double OECS	-0.9	-0.7	19.1	-1.4	1580

Note: Percentage change;  
Source: Own calculations

**Table 6.20 Full liberalisation of EU imports: Welfare and tariff Revenue – different elasticities under imperfect competition**

<i>Elasticities</i>	<i>Change in Tariff Rev. (% of base TR)</i>	<i>Change in Tariff Rev.</i>	<i>Change in Consumer Surp.</i>	<i>Welfare (% of tot. imports)</i>	<i>Welfare + Profits (% of tot. imports)</i>
Half elasticities	-18.98	-11.02	12.71	0.42	1.22
Standard elasticities	-20.00	-11.78	13.80	0.45	1.42
Double elasticities	-23.62	-14.82	24.18	1.48	3.16
Half OECS	-18.29	-2.90	3.38	0.51	1.39
Standard OECS	-19.32	-3.06	3.54	0.48	1.53
Double OECS	-22.90	-3.64	5.84	1.57	3.36

Note: First, fourth and fifth column are percentage changes; All other values are expressed in millions of US\$  
Source: Own calculations

In contrast, the impact on welfare differs somewhat from the Armington case. The changes in welfare are no longer linear and the welfare gain is much larger in the extreme cases than in the previous experiment. Hence, with the upper-end elasticities the change in

welfare + profits rises to 3.16% of base imports for the Cariforum group of countries as a whole, to 3.36% of base imports for the OECS economies. The increase in the elasticities also narrows the gap between the lower and upper bound for the change in welfare. To the extent that an imperfectly competitive market structure is a more realistic depiction of Caribbean import markets, than the choice of elasticities in assessing the impact of trade liberalisation scenarios tends to be more significant.

## B) The importance of different levels of aggregation

In order to assess the importance of different levels of aggregation of the underlying data we used data at three different levels of aggregation. The first one is based on *chapters* from HS 1996. This level of aggregation is at the two-digits level, and there are 98 different product groups covered. The second level of aggregation is based on HS 1996 *headings*, is at the four-digits level, and covers around 1300 different product groups. The final and the most detailed one is based on HS 1996 *sub-headings* and covers over 5000 different products. The results are given in Table 6.21.

**Table 6.21 Full liberalisation of EU imports: % changes in trade flows – different levels of aggregation**

<i>Level of Aggregation</i>	Base = total imports from a given source				
	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
2 – digits	-5.2	-4.2	83.9	-4.8	88
4 – digits	-3.8	-2.7	67.8	-3.3	720
6 – digits	-3.5	-2.8	58.6	-2.7	1894
2 - digits OECS	-5.5	-3.9	73.6	-5.4	86
4 - digits OECS	-4.5	-3.0	62.0	-3.9	633
6 - digits OECS	-3.9	-2.9	52.2	-3.1	1580

Note: Percentage change; Base is total imports from a given source  
Source: Own calculations

<i>Level of Aggregation</i>	Base = total imports from all sources				
	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
2 - digits	-1.4	-0.7	9.6	-2.0	88
4 - digits	-0.9	-0.4	7.5	-1.4	720
6 - digits	-0.8	-0.4	7.1	-1.3	1894
2 - digits OECS	-1.0	-0.9	10.0	-2.4	86
4 - digits OECS	-0.8	-0.7	8.5	-1.7	633
6 - digits OECS	-0.8	-0.5	7.9	-1.5	1580

Note: Percentage change; Base is total imports from all sources  
Source: Own calculations

From the table we can see that the choice of the level of aggregation is quite important for the conclusions that we reach. Generally decreasing the level of aggregation increases the changes in the trade flows. There are two processes going on here when we decrease the level of aggregation. First, we are summing industries which were previously separate and thus we allow for substitution between products which were earlier not substitutable. Second, we change the way in which competition takes place. For example if you take two industries which were previously separate and each of them was dominated by either EU or US supplier. There was a very limited scope for trade diversion. However, when we add them together we force both sources to compete and it ultimately leads to greater changes in structure of trade flows and more possibilities for trade diversion. The results obtained at the more aggregate level can perhaps be seen as approximation for the long run where more substitution between different product classes will occur. Though as discussed earlier this form of modelling is not particularly suited to simulating long run changes, as these are likely to depend on a myriad other factors which are not taken into account here.

At the two-digit level, the Cariforum countries tend to increase their total imports by 5.5 % on average, while the OECS economies see an increase in import of 5.7%. At the 6-digit level, the corresponding figures are 4.6% and 5.1% respectively. Hence, the overall increase in imports is greater by 0.9 % in the most aggregated case against the least aggregated for the former group of countries, and is greater by 0.6% for the OECS economies.

**Table 6.22 Full liberalisation of EU import: Welfare and tariff revenue under different levels of aggregation**

<i>Level of Aggregation</i>	<i>Change in Tariff Rev. (% of base TR)</i>	<i>Change in Tariff Rev.</i>	<i>Change in Consumer Surp.</i>	<i>Change in Welfare</i>	<i>Welfare (% of tot. imports)</i>
2 - digits	-21.56	-18.36	19.83	1.37	0.24
4 - digits	-21.47	-16.12	17.75	1.51	0.22
6 - digits	-22.32	-13.69	15.37	1.57	0.23
2 - digits OECS	-23.02	-4.44	4.98	0.53	0.23
4 - digits OECS	-21.44	-3.92	4.58	0.65	0.28
6 - digits OECS	-21.64	-3.46	4.04	0.57	0.27

Note: First and last column are percentage changes; All other values are expressed in millions of US\$  
Source: Own calculations

Whereas the pattern of trade varied somewhat across the different levels of aggregation, this is not the case with regard to the overall welfare change, nor with regard to the component parts of welfare<sup>3</sup>. Overall, the impact on welfare is relatively stable. For the Cariforum group of countries as the level of disaggregation is increase the welfare impact as a proportion of total welfare falls slightly, while the reverse takes place for the OECS economies. Nevertheless, as earlier the increases in welfare are extremely small.

Finally, we explore the same issue of sensitivity but where we use the imperfectly competitive version of the model. As earlier, we begin by looking first at the trade flows, where the results are given in Table 6.23.

**Table 6.23 Full liberalisation of EU imports: Changes in trade flows under different levels of aggregation with imperfect competition**

	Base = total imports from a given source				
<i>Level of Aggregation</i>	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
2 – digits	-2.42	-2.64	66.32	-1.59	88
4 – digits	-1.68	-1.54	54.35	-1.04	720
6 – digits	-1.52	-1.41	47.17	-0.87	1894
2 - digits OECS	-3.03	-1.92	56.66	-1.59	86
4 - digits OECS	-2.03	-1.35	48.33	-1.17	633
6 - digits OECS	-1.65	-1.31	41.88	-0.99	1580

Note: Percentage change; Base is total imports from a given source  
Source: Own calculations

	Base = total imports from all sources				
<i>Level of Aggregation</i>	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
2 - digits	-0.54	-0.33	7.36	-0.61	88
4 - digits	-0.39	-0.20	5.87	-0.41	720
6 - digits	-0.33	-0.15	5.65	-0.38	1894
2 - digits OECS	-0.57	-0.42	7.69	-0.68	86
4 - digits OECS	-0.38	-0.29	6.56	-0.50	633
6 - digits OECS	-0.32	-0.23	6.28	-0.46	1580

Note: Percentage change; Base is total imports from all sources  
Source: Own calculations

As before, we see from the table that generally the changes in trade flows are lower than with the Armington specification. However, as with the Armington specification we

<sup>3</sup> It is worth noting that the base for calculating change in the tariff revenue changes slightly across the different levels of aggregation, and this is driven by differences in the raw data across the different HS levels of aggregation.

see that changing the level of aggregation has quite a definite impact on the changes in trade flows. If we look at the exports of the EU, at the 2-digit level to the Cariforum group of countries we seen an increase of just over 66%, whereas at the 6-digit level the increase is 47%. As a percentage of base total imports, these differences represent an increase in exports from the EU of 7.36% in the former case and 5.65% in the latter case. Similarly, when we look at the decreases in imports from the other possible sources, we see that the higher the level of aggregation the larger are the absolute changes in trade flows.

Table 6.24 then gives the associated changes in welfare. Here we see that the results are quite interesting. With the Armington assumption, the impact on welfare was fairly stable – here we see that this is no longer the case. Hence if we take the last column of the table we see that for the Cariforum group of countries as a whole as you move from the 2-digit to the 6-digit level of aggregation welfare increases from 1.45% of base imports to 1.95%. In contrast for the OECS economies the welfare gains is highest at the 2-digit level, at 2.13% of base imports, and lowest at the 6-digit level where the welfare change is 1.37% of base imports. The results in the imperfectly competitive model depend on the a given “firms” market share – those market shares can move in different ways depending on the levels of aggregation used and this is driving these differences in the results. This again suggests that interpreting the results needs to be done with a degree of caution with regard to the quantitative conclusions, though as earlier the qualitative conclusions are highly consistent.

**Table 6.24 Full liberalisation of EU imports: Welfare and tariff Revenue with different levels of aggregation under imperfect competition**

<i>Level of Aggregation</i>	<i>Change in Tariff Rev. (% of base TR)</i>	<i>Change in Tariff Rev.</i>	<i>Change in Consumer Surp.</i>	<i>Welfare (% of tot. imports)</i>	<i>Welfare + Profits (% of tot. imports)</i>
2 - digits	-19.18	-16.00	17.91	0.51	1.45
4 - digits	-19.15	-13.83	15.90	0.42	1.35
6 - digits	-20.00	-11.78	13.80	0.45	1.95
2 - digits OECS	-20.55	-3.06	3.54	0.48	2.13
4 - digits OECS	-19.09	-3.46	3.87	0.46	1.44
6 - digits OECS	-19.32	-3.95	4.08	0.42	1.37

Note: First, fourth and fifth column are percentage changes; All other values are expressed in millions of US\$  
Source: Own calculations

## **6.4 Substantially all trade**

In all of the preceding experiments, we have assumed that the Cariforum economies liberalise their tariffs on all their imports from the EU. This is clearly an outer bound as a key focus of discussions in the EPA negotiations is the issue of substantially all trade. Hence, in this section of the report we focus directly on the issue of substantially all trade. The key elements to be considered here are to do with how “substantially all” is to be defined, with how sensitive the simulations are to substantially all trade as opposed to all trade being liberalised, and with how difficult might it be for the Cariforum economies to reach agreement on which industries to include or exclude.

### **6.4.1 Substantially all trade**

As is well known Article XXIV of the WTO allows for regional trade agreements but under the condition that the agreements serve to liberalise “substantially all trade”. The term substantially all has not been precisely defined and is therefore open to some interpretation. However, there appears to be common acceptance among analysts that the term applies to the value of trade (as opposed to, for example, the number of product lines included). There also appears to be some acceptance that liberalising 90% of the value of trade between partners is deemed to meet the criterion of substantially all.

Even if agreement on the above can be achieved, a further issue then arises as to whether each partner is required to liberalise 90% of trade, or whether asymmetry across partners is possible. In the recent EU- South Africa agreement, this issue was resolved by the EU liberalising (almost) all its trade, while South Africa liberalised 90% of the value of its tariff lines. In this way, the average degree of liberalisation was 90%. It seems clear that in the ACP, and the Caribbean context a similar form of symmetry is likely to be agreed upon. Hence for the purpose of the simulations that we report on here we are assuming that the Caribbean economies will be required to liberalise 80% of the value of their trade upon which there are currently tariffs on imports from the EU.

This in turn raises the next set of problems or issues that need to be addressed – notably what is the criterion that is to be used in order to decide which industries are to be included and which are to be excluded. Each negotiating country will clearly have their priorities based on the domestic political, economic and social situation. In the absence of



detailed information about those priorities there appear to be two principal criteria open to the modeller. The first is to assume that the existing structure of protection reflects the underlying political economy within each economy. Hence, those industries, which face a high tariff, are those which the country has in some sense historically chosen to protect. It seems reasonable therefore to assume that the same industries are likely to be the ones that the economy would wish to continue to protect. Hence, the first criterion which could be employed is to exclude the highest tariff industries from the process of trade liberalisation.

An alternative approach is to say that what is important for each economy, and particularly so in the Caribbean is the amount of tariff revenue that is collected. Substantial declines in tariff revenue are likely to lead to the need to governments to switch to alternative revenue raising measure which may be politically difficult to achieve. Hence, the alternative criterion is to protect the highest tariff-revenue generating industries. Note that these are unlikely to be the same industries as the high tariff industries. At the limit, a very high tariff prevents all imports from entering and hence the amount of tariff revenue raised is nil. In the Caribbean context a disadvantage of the first criterion, is that most of the Cariforum countries are part of Caricom which levies a common external tariff. That common external tariff has arisen through a complex process of negotiations and to the extent that it reflects the political economy of the region, it is more likely to reflect some weighted average of preferences across the Caricom economies, as opposed to identifying or reflecting well individual country preferences. Given also the importance of tariff revenue in the region, for the purposes of this sensitivity analysis we have therefore run the model on the basis of the second criterion.

### **A) Simulating the impact of substantially all trade**

Hence, in the simulation below we have excluded from the liberalisation those industries, which generate the highest tariff revenue, where we exclude the industries which together give 20% of the total imports from the EU. We have done this separately for each country, which clearly means that each country is excluding a different set of industries. This has clear implications for the region and these issues are discussed in more detail below. For the purposes of the simulations, however, the aim is to explore the sensitivity of the results on a country-by-country basis. Note also that due to the high

concentration of imports the criterion adopted usually means that only a few industries end up being excluded.

Analogously to the discussion in the preceding section, we first present the changes in trade flows arising from this experiment and then move on to a discussion of the welfare effects. As we have already conducted extensive sensitivity analysis over different modelling scenarios, we restrict ourselves here to the Armington modelling structure.

**Table 6.25 Liberalisation of EU imports excluding the 20% highest tariff revenue generating industries: Changes in trade flows (Base 1)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	-2.0	-2.6	42.8	-2.8	1161
<b>Bahamas, The</b>	-1.1	-0.9	131.0	-1.4	1063
<b>Barbados</b>	-3.7	-5.2	43.7	-3.6	2931
<b>Belize</b>	-1.0	-2.2	29.5	-1.2	1110
<b>Dominica</b>	-2.2	-2.9	33.0	-2.1	1444
<b>Dominican Republic</b>	-1.6	-0.8	30.8	-1.7	2632
<b>Grenada</b>	-2.4	-2.4	34.2	-2.3	1787
<b>Guyana</b>	-1.9	-1.3	24.3	-1.8	1984
<b>Jamaica</b>	-1.1	-2.8	30.4	-1.6	2551
<b>St. Kitts and Nevis</b>	-2.9	-1.7	43.5	-2.1	1364
<b>St. Lucia</b>	-2.5	-2.7	31.5	-2.8	2019
<b>St. Vincent and the Grenadines</b>	-2.6	-2.7	33.0	-2.6	1643
<b>Suriname</b>	-1.2	-2.6	13.9	-1.4	1805
<b>Trinidad and Tobago</b>	-0.7	-1.8	12.9	-1.2	2850
<b>Unweighted average</b>	-1.9	-2.3	38.2	-2.0	1882
<b>OECS average</b>	-2.4	-2.5	36.3	-2.5	1570

Note: Percentage change; Base is total imports from a given source  
Source: Own calculations

Not surprisingly, the change in trade flows – both where the base is total import from a given source, or where the base is total imports from all sources – is smaller. Hence, if we look at imports from the EU, whereas in the benchmark experiment the EU increased its exports to the Caribbean by 58.6% for the Cariforum group of countries, and by 52.3% for the OECS grouping, the changes are now 38.2% and 36.3% respectively. Similarly, if we take total imports as the base, the increase in EU imports in the benchmark experiment was 7.1% for the Cariforum grouping, and 7.9% for the OECS countries, whereas now the magnitudes are 4.5% and 5.4%. In the same vein, the extent of

the reduction in imports from the remaining suppliers is also lessened as a result of this changed experiment.

**Table 6.26 Liberalisation of EU imports excluding the 20% highest tariff revenue generating industries: Changes in trade flows (Base 2)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	-0.3	-0.3	5.6	-1.7	1161
<b>Bahamas, The</b>	-0.1	0.0	3.2	-1.2	1063
<b>Barbados</b>	-0.9	-0.6	8.1	-1.6	2931
<b>Belize</b>	-0.3	-0.1	2.8	-0.6	1110
<b>Dominica</b>	-0.5	-0.6	5.2	-0.8	1444
<b>Dominican Republic</b>	-0.6	0.0	3.8	-0.8	2632
<b>Grenada</b>	-0.4	-0.5	5.2	-1.1	1787
<b>Guyana</b>	-0.4	-0.2	3.8	-0.8	1984
<b>Jamaica</b>	-0.4	-0.2	3.4	-0.7	2551
<b>St. Kitts and Nevis</b>	-0.6	-0.2	4.7	-1.2	1364
<b>St. Lucia</b>	-0.5	-0.5	5.8	-1.2	2019
<b>St. Vincent and the Grenadines</b>	-0.5	-0.6	5.8	-1.1	1643
<b>Suriname</b>	-0.3	-0.4	4.3	-0.4	1805
<b>Trinidad and Tobago</b>	-0.3	0.0	1.9	-0.4	2850
<b>Unweighted average</b>	-0.4	-0.3	4.5	-1.0	1882
<b>OECS average</b>	-0.5	-0.5	5.4	-1.2	1570

Note: Percentage change; Base is total imports from all sources  
Source: Own calculations

Table 6.27 then details the changes in tariff revenue and in welfare arising from this simulation. Given that we have excluded the highest tariff revenue generating industries it is of little surprise that there is quite a substantial impact on the amount of tariff revenue which is lost as a result of this experiment. The decline in tariff revenue is now more than 40% less than it was in the benchmark experiment for the Cariforum countries, and approximately 35% less for the OECS countries. In the benchmark experiment there was an average loss of tariff revenue for the Cariforum grouping, equal to 22.32% of base tariff revenue, whereas the loss is now 12.39%; and the corresponding figures for the OECS are 21.64% and 13.6%

What is also perhaps not surprising from this table is that while there is again an increase in welfare this has now considerably declined. For the Cariforum countries, the welfare gain is nearly 45% lower than it was initially, and for the OECS group of countries it is just over 40% lower. Hence, where there was already a very modest gain in

welfare in the benchmark scenario, that gain would be significantly lower through the exclusion of the high tariff-revenue generating industries<sup>4</sup>.

**Table 6.27 Liberalisation of EU imports excluding the 20% high tariff revenue generating industries: Welfare and tariff Revenue**

	<i>Change in Tariff Rev. (% of base TR)</i>	<i>Change in Tariff Rev.</i>	<i>Change in Consumer Surp.</i>	<i>Change in Welfare</i>	<i>Welfare (% of tot. imports)</i>
<b>Antigua and Barbuda</b>	-12.64	-3.22	3.55	0.32	0.11
<b>Bahamas, The</b>	-3.01	-10.01	11.00	0.95	0.06
<b>Barbados</b>	-14.57	-14.61	16.94	2.13	0.22
<b>Belize</b>	-6.52	-1.97	2.23	0.24	0.07
<b>Dominica</b>	-14.08	-1.05	1.36	0.30	0.25
<b>Dominican Republic</b>	-11.48	-36.85	38.79	1.70	0.04
<b>Grenada</b>	-14.35	-2.04	2.35	0.30	0.14
<b>Guyana</b>	-11.37	-3.28	3.63	0.31	0.07
<b>Jamaica</b>	-9.23	-18.52	21.25	2.68	0.09
<b>St. Kitts and Nevis</b>	-10.03	-1.66	1.82	0.16	0.08
<b>St. Lucia</b>	-14.10	-3.25	3.82	0.56	0.18
<b>St. Vincent</b>	-16.22	-1.80	2.14	0.33	0.20
<b>Suriname</b>	-25.63	-3.50	4.78	1.27	0.29
<b>Trinidad and Tobago</b>	-10.27	-9.99	10.72	0.68	0.03
<b>Unweighted average</b>	-12.39	-7.98	8.88	0.85	0.13
<b>OECS average</b>	-13.6	-2.2	2.5	0.3	0.16

Note: First and last column are percentage changes; All other values are expressed in millions of US\$  
Source: Own calculations

## **B) Substantially all trade, and special and differential treatment**

As discussed earlier, in the preceding “substantially all” simulation we allowed the products which are excluded from the trade liberalisation process to vary across the countries. In that experiment, each country separately determined the list of high tariff-revenue generating industries, which were to be excluded. De facto then the simulation we have run allows for the possibility of differential treatment across the countries. In the EPA negotiations the issue of special and differential treatment is a potentially thorny one. The position of the EU on this appears to be that it would not wish there to be special and differential treatment in the form of different product lists for each country. The position

<sup>4</sup> We ran a number of simulation with alternative criteria concerning substantially all trade, and not surprisingly the qualitative results in terms of the welfare impact were as would be expected.

of the Cariforum grouping is less clear on this. On balance it is clear that the LDCs, and hence many of the OECS islands, tend to favour special and differential treatment including in the form of different product lists, whereas this is not necessarily the case for the MDCs. Similarly, discussion of SDT in the literature leads to contrasting views. This can be seen from the following two citations:

“...reliance on special and differential treatment as a way of relating to the world economy has not served the sub-region [ie the OECS] well, over the longer term. Preferences and the maintenance of non-reciprocal protection of the domestic market have pushed the sub-region, and its entrepreneurs, towards areas of production in which they ultimately cannot be competitive and which cannot support the sustained growth in incomes and employment needed to reduce poverty and deepen social development.” (World Bank 2005)

“In the negotiations, CARICOM should, at the least, seek exclusion of some CARICOM states (in particular the LDCs) from the obligation to grant reciprocal preferential access in favour of the EU” (Chaitoo & Isaacs, 2003)

It is worth, therefore, exploring this issue of special and differential treatment (SDT) in a little more detail. Justification for SDT typically derives from a perceived lack of resources / structure to engage fully and successfully in the integrated economy. That perceived lack of resources or structure can refer to either a lack of human or physical infrastructure, or because of weaknesses in the underlying institutions be they legal, regulatory or fiscal for example, difficulties in accessing appropriate forms of credit, and/or due to the size or location of a given economy and hence its’ potential vulnerability. It is undoubtedly the case that for certain, often very small economies, there are indeed difficulties associated with one or more of the above which make it more difficult for them to engage more successfully in the global economy<sup>5</sup>.

In this report, therefore we recognise that there may indeed be a case for special and differential treatment for particular economies under certain circumstances. However, there remains the important question of what form any SDT could or should take? In particular, it is important to consider whether the form of proposed SDT is more likely to help or to hinder the successful integration of a given country into the global economy. In terms of trade negotiations the forms of SDT that are typically discussed include: (i) differential and improved access to the markets of trading partners, (ii) differential

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<sup>5</sup> See Winters & Martin for a discussion of some of these issues.

restrictions with regard to access of the trading partners to the domestic market; (iii) flexibility in the implementation of given agreements, for example with respect to timing or coverage of goods, and (iv) differential rules being applied to different partners. There is also an issue of whether any differential treatment which is granted should be done so on a permanent or temporary basis, as the incentives within a given economy are likely to differ if any differential treatment is time-limited or not.

In order to be successful SDT needs to be able to distinguish between countries and thus to be able to recognise their different needs, and the evolution of those needs over time. Other wise SDT is likely to be a blunt instrument that arbitrarily includes / excludes countries, and is less likely to be successful in addressing the needs of specific countries. Discussions of SDT in the Caribbean context and particularly in the context of the EPA negotiations are complicated by three factors.

The first is the existing presence of SDT within the region itself. This can be seen in the long-standing distinction between LDCs and MDCs. The principal form of SDT which thus exists within the region, essentially allows for the application of different rules or different tariff levels across countries and according to with whom they are trading. As discussed earlier, there is great diversity across the Cariforum region as well as great diversity across both the MDCs and the LDCs. In particular, it is clear that the LDC's are not simply the poorer members of the region. Clearly, some of the LDCs are indeed the poorer members and this is a potential justification for SDT. Others clearly are not, and the presence of SDT appears to be more justified by their perceived vulnerability due to both size and location, and in particular with regard to natural disasters.

The second complication involves the inclusion of the Dominican Republic in the Cariforum grouping, and hence in the EPA negotiations. Formal trade relations between the Dominican Republic and the Caricom countries are also asymmetric with regard to the treatment of MDCs and LDCs. Perhaps more importantly the Dominican Republic is significantly bigger than any of the other Caribbean islands and there are concerns in the region with regard to this size asymmetry – both in terms of implications for trade and production but also possibly with regard to migration issues.

The third complication is to do with the relationship between the EPA process, and the process of regional integration in the region and in particular progress towards the Caribbean Single Market and Economy. As discussed earlier the Caribbean region is in the

process of attempting to greatly deepen the process of integration within the region, and hence to move from being a common market to being more of a single market. This is rightly seen as being important in terms of increasing the competitiveness and flexibility of the region as it engages increasingly with the world economy. The success of that process in terms of economic growth and prosperity, and in terms of enabling the integration of the Caribbean islands successfully into the globalised world economy, will thus depend crucially on the extent to which the CSME is de facto implemented. The greater the removal of shallow integration barriers, the greater the promotion of measures of positive or deep integration the more likely it is that the process will generate higher rates of economic growth. However, clearly then, any obstacles or barriers to that process are likely to work in the opposite direction. Special and differential treatment by introducing asymmetries in the treatment of countries, by for example, allowing for asymmetries in tariff levels etc across countries, effectively introduces distortions and thus barriers to successful regional integration. Not only does it introduce and maintain those forms of distortions which is likely to increase economic inefficiencies, it also greatly increases the bureaucratic and administrative burden. This is in a context, where the underlying institutional capacity is already very limited.

It is therefore extremely important to be very clear about the grounds for any special and differential treatments (infrastructure, institutions, size/location), and given those grounds to consider carefully optimal policy responses. The view in this report is that introducing asymmetries in trade rules, asymmetries in tariff lists etc. is highly likely to increase distortions and increase inefficiencies and in the long run to make it more difficult for the Caribbean economies to successfully integrate into the world economy, and that therefore such form of SDT should be avoided.

What are the practical implications of this for the EPA process? We would argue that introducing different lists across countries should be avoided on the grounds detailed above. If differential treatment with regard to tariff liberalisation is to be sought a preferable option, though far from ideal would be to have a common list, but possibly with different time scales for specific countries. Clearly introducing different time scales also introduces distortions and adds to bureaucratic complexity, but less so than with differential lists. In addition as the sole difference is over time scale in principle the SDT is time delimited which should introduce more appropriate incentives in the long run.

A much more satisfactory way of addressing the problem of different countries' development needs is not to introduce diversity in (trade) rules, but in the implementation of development assistance and aid. We would therefore argue that there is a need for addressing the concerns of specific countries via this route as opposed to via introducing distortions in the underlying trade rules. That development assistance could be channelled in various way. However, two obvious routes are worth mentioning in the context of the Caribbean. The first, is within the region itself through the creation of a regional development fund which could thus help to facilitate the process of intra-regional integration and help to ensure that the benefits from that process of regional integration are more broadly spread. There have been discussions for some time in the region concerning such a fund, but these discussions are still on-going and such a fund has not yet been realised. The second is in the context of the EPA process. Here, as in the Cotonou agreement there is explicit recognition by both sides of the importance of development assistance and aid. It is clearly extremely important that this is realised in an effective and timely manner.

### **C) Achieving agreement on substantially all trade may be hard to achieve**

In the preceding section, we argued that it is preferable that the Cariforum countries achieve agreement with the EU on a common list of industries to be included and excluded from the agreed process of trade liberalisation. In this section of the report, we use the results from our simulations detailed earlier to consider different possible criteria for substantially all trade, in order to see how difficult it might be for the countries to agree on a common list. The procedure we adopt here is as follows. First, choose a given criterion, which determines the industries that should be excluded from the tariff liberalisation process. In the first instance for example, we exclude the high-tariff revenue generating industries as earlier, and we do this for each country separately. We then look at the industries which are excluded by each country and examine the extent to which there is a high or low degree of overlap across countries. Hence, here we are seeing how much commonality there is across countries over the industries they would exclude under this criterion. Consider Table 6.28 below, which identifies the degree of overlap across the Cariforum economies.



The first row of the table gives the number of industries, which each country would wish to exclude on the basis of retaining tariffs on the highest tariff-revenue generating industries. Hence, Antigua and Barbuda would wish to exclude 2 industries, Dominica, 8 industries, the Dominican Republic 5 and so on. Here we see that in each case there are only a few industries, which each country would choose to exclude on the basis of this criterion. Each column or subsequent row of the table then gives the % degree of overlap across pairs of countries.

**Table 6.28: Substantially all trade: Degree of overlap across countries with the high tariff-revenue generating industries excluded**

	ATG	BHS	BRB	BLZ	DMA	DOM	GRD	GUY	JAM	KNA	LCA	VCT	SUR	TTO
<i>0/0</i> <sup>1</sup>	2	4	9	4	8	5	7	10	3	4	7	5	4	4
ATG		50	50	50	50	50	50	50	50	50	50	50	50	50
BHS	50		25	25	25	25	25	25	33	25	25	25	25	25
BRB	50	25		25	50	20	43	44	33	50	29	20	25	50
BLZ	50	25	25		25	25	25	25	33	25	50	25	25	25
DMA	50	25	50	25		20	57	38	33	25	57	20	25	75
DOM	50	25	20	25	20		20	20	67	25	20	20	25	50
GRD	50	25	43	25	57	20		29	33	25	29	20	25	50
GUY	50	25	44	25	38	20	29		33	50	14	20	25	25
JAM	50	33	33	33	33	67	33	33		33	67	33	33	67
KNA	50	25	50	25	25	25	25	50	33		25	25	25	25
LCA	50	25	29	50	57	20	29	14	67	25		40	25	50
VCT	50	25	20	25	20	20	20	20	33	25	40		25	25
SUR	50	25	25	25	25	25	25	25	33	25	25	25		25
TTO	50	25	50	25	75	50	50	25	67	25	50	25	25	
Ave.	50	28	36	29	38	30	33	31	42	31	37	27	28	42

Source: own calculations;

1: gives the number of industries for which there is overlap across first all the Cariforum countries, and secondly all the OECS countries.

In calculating the % degree of overlap across pairs of countries the choice of base is important. For example, the number of industries, which are common to both Antigua and Barbuda is equal to 1. The total number of industries that Antigua wishes to exclude is 2, hence the degree of overlap on the Antigua base is 50%. The number of industries, which Dominica wishes to exclude is 8, hence the degree of overlap on the Dominica base would 12.5%. From the point of view of a bilateral negotiation between any given pair of countries, what is more important is the percentage degree of overlap for the country with the smallest base number of industries. Hence, in each case in the table below we calculate the percentage degree of overlap, where the base is always the country with smaller

number of industries. In consequence, therefore the table is completely asymmetric, and therefore can either be read across the rows or the columns. The bottom row of the table gives the average degree of overlap for each country.

Hence, if we look down the first column we see that for Antigua 50% of the industries it would wish to exclude, are also on Dominica's list of excluded industries. Indeed this is true for the degree of overlap between Antigua and all the other countries in the table. If we look at the last row of the table, we see the average degree of overlap for each country. Here we see that the lowest degree of overlap is for St Vincent, and also for St. Vincent and the Grenadines (27%), Suriname, and The Bahamas (28%); and the highest average degree of overlap is for Antigua and Barbuda. If we look at the number of cases for which the degree of bilateral overlap is at 50% or more we see that this takes place in just over 30% of the cases.

What is also interesting is the degree of overlap across *all* the countries – in other words how many industries are there that all the countries would wish to exclude on the basis of this criterion. We have calculated this for all the Cariforum countries, as well as for the OECS countries alone. The degree of total overlap is then given in the top-left cell in bold italics. The first number refers to the degree of overlap across all the Cariforum countries, and the second number to the degree of overlap across the OECS countries. In Table 6.28, we see that there are no industries, which are common to all the countries. The message that appears to emerge from this analysis is that to the extent that this criterion is a reasonable reflection of the political economy in each island, than agreement on a common list of industries to be included in substantially all trade may be difficult to achieve.

In order to explore the sensitivity of the preceding to alternatives, we have performed the same analysis on a range of alternative criteria. These are: First, we choose to exclude the high tariff industries, as this too is a potential indicator of the degree to which each economy would wish to protect certain industries. Secondly, on the basis of our benchmark simulation we take all those industries which experienced the biggest increase in imports from the EU. Naturally, these may well be closely correlated with the high tariff industries, but to the extent that these sectors are competing with Caribbean sectors, this provides an alternative basis for thinking about which industries to include and exclude. Thirdly, we take an alternative approach and consider for each economy the impact that tariff liberalisation has on exports of the other Caribbean economies. Hence,

here the aim is to exclude those industries, which see the biggest decline in Caribbean exports. This, criterion can thus be thought of as trying to minimise the aggregate impact on Caribbean exports. Each of the preceding are criteria designed to identify in the context of the model which industries the Caribbean economies may wish to protect the most. The final overlap we consider is where we take an alternative approach, and now consider which industries each economy might wish to exclude if it were trying to maximise the welfare gain from the liberalisation.

**Table 6.29: Substantially all trade: Degree of overlap across countries with the high tariff industries excluded**

	ATG	BHS	BRB	BLZ	DMA	DOM	GRD	GUY	JAM	KNA	LCA	VCT	SUR	TTO
<i>0/0</i> <sup>1</sup>	109	119	289	44	167	613	202	189	78	119	116	139	54	376
ATG		10	44	39	28	41	39	28	46	22	36	29	35	54
BHS	10		18	18	18	26	16	18	12	12	13	12	7	24
BRB	44	18		55	35	50	39	40	65	34	43	42	48	45
BLZ	39	18	55		55	50	55	59	45	30	55	36	25	68
DMA	28	18	35	55		59	46	41	29	41	22	36	30	52
DOM	41	26	50	50	59		57	53	40	55	41	56	31	53
GRD	39	16	39	55	46	57		39	37	45	42	41	46	60
GUY	28	18	40	59	41	53	39		38	45	34	42	33	63
JAM	46	12	65	45	29	40	37	38		13	41	33	41	51
KNA	22	12	34	30	41	55	45	45	13		21	34	11	57
LCA	36	13	43	55	22	41	42	34	41	21		28	37	45
VCT	29	12	42	36	36	56	41	42	33	34	28		28	58
SUR	35	7	48	25	30	31	46	33	41	11	37	28		46
TTO	54	24	45	68	52	53	60	63	51	57	45	58	46	
Ave.	35	16	43	45	38	47	43	41	38	32	35	37	32	52

Source: own calculations; 1: gives the number of industries for which there is overlap across first all the Cariforum countries, and secondly all the OECS countries.

Table 6.29 thus gives the degree of overlap where the high tariff industries are excluded. A big difference between this criterion and the preceding is the number of industries, which each country would wish to exclude, which is now much higher. The highest number of industries is for the Dominican Republic (613), and for Trinidad and Tobago (376), and the lowest number for Belize (44) and Suriname (54). For 9 of the 14 economies the average degree of overlap has risen while for the remainder it is either the same or has fallen. In 24% of the bilateral overlaps (22 cases) is the degree of bilateral overlap greater than or equal to 50%. Once again, however, both for the Cariforum grouping and for the OECS group of countries there are no industries, which are common to all the countries in terms of appearing on their exclusion lists.

Table 6.30 takes the case where we exclude all industries according to the magnitude of the increase in imports from the EU. We exclude all those with the largest changes in trade flows. As in the first case (high tariff-revenue generating industries), the number of industries, which would be excluded on this basis is small, with the highest number being for The Bahamas (11) and for Guyana (10). If we look at the average across countries than the highest degree of overlap is for Antigua and Barbuda, which is always at 50% - which of course means that with respect to each of the other countries there is at least one of the two Antiguan industries in common. The lowest average degree of overlap is for The Bahamas and for St.Kitts. 26% of the bilateral overlaps have a degree of overlap of 50% or more. Finally, again the number of industries, which overlap totally is equal to zero.

**Table 6.30: Substantially all trade: Degree of overlap across countries excluding those industries with the biggest change in imports from the EU**

	ATG	BHS	BRB	BLZ	DMA	DOM	GRD	GUY	JAM	KNA	LCA	VCT	SUR	TTO
<i>0/0</i> <sup>1</sup>	2	11	9	4	8	5	8	10	3	5	8	5	4	5
ATG		50	50	50	50	50	50	50	50	50	50	50	50	50
BHS	50		11	25	13	40	25	10	33	20	25	20	25	40
BRB	50	11		25	38	20	50	44	33	40	25	40	25	40
BLZ	50	25	25		50	25	25	25	33	25	50	25	25	50
DMA	50	13	38	50		20	63	38	33	20	25	40	25	60
DOM	50	40	20	25	20		20	20	67	20	20	20	25	40
GRD	50	25	50	25	63	20		38	33	20	13	40	25	40
GUY	50	10	44	25	38	20	38		33	40	13	40	25	40
JAM	50	33	33	33	33	67	33	33		33	67	67	33	67
KNA	50	20	40	25	20	20	20	40	33		20	20	25	20
LCA	50	25	25	50	25	20	13	13	67	20		40	25	60
VCT	50	20	40	25	40	20	40	40	67	20	40		25	20
SUR	50	25	25	25	25	25	25	25	33	25	25	25		25
TTO	50	40	40	50	60	40	40	40	67	20	60	20	25	
Ave.	50	26	34	33	36	30	34	32	45	27	33	34	28	42

Source: own calculations; 1: gives the number of industries for which there is overlap across first all the Cariforum countries, and secondly all the OECS countries.

The next possible criterion for choosing which industries to exclude which we considered was to take the impact of the change in tariffs on Caribbean exports, and to protect those industries which saw the biggest decline in Caribbean exports. This can be seen in Table 6.31. Under this criterion, we see the largest number of industries being excluded. Nevertheless, once again there appear to be no industries which are common to all the Cariforum countries.

**Table 6.31: Substantially all trade: Degree of overlap across countries where the Caribbean export industries which see the biggest decline are excluded**

	ATG	BHS	BRB	BLZ	DMA	DOM	GRD	GUY	JAM	KNA	LCA	VCT	SUR	TTO
$0/0^1$	502	402	1027	257	319	1016	507	515	289	256	511	559	151	586
ATG		24	43	39	30	39	34	26	26	36	27	37	23	37
BHS	24		26	25	20	28	18	12	18	17	25	28	19	27
BRB	43	26		45	49	33	50	44	39	44	38	42	29	43
BLZ	39	25	45		21	43	32	32	13	18	25	40	13	40
DMA	30	20	49	21		39	34	29	19	29	34	42	20	34
DOM	39	28	33	43	39		38	42	35	41	32	37	30	38
GRD	34	18	50	32	34	38		30	23	37	25	39	15	31
GUY	26	12	44	32	29	42	30		13	32	18	30	15	30
JAM	26	18	39	13	19	35	23	13		14	43	28	28	30
KNA	36	17	44	18	29	41	37	32	14		31	42	11	42
LCA	27	25	38	25	34	32	25	18	43	31		34	32	29
VCT	37	28	42	40	42	37	39	30	28	42	34		18	32
SUR	23	19	29	13	20	30	15	15	28	11	32	18		20
TTO	37	27	43	40	34	38	31	30	30	42	29	32	20	
Ave.	32	22	40	30	31	36	31	27	25	30	30	35	21	33

Source: own calculations; 1: gives the number of industries for which there is overlap across first all the Cariforum countries, and secondly all the OECS countries.

**Table 6.32: Substantially all trade: Degree of overlap across countries where industries have been selected in order to maximise the welfare gain**

	ATG	BHS	BRB	BLZ	DMA	DOM	GRD	GUY	JAM	KNA	LCA	VCT	SUR	TTO
	184	7	242	5	429	27	66	64	44	105	578	534	172	26
ATG		14	48	20	40	26	56	39	25	46	33	48	11	46
BHS	14		14	20	14	14	14	14	14	14	14	14	14	14
BRB	48	14		20	39	19	59	42	36	49	27	52	15	38
BLZ	20	20	20		20	20	20	20	40	40	60	20	20	40
DMA	40	14	39	20		30	59	45	41	50	31	43	28	31
DOM	26	14	19	20	30		26	22	33	11	19	22	19	15
GRD	56	14	59	20	59	26		33	18	45	33	59	11	35
GUY	39	14	42	20	45	22	33		14	36	17	53	11	31
JAM	25	14	36	40	41	33	18	14		25	48	36	43	19
KNA	46	14	49	40	50	11	45	36	25		30	59	10	42
LCA	33	14	27	60	31	19	33	17	48	30		31	41	31
VCT	48	14	52	20	43	22	59	53	36	59	31		21	38
SUR	11	14	15	20	28	19	11	11	43	10	41	21		12
TTO	46	14	38	40	31	15	35	31	19	42	31	38	12	
Ave.	35	15	35	28	36	21	36	29	30	35	32	38	20	30

Source: own calculations; 1: gives the number of industries for which there is overlap across first all the Cariforum countries, and secondly all the OECS countries.

Finally, Table 6.32 gives the degree of overlap across the countries where the criterion has been to maximise the welfare gain from the proposed trade liberalisation. Here we see that the average degree of overlap is typically fairly low, and there are only 9 bilateral pairings where the degree of overlap is at 50% or more.

The picture that emerges from this analysis is complex but also fairly straightforward. It is complex in the sense that there are a number of plausible decision criteria that could be utilised by policy makers in thinking not simply about which industries to exclude in their own countries, but also in considering how to achieve agreement with the other Cariforum economies on a mutually acceptable list of substantially all industries. The picture is also complex in the sense that there are a large number of bilateral overlaps presented with respect to each of the preceding, and of course the degree of overlap across the criteria is typically fairly low. On the other hand, there is a fairly strong conclusion, which emerges from this analysis. This is that on average there is comparatively little overlap within any of the overlap criteria considered, and even less across the different criteria. This of course derives from the high degree of heterogeneity across the Caribbean economies, which has been discussed in other parts of this report. However, in turn this suggests that reaching agreement on a common list of industries to be excluded under substantially all trade may be fairly difficult to achieve. Of course, we recognise that in practice policy makers do not choose lists on the basis of the mechanical application of a given criteria. In reality, there will be a detailed examination of the schedules and close negotiation over those lists. However, the analysis does indicate that there is a strong prima facie case that the process of detailed negotiation is likely to be complex and maybe protracted. The underlying reason for this is the differential economic and indeed effective tariff structures within the Caribbean region.

## **6.5 Assessing some alternative liberalisation scenarios**

In all the preceding discussion, we have assumed that the Caribbean economies will liberalise their tariffs on imports from the EU only. We have not considered possible policy responses to the change in tariff revenue, nor have we considered the possible impact on trade and welfare of alternative multilateral trade liberalisation scenarios. These options are considered in this section. Here we present outcomes from several different unilateral liberalization scenarios conducted by the Caribbean countries. First, we look at the case of full liberalization meaning liberalization of tariff lines on all goods coming from all sources. We also explore the effects of liberalizing trade only on goods, which are imported from the EU but from all sources. The third plausible simulation to consider involves the liberalization of tariffs on goods imported from both the EU and the US, but

not the rest of the world. This can be thought of as a stylised combined EPA + FTAA experiment. The different scenarios are assessed using the Armington version of model with the benchmark set of elasticities.

### 6.5.1 MFN liberalisation

From the theoretical point of view full unilateral liberalization, if the markets are perfectly competitive, is the most plausible choice that a country can make in the sense that this is the option that would maximise the overall welfare gains.

**Table 6.33 MFN liberalization – Changes in trade flows (Base 1)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	43.8	-16.4	35.3	35.6	3452
<b>Bahamas, The</b>	112.2	-27.8	60.7	90.7	4496
<b>Barbados</b>	57.0	-20.3	36.8	42.9	4433
<b>Belize</b>	32.6	-24.3	26.0	32.4	3819
<b>Dominica</b>	42.3	-12.9	29.8	29.9	3512
<b>Dominican Republic</b>	21.7	22.4	24.9	21.1	3921
<b>Grenada</b>	35.9	-14.3	27.0	32.5	3752
<b>Guyana</b>	36.9	-11.4	22.6	26.9	4022
<b>Jamaica</b>	33.6	-18.0	23.6	24.2	4412
<b>St. Kitts and Nevis</b>	54.6	-18.2	27.3	36.9	3757
<b>St. Lucia</b>	45.7	-14.3	29.8	37.8	3848
<b>St. Vincent and the Grenadines</b>	38.8	-13.2	31.3	32.6	3773
<b>Suriname</b>	14.4	-8.5	20.7	6.6	2288
<b>Trinidad and Tobago</b>	11.8	-15.5	13.3	13.5	4379
<b>Unweighted average</b>	41.5	-13.8	29.2	33.1	3847
<b>OECS average</b>	43.5	-14.9	30.1	34.2	3682

Note: Percentage change; Base is total imports from a given source

Source: Own calculations

With this simulation, we see that the changes in trade flows are substantially different to those in the benchmark experiment. The largest increase in imports occurs for goods imported from rest of the world, then for US, and for the EU. There is also big trade reorientation from inefficient suppliers in the CARIFORUM countries to the ones outside it. The Dominica Republic is the only country that increases its imports from all sources because at the outset it was outside the CARICOM agreement. The Bahamas experience the largest percentage changes in the trade flows.

**Table 6.34 MFN liberalization – Changes in trade flows (Base 2)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	7.0	-2.1	4.6	20.7	3452
<b>Bahamas, The</b>	6.7	-0.2	1.5	82.4	4496
<b>Barbados</b>	14.2	-2.2	6.8	19.7	4433
<b>Belize</b>	10.7	-1.0	2.4	17.4	3819
<b>Dominica</b>	9.3	-2.9	4.7	11.9	3512
<b>Dominican Republic</b>	8.3	0.2	3.1	10.2	3921
<b>Grenada</b>	6.5	-2.8	4.1	15.3	3752
<b>Guyana</b>	8.8	-1.9	3.5	11.8	4022
<b>Jamaica</b>	12.3	-1.1	2.6	11.2	4412
<b>St. Kitts and Nevis</b>	11.3	-2.2	3.0	20.8	3757
<b>St. Lucia</b>	9.2	-2.6	5.5	16.3	3848
<b>St. Vincent and the Grenadines</b>	7.0	-3.0	5.5	13.7	3773
<b>Suriname</b>	3.5	-1.4	6.3	1.9	2288
<b>Trinidad and Tobago</b>	5.8	-0.4	2.0	4.6	4379
<b>Unweighted average</b>	8.6	-1.7	4.0	18.4	3847
<b>OECS average</b>	8.4	-2.6	4.6	16.5	3682

Note: Percentage change; Base is total imports from all sources  
Source: Own calculations

Table 6.34 presents the result when the base for the percentage changes is total imports from all sources. On average, we see that the CARIFORUM countries increase their import by one third as a result of the unilateral liberalization of trade with respect to all markets. The composition of trade changes strongly in favour of the US firms and to a lesser extent the rest of the Rest of The World and the EU. The remaining CARIFORUM countries exports decline. These results serve to highlight the conclusions derived from the discussion of the benchmark set of results. There we argued that bilaterally reducing tariffs with respect to the EU is likely to lead to significant trade diversion. This can now be seen in the increase in ROW trade and US trade under the multilateral liberalisation scenario.

Table 6.35 then details the changes in welfare arising from this experiment. As this represents a complete liberalisation of all tariffs all tariff revenue is lost. Not surprisingly then also we see that the MFN trade liberalisation is purely welfare enhancing giving an average welfare increase of 2.69 % which is around 1.6% of GDP for the average Caribbean country. It is worth also pointing out that under different modelling assumptions (with regard to elasticities, and with regard to the nature of the underlying competitive interaction) these overall welfare numbers could easily be higher.



**Table 6.35 MFN liberalization – Welfare and Tariff Revenue**

	<i>Change in Tariff Rev. (% of base TR)</i>	<i>Change in Tariff Rev.</i>	<i>Change in Consumer Surp.</i>	<i>Change in Welfare</i>	<i>Welfare (% of tot. imports)</i>
<b>Antigua and Barbuda</b>	-100.00	-25.45	32.43	6.77	2.38
<b>Bahamas, The</b>	-100.00	-333.02	534.07	196.36	11.50
<b>Barbados</b>	-100.00	-100.31	137.56	33.12	3.38
<b>Belize</b>	-100.00	-30.15	38.45	7.94	2.26
<b>Dominica</b>	-100.00	-7.45	10.06	2.46	2.07
<b>Dominican Republic</b>	-100.00	-321.09	382.18	57.70	1.22
<b>Grenada</b>	-100.00	-14.24	17.87	3.53	1.69
<b>Guyana</b>	-100.00	-28.87	36.48	7.30	1.64
<b>Jamaica</b>	-100.00	-200.61	267.52	65.16	2.23
<b>St. Kitts and Nevis</b>	-100.00	-16.59	21.94	5.22	2.82
<b>St. Lucia</b>	-100.00	-23.08	31.70	8.46	2.78
<b>St. Vincent</b>	-100.00	-11.12	14.27	3.07	1.84
<b>Suriname</b>	-100.00	-13.64	18.15	4.44	1.03
<b>Trinidad and Tobago</b>	-100.00	-97.36	121.93	23.63	0.87
<b>Unweighted average</b>	-100.00	-87.36	118.90	30.37	2.69
<b>OECS average</b>	-100.00	-16.32	21.38	4.92	2.26

Note: First and last column are percentage changes; All other values are expressed in millions of US\$

Source: Own calculations

In order to compare the MFN liberalization to the previous experiments, we now reduce its coverage. In the next experiment therefore, we only include those product groups, which are imported from the EU in the base. Hence, here the thought experiment is to imagine that the Caribbean liberalises its tariffs on all its imports from the EU, and on the same products on imports from all other sources.

The percentage values are fairly similar to those reported in the previous experiment, which suggests that trade in the products imported from the EU tends to reflect the patterns observed in trade in all goods. If we look at the change in trade flows where the base is total imports for each country (Table 6.37) we see that imports increase in aggregate by 25% which is only 5% less than in the case where we covered all of the goods. Note that the difference between the two scenarios in terms of the number of goods included is a little over 2000 product groups on average. In turn, this implies that Caribbean trade is fairly concentrated over certain product groups. The shifts in the composition of trade in this table reflect closely the changes in the previous experiment.

**Table 6.36 MFN liberalization of EU import goods – Changes in trade flows (Base 1)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	36.6	-13.7	35.3	29.7	1166

<b>Bahamas, The</b>	89.8	-24.5	60.7	66.1	1071
<b>Barbados</b>	54.7	-19.9	36.8	41.8	2946
<b>Belize</b>	26.8	-20.9	26.0	26.0	1117
<b>Dominica</b>	36.9	-12.2	29.8	27.3	1460
<b>Dominican Republic</b>	19.5	18.7	24.9	19.9	2640
<b>Grenada</b>	33.4	-13.5	27.0	30.3	1799
<b>Guyana</b>	33.5	-10.9	22.6	21.8	2001
<b>Jamaica</b>	32.9	-17.4	23.6	22.9	2558
<b>St. Kitts and Nevis</b>	49.0	-16.5	27.3	31.5	1368
<b>St. Lucia</b>	44.1	-13.6	29.8	35.1	2035
<b>St. Vincent and the Grenadines</b>	36.2	-12.5	31.3	30.0	1654
<b>Suriname</b>	14.1	-8.4	20.7	6.2	1818
<b>Trinidad and Tobago</b>	10.8	-12.5	13.3	12.6	2876
<b>Unweighted average</b>	37.0	-12.7	29.2	28.7	1894
<b>OECS average</b>	39.4	-13.7	30.1	30.6	1580

Note: Percentage change; Base is total imports from a given source  
Source: Own calculations

**Table 6.37 MFN liberalization of EU import goods – Changes in trade flows  
(Base 2)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	5.9	-1.7	4.6	17.2	1166
<b>Bahamas, The</b>	5.4	-0.2	1.5	60.0	1071
<b>Barbados</b>	13.6	-2.1	6.8	19.2	2946
<b>Belize</b>	8.8	-0.9	2.4	13.9	1117
<b>Dominica</b>	8.1	-2.7	4.7	10.9	1460
<b>Dominican Republic</b>	7.5	0.2	3.1	9.6	2640
<b>Grenada</b>	6.1	-2.6	4.1	14.3	1799
<b>Guyana</b>	8.0	-1.8	3.5	9.5	2001
<b>Jamaica</b>	12.0	-1.1	2.6	10.6	2558
<b>St. Kitts and Nevis</b>	10.1	-2.0	3.0	17.7	1368
<b>St. Lucia</b>	8.9	-2.5	5.5	15.2	2035
<b>St. Vincent and the Grenadines</b>	6.5	-2.8	5.5	12.6	1654
<b>Suriname</b>	3.5	-1.3	6.3	1.8	1818
<b>Trinidad and Tobago</b>	5.3	-0.3	2.0	4.3	2876
<b>Unweighted average</b>					
<b>OECS average</b>					

Note: Percentage change; Base is total imports from all sources  
Source: Own calculations

Given the similarities in the changes in trade, it is then not surprising that the welfare results (Table 6.38) are also very similar to what we saw in the previous run. The welfare increases by 2.35% on average, which is around 1.42% of GDP for the typical Caribbean country.

**Table 6.38 MFN liberalization EU import goods only – Welfare and tariff revenue**

	<i>Change in Tariff Rev. (% of base TR)</i>	<i>Change in Tariff Rev.</i>	<i>Change in Consumer Surp.</i>	<i>Change in Welfare</i>	<i>Welfare (% of tot. imports)</i>
<b>Antigua and Barbuda</b>	-84.86	-21.60	27.67	5.89	2.07
<b>Bahamas, The</b>	-71.82	-239.18	389.75	146.87	8.60
<b>Barbados</b>	-96.14	-96.44	133.25	33.38	3.40
<b>Belize</b>	-81.68	-24.63	31.63	6.70	1.91
<b>Dominica</b>	-90.42	-6.74	9.11	2.24	1.88
<b>Dominican Republic</b>	-91.29	-294.80	353.56	55.63	1.18
<b>Grenada</b>	-93.71	-13.35	16.75	3.31	1.58
<b>Guyana</b>	-85.20	-24.60	31.16	6.30	1.41
<b>Jamaica</b>	-95.73	-192.04	256.24	62.52	2.14
<b>St. Kitts and Nevis</b>	-86.74	-14.39	19.12	4.61	2.49
<b>St. Lucia</b>	-94.74	-21.86	30.04	8.02	2.64
<b>St. Vincent</b>	-93.49	-10.40	13.36	2.89	1.73
<b>Suriname</b>	-98.06	-13.37	17.85	4.40	1.02
<b>Trinidad and Tobago</b>	-92.97	-90.52	112.69	21.27	0.78
<b>Unweighted average</b>	-89.77	-75.99	103.01	26.00	2.35
<b>OECS average</b>	-90.66	-14.72	19.34	4.49	2.07

Note: First and last column are percentage changes; All other values are expressed in millions of US\$

Source: Own calculations

**Table 6.39 EU+US liberalization – Changes in trade flows**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	-13.5	-14.4	40.4	39.7	3452
<b>Bahamas, The</b>	-35.6	-27.2	65.2	95.6	4496
<b>Barbados</b>	-18.2	-16.4	49.9	53.4	4433
<b>Belize</b>	-12.9	-17.3	41.4	40.8	3819
<b>Dominica</b>	-10.9	-10.0	36.7	36.4	3512
<b>Dominican Republic</b>	-9.0	32.6	31.9	28.3	3921
<b>Grenada</b>	-12.8	-12.2	32.3	37.7	3752
<b>Guyana</b>	-8.9	-7.9	27.8	32.1	4022
<b>Jamaica</b>	-8.6	-12.7	36.8	30.9	4412
<b>St. Kitts and Nevis</b>	-16.1	-14.0	35.8	44.3	3757
<b>St. Lucia</b>	-14.3	-12.0	36.9	45.0	3848
<b>St. Vincent and the Grenadines</b>	-11.2	-10.1	36.1	37.5	3773
<b>Suriname</b>	-3.6	-4.8	23.5	8.3	2288
<b>Trinidad and Tobago</b>	-3.8	-8.8	20.0	18.2	4379
<b>Unweighted average</b>	-12.8	-9.7	36.8	39.1	3847
<b>OECS average</b>	-13.1	-12.1	36.4	40.1	3682

Note: Percentage change; Base is total imports from a given source

Source: Own calculations

The last simulation that we report on here is the one in which we liberalize trade with the EU and US, but retain tariffs on the rest of the world. As before we present the changes in trade flows with both the source country as the base (table 6.39), and also with total imports as the base (Table 6.40).

From the table we see that imports from both the EU and US are rising by roughly the same amount - nearly 40%. At the same time, the imports from other sources fall roughly by 10%. The only area for possible trade diversion is the decrease of imports coming from rest of the world.

**Table 6.40 EU+US liberalization – Changes in trade flows**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	-2.2	-1.8	5.3	23.0	3452
<b>Bahamas, The</b>	-2.1	-0.2	1.6	86.8	4496
<b>Barbados</b>	-4.5	-1.8	9.2	24.5	4433
<b>Belize</b>	-4.2	-0.7	3.9	21.9	3819
<b>Dominica</b>	-2.4	-2.2	5.8	14.5	3512
<b>Dominican Republic</b>	-3.5	0.3	4.0	13.6	3921
<b>Grenada</b>	-2.3	-2.4	4.9	17.7	3752
<b>Guyana</b>	-2.1	-1.3	4.3	14.0	4022
<b>Jamaica</b>	-3.1	-0.8	4.1	14.3	4412
<b>St. Kitts and Nevis</b>	-3.3	-1.7	3.9	25.0	3757
<b>St. Lucia</b>	-2.9	-2.2	6.8	19.4	3848
<b>St. Vincent and the Grenadines</b>	-2.0	-2.3	6.3	15.8	3773
<b>Suriname</b>	-0.9	-0.8	7.2	2.4	2288
<b>Trinidad and Tobago</b>	-1.9	-0.2	3.0	6.1	4379
<b>Unweighted average</b>	-2.7	-1.3	5.0	21.4	3847
<b>OECS average</b>	-2.5	-2.1	5.5	19.2	3682

Note: Percentage change; Base is total imports from all sources

Source: Own calculations

From table 6.40 we see that in aggregate imports increase by 22.4% which is slightly smaller than with the full liberalization but still quite substantial. The composition of the trade is changing, not surprisingly towards both the EU and US, but much more significantly towards the latter than the former. On average welfare increases by 1.88%, which is a much bigger welfare gain in comparison to the benchmark scenario where trade was only liberalised with the EU where the average welfare gain was equal 0.23 %. This clearly shows that the US is by far the most important trading partner of the Caribbean and much of the increase in welfare derives from liberalizing trade with the US. The large welfare gain is accompanied by large reductions in the tariff revenue equal to 75% on average.

**Table 6.41 EU+US liberalization – Welfare and Tariff Revenue**

	<i>Change in</i>	<i>Change in</i>	<i>Change in</i>	<i>Change in</i>	<i>Welfare (% of</i>
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	<i>Tariff Rev. (% of base TR)</i>	<i>Tariff Rev.</i>	<i>Consumer Surp.</i>	<i>Welfare</i>	<i>tot. imports)</i>
<b>Antigua and Barbuda</b>	-83.70	-21.30	26.34	4.89	1.72
<b>Bahamas, The</b>	-96.84	-322.50	507.05	180.66	10.58
<b>Barbados</b>	-74.39	-74.62	96.80	19.94	2.03
<b>Belize</b>	-73.28	-22.09	26.84	4.52	1.29
<b>Dominica</b>	-70.47	-5.25	6.80	1.45	1.22
<b>Dominican Republic</b>	-66.82	-217.40	247.54	28.21	0.60
<b>Grenada</b>	-79.31	-11.30	13.80	2.44	1.17
<b>Guyana</b>	-71.43	-20.62	24.75	3.93	0.88
<b>Jamaica</b>	-62.87	-126.12	154.79	27.89	0.96
<b>St. Kitts and Nevis</b>	-77.35	-12.83	16.01	3.10	1.67
<b>St. Lucia</b>	-78.53	-18.12	23.68	5.46	1.80
<b>St. Vincent</b>	-79.17	-8.81	10.97	2.11	1.26
<b>Suriname</b>	-79.64	-10.86	14.08	3.16	0.73
<b>Trinidad and Tobago</b>	-62.44	-60.80	71.00	9.77	0.36
<b>Unweighted average</b>	-75.44	-66.62	88.60	21.25	1.88
<b>OECS average</b>	-78.09	-12.93	16.27	3.24	1.47

Note: First and last column are percentage changes; All other values are expressed in millions of US\$  
Source: Own calculations

## 6.5.2 Restoring the Budget Revenue – Consumption Taxes

In all of the preceding simulations, we have indicated the extent to which tariff revenue declines under the different scenarios. At the limit, the loss of tariff revenue could be 100% if all tariffs are completely abolished. However, even in substantially all trade scenario where 80% of trade with the EU was liberalised there was a loss of tariff revenue equal to over 12% of base tariff revenue. These sorts of changes in government revenue are potentially substantial for many of the Caribbean economies who have traditionally relied fairly heavily on tariff revenue. Clearly, then there will need to be policy changes in order to compensate for the loss of tariff revenue. Clearly also there are a number of possible policy responses both on the side of revenue generation but also with respect to expenditure. It is not within the scope of this report to discuss these options in detail.

What we can do however, is to consider the possibility of the lost tariff revenue being restored through the application of a consumption tax. Indeed, it could be argued that for very small developing countries where a high proportion of domestically consumed goods are imported a single consumption tax collected at the border is possibly the most efficient way of raising fiscal revenue. In this section, therefore, we compute the level of this tax needed to keep the budget in balance when we introduce unilateral

liberalization of tariffs levied on imports from all sources – ie the full MFN scenario. We also present the level of the tax, which would keep the budget in balance in the benchmark scenario, levied either on all goods or only the goods imported from the EU. In each case, we have computed the required amount of tax at the different levels of aggregation. The tables indicate the changes in trade flows and welfare as a result of these different options.

First, for each country, we present the consumption tax on imports needed to keep the budget revenue intact in the case of the full MFN liberalization. We report this tax at each of our three levels of trade aggregation.

**Table 6.42 MFN liberalization - Required level of taxes to keep revenue intact**

	<i>2 Digits</i>	<i>4 Digits</i>	<i>6 Digits</i>
<b>Antigua and Barbuda</b>	10.10%	10.02%	9.77%
<b>Bahamas, The</b>	27.70%	23.14%	21.91%
<b>Barbados</b>	11.92%	10.79%	11.05%
<b>Belize</b>	10.40%	8.33%	9.50%
<b>Dominica</b>	8.40%	6.83%	6.37%
<b>Dominican Republic</b>	7.55%	7.87%	7.25%
<b>Grenada</b>	8.60%	7.97%	7.23%
<b>Guyana</b>	8.30%	7.76%	6.67%
<b>Jamaica</b>	7.54%	6.86%	7.20%
<b>St. Kitts and Nevis</b>	10.40%	9.43%	9.32%
<b>St. Lucia</b>	8.50%	8.20%	7.70%
<b>St. Vincent and the Grenadines</b>	7.70%	7.34%	6.76%
<b>Suriname</b>	9.10%	4.20%	3.20%
<b>Trinidad and Tobago</b>	6.92%	4.36%	3.75%
<b>Unweighted average</b>	10.2%	8.8%	8.4%

Source: Own calculations

At the two digits, we need a tax rate equal to 10% to raise the same amount of revenue which is equal to the lost tariff revenue. However, as you increase the level of disaggregation the equivalent tax rate declines to 8.4% at the 6-digit level. There are also large differences between individual countries in their tax rates. Trinidad and Tobago needs the lowest amount of taxation at the each level with a range between 4-7%, while The Bahamas require taxes four times bigger ranging from 22% to almost 28%. These differences in the consumption tax on imports clearly arise from the differential levels of tariffs across the islands and therefore on the amount of tariff revenue which is lost.

In Tables 6.43 and 6.44, we then give the impact on trade flows arising from this experiment. For purposes of comparison with the preceding simulations, we only report the results of the experiment run at the 6-digit level of disaggregation.

**Table 6.43 MFN liberalization with compensating consumption taxes:  
Changes in trade flows (Base 1)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	13.3	-31.7	7.9	7.8	3452
<b>Bahamas, The</b>	28.6	-51.8	-1.9	15.3	4496
<b>Barbados</b>	21.9	-37.7	5.8	10.7	4433
<b>Belize</b>	5.8	-38.9	3.0	5.1	3819
<b>Dominica</b>	22.3	-24.2	13.1	11.9	3512
<b>Dominican Republic</b>	2.2	3.2	4.6	1.3	3921
<b>Grenada</b>	13.9	-27.0	7.0	11.0	3752
<b>Guyana</b>	16.1	-23.5	4.8	7.7	4022
<b>Jamaica</b>	12.3	-29.4	3.6	4.2	4412
<b>St. Kitts and Nevis</b>	22.4	-33.4	2.0	9.3	3757
<b>St. Lucia</b>	20.7	-27.0	8.6	14.5	3848
<b>St. Vincent and the Grenadines</b>	17.4	-25.0	11.7	12.9	3773
<b>Suriname</b>	5.4	-15.1	11.8	-1.5	2288
<b>Trinidad and Tobago</b>	2.4	-21.9	3.0	3.2	4379
<b>Unweighted average</b>	14.6	-27.4	6.1	8.1	3847
<b>OECS average</b>	18.3	-28.0	8.4	11.2	3682

Note: Percentage change; Base is total imports from a given source  
Source: Own calculations

In comparison to the MFN only experiment the biggest change arising from this experiment is the decline in imports from the other Cariforum countries. With the MFN experiment import from these countries declined on average by 13.8% and for the OECS economies by 14.9%. We now see declines in imports from these sources equal to 27.4% and 28% respectively. We also see much smaller increases in imports from the other suppliers with imports now being between 65-70% lower than they were with the full MFN liberalisation.

**Table 6.44 MFN liberalization with compensating consumption taxes:  
Changes in trade flows (Base 2)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
Antigua and Barbuda	2.1	-4.0	1.0	4.5	3452
Bahamas, The	1.7	-0.4	0.0	13.9	4496
Barbados	5.5	-4.0	1.1	4.9	4433

Belize	1.9	-1.7	0.3	2.7	3819
Dominica	4.9	-5.4	2.1	4.7	3512
Dominican Republic	0.8	0.0	0.6	0.6	3921
Grenada	2.5	-5.3	1.1	5.2	3752
Guyana	3.8	-4.0	0.7	3.4	4022
Jamaica	4.5	-1.8	0.4	1.9	4412
St. Kitts and Nevis	4.6	-4.0	0.2	5.3	3757
St. Lucia	4.2	-4.9	1.6	6.3	3848
St. Vincent and the Grenadines	3.1	-5.6	2.1	5.4	3773
Suriname	1.3	-2.4	3.6	-0.4	2288
Trinidad and Tobago	1.2	-0.5	0.4	1.1	4379
Unweighted average	3.0	-3.2	1.1	4.2	3847
OECS average	3.6	-4.9	1.3	5.2	3682

Note: Percentage change; Base is total imports from all sources  
Source: Own calculations

When looking at Table 6.44 where the base is total imports we see that on average the Caribbean countries increase their imports by 5.1% and the OECS countries by 5.2%. This is more in line with the increase that we saw when we were only liberalizing trade with the EU. This is six times smaller than the outcome of liberalization without taxes. The composition of the trade however tends to shift in a similar fashion though there is a slightly smaller decline in the exports of the rest of the world.

In Table 6.45 which gives the tariff/revenue and welfare implications of this experiment. The striking feature which emerges from this table is that the introduction of the consumption tax results in an overall welfare loss, which is quite substantial. For the Cariforum group of countries in aggregate it represents 5.36% of the base value of imports, and for the OECS countries nearly 7% of the base value of imports. The negative change in welfare is largely due to the increase in the price of Caribbean imports, which previously entered duty free.

**Table 6.45 MFN liberalization with compensating consumption taxes – Welfare and tariff revenue**

	<i>Change in Tariff Rev. (% of base TR)</i>	<i>Change in Tariff Rev.</i>	<i>Change in Consumer Surp.</i>	<i>Change in Welfare</i>	<i>Welfare (% of tot. imports)</i>
<b>Antigua and Barbuda</b>	0.96	0.25	5.44	-19.54	-6.86
<b>Bahamas, The</b>	-0.21	-0.69	100.61	-202.06	-11.84
<b>Barbados</b>	-0.22	-0.23	33.73	-65.64	-6.70
<b>Belize</b>	2.22	0.67	5.91	-23.89	-6.80



<b>Dominica</b>	-1.85	-0.14	2.99	-4.28	-3.60
<b>Dominican Republic</b>	0.22	0.70	46.84	-271.15	-5.75
<b>Grenada</b>	0.46	0.07	3.40	-10.53	-5.04
<b>Guyana</b>	-1.82	-0.52	7.79	-20.44	-4.59
<b>Jamaica</b>	-0.32	-0.63	65.08	-130.61	-4.48
<b>St. Kitts and Nevis</b>	-2.08	-0.34	4.80	-11.20	-6.05
<b>St. Lucia</b>	-2.75	-0.63	9.01	-13.14	-4.32
<b>St. Vincent</b>	-2.57	-0.29	3.41	-7.35	-4.40
<b>Suriname</b>	-1.66	-0.23	5.21	-8.29	-1.92
<b>Trinidad and Tobago</b>	1.45	1.41	24.45	-72.00	-2.66
<b>Unweighted average</b>	-0.58	-0.04	22.76	0.00	-5.36
<b>OECS average</b>	0.96	0.25	5.44	-19.54	-6.86

Note: First and last column are percentage changes; All other values are expressed in millions of US\$

Source: Own calculations

We now turn to explore what the taxes would be needed in the benchmark scenario in order to keep the fiscal revenue stable. There are two possibilities we either levy this tax only on goods imported from the EU or we levy it on the goods imported from all sources. We first look at the former and then subsequently at the latter.

**Table 6.46 Liberalization of EU imports - Required level of consumption taxes to keep revenue constant**

	<i>2 Digits</i>	<i>4 Digits</i>	<i>6 Digits</i>
Antigua and Barbuda	11.00%	11.50%	10.88%
Bahamas, The	23.00%	21.30%	20.23%
Barbados	18.00%	15.05%	12.54%
Belize	12.00%	10.15%	9.86%
Dominica	9.00%	7.20%	6.65%
Dominican Republic	10.30%	10.05%	9.58%
Grenada	10.00%	7.85%	7.14%
Guyana	10.00%	9.85%	7.64%
Jamaica	9.00%	8.70%	7.60%
St. Kitts and Nevis	10.00%	8.85%	7.30%
St. Lucia	11.00%	10.50%	9.13%
St. Vincent and the Grenadines	11.00%	9.50%	8.38%
Suriname	14.00%	8.55%	6.66%
Trinidad and Tobago	6.70%	6.01%	4.95%
<b>Unweighted average</b>	<b>11.8%</b>	<b>10.4%</b>	<b>9.2%</b>

Source: Own calculations

A flat tariff line equal to 10% would simulate the effects of the tariff system that is currently in place. The changes in required tax level with the different aggregation levels are not as big as in the preceding case.

**Table 6.47 Liberalization of EU imports with consumption tax on EU goods – changes in trade flows (Base 1)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua Barbuda</b>	-0.4	-0.6	6.1	0.1	1166
<b>Bahamas, The</b>	-0.4	0.7	20.2	-0.2	1071
<b>Barbados</b>	-1.7	-1.6	7.2	0.2	2946
<b>Belize</b>	-0.8	-1.3	6.5	0.2	1117
<b>Dominica</b>	-1.3	-2.1	17.6	-0.2	1460
<b>Dominican Republic</b>	0.1	0.1	-0.9	0.2	2640
<b>Grenada</b>	-1.4	-1.1	11.1	-0.6	1799
<b>Guyana</b>	0.0	-0.3	3.1	0.1	2001
<b>Jamaica</b>	-1.0	-1.0	8.7	0.1	2558
<b>St. Kitts and Nevis</b>	-1.4	-0.5	13.6	-0.4	1368
<b>St. Lucia</b>	-1.2	-1.2	8.5	-0.3	2035
<b>St. Vincent and the Grenadines</b>	-0.7	-0.8	9.1	-0.3	1654
<b>Suriname</b>	1.2	-0.7	0.7	1.1	1818
<b>Trinidad and Tobago</b>	-0.7	-1.3	2.2	0.7	2876
<b>Unweighted average</b>	-0.7	-0.8	8.1	0.0	1894
<b>OECS average</b>	-1.1	-1.1	11.0	-0.3	1580

Note: Percentage change; Base is total imports from a given source  
Source: Own calculations

In this experiment the introduction of a single consumption tax on all imports from the EU does not change the trade flows by a large amount. The changes are 5 times smaller than in the benchmark scenario. This can also be seen from the table below where the result is that the overall increase in the imports is very small, at about 0.7%.

**Table 6.48 Liberalization of EU imports with consumption tax on EU goods – Changes in trade flows (Base 2)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	-0.1	-0.1	0.8	0.0	1166
<b>Bahamas, The</b>	0.0	0.0	0.5	-0.2	1071
<b>Barbados</b>	-0.4	-0.2	1.3	0.1	2946
<b>Belize</b>	-0.3	-0.1	0.6	0.1	1117
<b>Dominica</b>	-0.3	-0.5	2.8	-0.1	1460

<b>Dominican Republic</b>	0.0	0.0	-0.1	0.1	2640
<b>Grenada</b>	-0.2	-0.2	1.7	-0.3	1799
<b>Guyana</b>	0.0	0.0	0.5	0.0	2001
<b>Jamaica</b>	-0.4	-0.1	1.0	0.0	2558
<b>St. Kitts and Nevis</b>	-0.3	-0.1	1.5	-0.2	1368
<b>St. Lucia</b>	-0.2	-0.2	1.6	-0.1	2035
<b>St. Vincent and the Grenadines</b>	-0.1	-0.2	1.6	-0.1	1654
<b>Suriname</b>	0.3	-0.1	0.2	0.3	1818
<b>Trinidad and Tobago</b>	-0.3	0.0	0.3	0.2	2876
<b>Unweighted average</b>	-0.2	-0.1	1.0	0.0	1894
<b>OECS average</b>	-0.2	-0.2	1.6	-0.1	1580

Note: Percentage change; Base is total imports from all sources  
Source: Own calculations

A trade policy which changes the tariff system currently in place to one flat import tax is welfare decreasing.

**Table 6.49 Liberalization of EU imports with consumption tax on EU goods – Welfare and tariff revenue**

	<i>Change in Tariff Rev. (% of base TR)</i>	<i>Change in Tariff Rev.</i>	<i>Change in Consumer Surp.</i>	<i>Change in Welfare</i>	<i>Welfare (% of tot. imports)</i>
<b>Antigua and Barbuda</b>	-1.84	-0.40	1.12	-2.94	-1.03
<b>Bahamas, The</b>	-0.14	-0.34	2.79	-4.77	-0.28
<b>Barbados</b>	-0.15	-0.14	4.81	-16.09	-1.64
<b>Belize</b>	-1.09	-0.27	1.00	-2.26	-0.64
<b>Dominica</b>	-5.08	-0.34	0.92	-0.59	-0.50
<b>Dominican Republic</b>	-0.09	-0.28	6.99	-44.75	-0.95
<b>Grenada</b>	-3.45	-0.46	0.89	-1.66	-0.80
<b>Guyana</b>	-1.52	-0.37	1.41	-3.88	-0.87
<b>Jamaica</b>	-1.74	-3.35	9.29	-17.05	-0.58
<b>St. Kitts and Nevis</b>	-2.10	-0.30	0.66	-1.10	-0.59
<b>St. Lucia</b>	-1.13	-0.25	1.67	-3.25	-1.07
<b>St. Vincent</b>	-2.58	-0.27	0.81	-1.71	-1.02
<b>Suriname</b>	-1.74	-0.23	2.99	-5.49	-1.27
<b>Trinidad and Tobago</b>	-0.34	-0.30	4.19	-15.23	-0.56
<b>Unweighted average</b>	-1.64	-0.52	2.82	0.00	-0.84
<b>OECS average</b>	-1.84	-0.40	1.12	-2.94	-1.03

Note: First and last column are percentage changes; All other values are expressed in millions of US\$  
Source: Own calculations

The last question regarding the taxes would be: what is the level of tax which would replace current EU tariff revenue and is levied on goods from all sources.

**Table 6.50 Liberalization of EU imports - Required level of consumption taxes to keep revenue intact**

	<i>2 Digits</i>	<i>4 Digits</i>	<i>6 Digits</i>
<b>Antigua and Barbuda</b>	2.05%	2.03%	1.91%
<b>Bahamas, The</b>	2.65%	1.91%	1.91%

<b>Barbados</b>	4.35%	3.50%	3.55%
<b>Belize</b>	2.05%	1.43%	1.33%
<b>Dominica</b>	2.55%	1.93%	2.28%
<b>Dominican Republic</b>	1.49%	1.43%	1.43%
<b>Grenada</b>	2.25%	1.75%	1.63%
<b>Guyana</b>	1.75%	1.53%	1.56%
<b>Jamaica</b>	1.25%	1.19%	1.18%
<b>St. Kitts and Nevis</b>	2.05%	1.83%	1.65%
<b>St. Lucia</b>	2.65%	2.39%	2.42%
<b>St. Vincent and the Grenadines</b>	2.55%	2.13%	2.34%
<b>Suriname</b>	4.65%	2.39%	2.12%
<b>Trinidad and Tobago</b>	1.45%	1.17%	1.03%
<b>Unweighted average</b>	2.4%	1.9%	1.9%

Source: Own calculations

It turns out that if we levy import tax equal to 2% on average we should keep the fiscal revenue intact. This tax is very low and its value is almost constant at the different levels of aggregation.

**Table 6.51 Liberalization of EU imports with consumption tax on all imports – Changes in trade flows (Base 1)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
<b>Antigua and Barbuda</b>	-7.5	-6.7	51.9	-6.9	3452
<b>Bahamas, The</b>	-6.3	-7.8	179.1	-5.5	4496
<b>Barbados</b>	-14.2	-12.6	57.6	-12.2	4433
<b>Belize</b>	-6.3	-6.0	49.8	-4.4	3819
<b>Dominica</b>	-8.4	-8.4	40.9	-7.4	3512
<b>Dominican Republic</b>	-5.3	-3.8	39.8	-5.6	3921
<b>Grenada</b>	-7.2	-6.5	41.6	-6.8	3752
<b>Guyana</b>	-6.0	-5.2	32.3	-5.8	4022
<b>Jamaica</b>	-5.5	-5.0	45.8	-4.7	4412
<b>St. Kitts and Nevis</b>	-7.0	-5.9	48.6	-5.7	3757
<b>St. Lucia</b>	-9.8	-8.8	44.1	-9.1	3848
<b>St. Vincent and the Grenadines</b>	-8.6	-8.0	40.6	-8.3	3773
<b>Suriname</b>	-8.2	-8.9	19.1	-8.0	2288
<b>Trinidad and Tobago</b>	-4.2	-4.8	21.3	-4.3	4379
<b>Unweighted average</b>	-7.5	-7.0	50.9	-6.8	3847
<b>OECS average</b>	-8.1	-7.4	44.6	-7.4	3682

Note: Percentage change; Base is total imports from a given source

Source: Own calculations

The introduction of the tax rate levied on all goods substantially increases the scope for possible trade diversion. The rise in imports from the EU is similar to the one observed in the benchmark case while the decrease in imports from other sources is larger.

**Table 6.52 Liberalization of EU imports with consumption tax on all goods – Changes in trade flows (Base 2)**

	<i>World</i>	<i>CARIFORUM</i>	<i>EEC15</i>	<i>US</i>	<i>No. Products</i>
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<b>Antigua and Barbuda</b>	-1.2	-0.8	6.8	-4.0	3452
<b>Bahamas, The</b>	-0.4	-0.1	4.4	-5.0	4496
<b>Barbados</b>	-3.5	-1.3	10.6	-5.6	4433
<b>Belize</b>	-2.1	-0.3	4.7	-2.4	3819
<b>Dominica</b>	-1.8	-1.9	6.4	-3.0	3512
<b>Dominican Republic</b>	-2.0	0.0	4.9	-2.7	3921
<b>Grenada</b>	-1.3	-1.3	6.3	-3.2	3752
<b>Guyana</b>	-1.4	-0.9	5.0	-2.6	4022
<b>Jamaica</b>	-2.0	-0.3	5.0	-2.2	4412
<b>St. Kitts and Nevis</b>	-1.5	-0.7	5.3	-3.2	3757
<b>St. Lucia</b>	-2.0	-1.6	8.1	-3.9	3848
<b>St. Vincent and the Grenadines</b>	-1.6	-1.8	7.1	-3.5	3773
<b>Suriname</b>	-2.0	-1.4	5.9	-2.3	2288
<b>Trinidad and Tobago</b>	-2.1	-0.1	3.2	-1.5	4379
<b>Unweighted average</b>	-1.8	-0.9	6.0	-3.2	3847
<b>OECS average</b>	-1.6	-1.4	6.7	-3.5	3682

Note: Percentage change; Base is total imports from all sources; Source: Own calculations

**Table 6.53 Liberalization of EU imports with consumption tax on EU goods – Welfare and tariff revenue**

	<i>Change in Tariff Rev. (% of base TR)</i>	<i>Change in Tariff Rev.</i>	<i>Change in Consumer Surp.</i>	<i>Change in Welfare</i>	<i>Welfare (% of tot. imports)</i>
<b>Antigua and Barbuda</b>	-2.56	-0.65	0.81	-4.41	-1.55
<b>Bahamas, The</b>	0.06	0.20	-8.45	-29.69	-1.74
<b>Barbados</b>	0.65	0.65	0.77	-27.62	-2.82
<b>Belize</b>	-1.42	-0.43	0.29	-4.11	-1.17
<b>Dominica</b>	3.59	0.49	-0.11	-2.04	-1.72
<b>Dominican Republic</b>	-1.32	-4.23	3.14	-60.03	-1.27
<b>Grenada</b>	-1.93	-0.27	0.44	-2.81	-1.34
<b>Guyana</b>	-0.47	-0.13	0.52	-5.78	-1.30
<b>Jamaica</b>	-1.99	-3.99	5.11	-28.85	-0.99
<b>St. Kitts and Nevis</b>	0.47	0.08	-0.16	-2.63	-1.42
<b>St. Lucia</b>	0.51	0.12	0.65	-5.58	-1.83
<b>St. Vincent</b>	2.65	0.29	0.03	-3.11	-1.86
<b>Suriname</b>	3.56	1.17	1.45	-7.26	-1.68
<b>Trinidad and Tobago</b>	3.60	7.40	-5.82	-28.03	-1.03
<b>Unweighted average</b>	0.39	0.05	-0.10	0.00	-1.55
<b>OECS average</b>	0.46	0.01	0.28	-3.43	-1.62

Note: First and last column are percentage changes; All other values are expressed in millions of US\$

Total imports increase on average by 0.1% which means that they do not change. The only changes are occurring in the composition of trade the EU is significantly increasing its market share, at the expense of mainly US. These changes are welfare decreasing, the lost welfare is equal to 1.5% of imports. The new composition of imports is clearly sub-optimal to the base one.

## 6.6 Summary and Conclusions

In this part of the report, we have modelled EPA induced reductions in trade barriers and assessed the possible impact on patterns of trade and welfare. These simulations were carried out at a disaggregated country and product level. It is important to point out that the simulations are based on a complete and immediate liberalisation of the relevant tariffs. In reality the process of tariff dismantling will be phased in over a number of years – and indeed part of the EPA negotiations will be concerned with agreeing an appropriate time-scale. Clearly then, there will be ongoing changes and reforms taking place in order to support that process of trade liberalisation, as well as of course other exogeneous changes to the policy environment. All of this, of course, cannot be modelled. Hence, as is standard in the partial and general equilibrium literature, the experiments we report here are based on moving from the tariff inclusive equilibrium to one in which the tariffs are completely removed. We could of course model a partial reduction in tariffs. The changes in trade and welfare tend, however, to be fairly monotonic with the change in tariffs, and hence the complete reduction in tariffs, which we model here provides a useful outer bound.

Bearing the above in mind, the results, based on mid-range of elasticity values, suggest that on average imports from the EU as a percentage of total imports could rise in the order of 7.1% under perfectly competitive assumptions, and 5.7% in the presence of imperfect competition. Corresponding to this there is a decline in imports from the US (-3.2% under perfect competition, -0.4% under imperfect competition), the other Cariforum countries (-0.4%, -0.1%), and from the rest of the world (-0.8%, -0.3%). For the OECS countries the figures were similar though the absolute magnitudes a little higher. Increasing the underlying elasticities results in substantially larger changes in trade flows. These results suggest some possibility of trade creation, little indication of trade reorientation, and considerable scope for trade diversion.

This is then reflected in the impact of the preceding liberalisations on net welfare for the Cariforum countries. Welfare gains are typically very small. Under perfect competition the net welfare gain, depending on the underlying elasticities used, ranges from between 0.07% to 0.99% of base total total imports. Under imperfect competition, the welfare gain ranges from 0.45% to 1.48% when the monopoly profits accrue to the EU

suppliers, and from 1.95% to 3.16% of base imports when the monopoly profits accrue to domestic distributors.

In contrast, full MFN liberalisation, under perfect competition, leads to a smaller increase in imports from the EU (4%), and more substantial increases in imports from the US (18.4%), and the rest of the world (8.6%). Imports from Cariforum suppliers decrease by -1.7%. Correspondingly, the welfare gains are significantly higher, at 2.69% of base imports on average for all the Cariforum countries, and 2.26% for the OECs economies.

The changes in trade flows are also accompanied by substantial losses of tariff revenue, which on average range from 20% - 30% for the non-MFN liberalisation scenarios. Given the importance of tariff revenue as a source of government revenue for many of these economies, this represents potentially a substantial fall in government revenue.

Where the EU liberalisation is combined with a consumption tax levied on all imports, there is a smaller increase in EU imports than in the base (6%), and more substantial decline in imports from the remaining suppliers – the US (-3.2%), the Rest of the World (-1.8%) and the other Cariforum countries (-0.9%). This simulation leads to a decline in welfare amounting to -1.55% of total imports for the Cariforum average, and -1.62 for the OECS countries.

This part of the report also considered the implications for the liberalisation of “substantially” all trade. As a working assumption, we assumed that there may be different criteria for defining substantially, but that on average the Cariforum countries would liberalise 80% of their trade. Using a criterion which excluded the 20% of industries which generate the most tariff revenue diminishes the impact on trade flows, and reduces the welfare gain to 0.13% of base imports for the Cariforum average, and 0.16% for the OECS economies. De facto this simulation was run on the basis of allowing for special and differential treatment, as the exclusion of industries was achieved on a country by country basis.

Discussion of substantially all trade, naturally leads to a consideration of special and differential treatment. Here, we recognise that there may indeed be a case for special and differential treatment for particular economies under certain circumstances. However, we argue that in order to be successful SDT needs to be able to distinguish between countries and thus to be able to recognise their different needs, and the evolution of those

needs over time. It is therefore extremely important to be clear about the grounds for any special and differential treatments (infrastructure, institutions, size/location), and given those grounds to consider carefully optimal policy responses. Our view in this report is that introducing asymmetries in trade rules, asymmetries in tariff lists etc. is highly likely to increase distortions and increase inefficiencies and in the long run to make it more difficult for the Caribbean economies to successfully integrate into the world economy, and that therefore such form of SDT should be avoided.

If differential treatment with regard to tariff liberalisation is to be sought a preferable option, though far from ideal would be to have a common list, but possibly with different time scales for specific countries. Clearly introducing different time scales also introduces distortions and adds to bureaucratic complexity, but less so than with differential lists. In addition as the sole difference is over time scale in principle the SDT is time delimited which should introduce more appropriate incentives in the long run.

A more satisfactory way of addressing the problem of different countries' development needs is not to introduce diversity in (trade) rules, but in the implementation of development assistance and aid. We would therefore argue that there is a need for addressing the concerns of specific countries via this route as opposed to via introducing distortions in the underlying trade rules. That development assistance could be channelled within the region itself, both through the creation of a regional development fund, and via development assistance and aid as under the Cotonou agreement.

Finally, this part of the report also considered the issue of how difficult it might be for the economies to agree on a common list of industries to exclude under the auspices of substantially all trade. On the basis of various possible criteria (high tariff revenue, high tariff, largest welfare gain....) we have explored the degree of overlap across Cariforum countries over the industries they would wish to exclude. Using these criteria we show that there is very little overlap criteria, which of course derives from the high degree of heterogeneity across the Caribbean economies. This, in turn, suggests that reaching agreement on a common list of industries to be excluded under substantially all trade may be fairly difficult to achieve and that therefore the process of detailed negotiation may be complex and protracted.





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