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To Have or Not to Have the Common External Tariff: The CARICOM Countries Conundrum[1]

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Abstract

This study utilizes a source-based demand systems model to estimate demand for imported poultry products in the Caribbean Community (CARICOM), and to evaluate the impact that modifications of the Common External Tariff (CET) would have on the demand for poultry products from the United States, Brazil, Canada and the European Union. Own price elasticities suggest that CARICOM's poultry import demand is highly price responsive in both the short run and the long run, and that any significant increases in imported poultry prices could be expected to trigger greater than proportional decreases in quantities demanded from all source countries except Brazil. Results also suggest that if the CET were removed, all source countries would be able to expand poultry product exports into CARICOM. Canada is the only country that would decrease exports to CARICOM in the long run if the CET were removed. Poultry exports to the region from most source countries would contract with a doubling of the CET to 80%, in both the short run and the long run.

Keywords: Caribbean Community (CARICOM); Central Bureau Statistics demand system; poultry import demand; price elasticity; Common External Tariff (CET)

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Introduction

Poultry is the most widely consumed meat type in the Caribbean. Statistics published by the Food and Agriculture Organization (FAO), estimated that poultry meat comprised 82% of all animal protein and 55% of all protein consumed in 2011. Average annual consumption across the region was reported as 35 kilograms per capita, with a range of 32-41 kilograms per capita across countries (FAO 2011). In recent years, the continued influx of poultry meat imports has caused Caribbean governments, the Caribbean Poultry Association (CPA), and other stakeholders to push for increased protection for the regional (domestic) poultry industry, as imports have tended to be more competitively and lower priced than domestically produced poultry meat (Agritrade 2011; 2012). Poultry meat and products imported into Caribbean Community (CARICOM) member states are subject to a Common External Tariff (CET). However, in practice, and as allowed by law, there is considerable variance in the rates that are actually applied, given that some countries also apply surcharges and taxes in tandem with the CET.

In an effort to be more competitive regionally and globally, the Caribbean Poultry Association (CPA) has been lobbying for modernization and an enhancement of regional tariff and regulatory frameworks for poultry products. Per the tariff regime specifically, this could involve an increase in the minimum CET from 40% to 80%, with a harmonization of supplementary levies (Agritrade 2012). Other suggested measures include (a) implementation of safeguard mechanisms linked to import licensing arrangements; (b) prohibitions on frozen products that are thawed and sold as fresh chilled products; (c) the introduction of country of origin labelling; (d) prohibitions on repackaging of imported frozen poultry parts; and (e) harmonization and strengthening of Caribbean sanitary and phytosanitary (SPS) regulatory systems that apply to poultry products (Agritrade 2011). If implemented, the aforementioned measures could affect the competitiveness of imported poultry meat and associated products. The United States (US), Brazil, Canada and the European Union (EU) are the main exporters of poultry meat and products to the Caribbean region, controlling 99% of the imported poultry supplies.

The study utilizes a source-based demand system model to estimate the Caribbean demand for imported poultry products and evaluate the impact that modifications of the Common External Tariff (CET), as applied by the countries in the Caribbean Community (CARICOM) group, would have on the exporting country demand. Given that CARICOM is a subgroup of the Caribbean region, issues faced by CARICOM states are consistent with those faced by the region at large. Two scenarios are evaluated. First, we assume a doubling of the CET rate to 80%. For agricultural commodity imports, the current CET employed by CARICOM member states is 40% on average, although there is some deviation in rates applied by individual members. Although doubling the tariff is contrary to global trade liberalization trends that include lowering of tariffs, we assume that CARICOM governments agree to double the rate in accordance with the CPA's lobbying efforts. The second scenario assumes complete removal of the CET, which is plausible under negotiated agreements that would liberalize trade between CARICOM and the source countries for poultry meat. This scenario is also plausible since there is precedence for the suspension of the CET. In 2008, CARICOM's Council for Trade & Economic Development (COTED) approved a suspension on three categories of food items (primarily) for specific time periods in order to ease the effects of rising costs of commodities across the region. Broiler meat

was included in the list of items for some countries (CARICOM Secretariat 2008). Removal of the CET would essentially reduce the differential between the prices of poultry products in CARICOM countries, and consumers would pay lower prices for imported poultry meat from the various source countries. Table 1 lists the member and associate member states of CARICOM.

Table 1. Member and Associate Member States of the Caribbean Community (CARICOM).

Member States	Associate Members
Antigua and Barbuda	Anguilla
The Bahamas	Bermuda
Barbados	British Virgin Islands
Belize	Cayman Islands
Dominica	Turks and Caicos Islands
Grenada	
Guyana	
Haiti	
Jamaica	
Montserrat	
Saint Lucia	
St. Kitts and Nevis	
St. Vincent and the Grenadines	
Suriname	
Trinidad and Tobago	

Source. CARICOM Secretariat 2014.

As shown by Asche, Bremnes, and Wessells (1999), the study assumes that the level of market integration among poultry products allows for aggregation from species specific to a generic product category without significant loss of information, at least when assessing long-run relationships. This implies that products from broilers, turkeys and ducks can be represented as a single aggregate. However, as shown by Muhammad and Jones (2011) import preferences are not necessarily homogeneous across exporting countries and significant information loss can occur when source is not considered. Similar products from different sources may be physically different, which may be the case for the poultry products being studied. Short run and long run components are included in the model to account for the dynamic nature of the trading environment, where the inclusion of a long run time frame reflects market and resource allocation adjustments that are likely to occur following negotiated trade agreements (Jones and Blayney 2014).

Following this section, a brief discussion characterizing poultry meat importation into the Caribbean Community (CARICOM) is presented. This section focuses primarily on imports originating from the US, given its importance as a key supplier of food products to the region. Section 3 describes the regional poultry sector, and CARICOM tariff policy with implications for poultry meat trade. Methodology, data, model results and discussion are presented in Sections 4, 5 and 6, respectively. General implications for exporting countries (the United States, Brazil, European Union and Canada) and CARICOM (producers and consumers) are discussed in the final section of the paper.

Caribbean Poultry Meat Importation Trends

The Caribbean region comprises a set of countries with distinct country groupings including the continental countries of Guyana, Belize and Suriname, countries with sizeable populations (Haiti, Trinidad and Tobago, Dominican Republic, Cuba and Jamaica), and the smaller countries of the Organization of the Eastern Caribbean States (OECS) and Barbados. By definition, the countries are small, open economies that are easily affected by the ongoing events in the global economy due to their reliance on developed nations for trade, economic assistance and financial investment and high level of migration. The United States, the European Union and Taiwan provide ongoing support and assistance via different arrangements.

As the largest supplier of food products to the Caribbean, the United States has an estimated 55% share overall of the market for imported agricultural products. The Caribbean is the 7th largest export market for U.S. consumer-oriented foods, with poultry, red meats, dairy products and snacks comprising the top export categories (Gonzalez 2014). In 2011, the United States exported $823 million of consumer-oriented products to the Caribbean, and surpassed this in 2012 with a record breaking $1.4 billion in consumer-oriented product exports to the region (Gonzalez 2012; Gonzalez and Nishiura 2013). Geographical proximity of the Caribbean to the U.S, the strong appeal of U.S. products among island populations, urbanization, lifestyle changes and the expansion of tourism on most islands, as well as the decline in per capita agricultural production are among the factors that drive demand for U.S. products. With the exception of Guyana, Suriname and Belize, most countries are net food importers that have become increasingly dependent on food importation over time. In tandem, these socioeconomic conditions and characteristics of the Caribbean market would appear to augur well for increased demand for US agricultural and consumer-oriented products in the future, albeit depending on global economic conditions.

Between 2005 and 2009, US poultry meat exports to the Caribbean region grew 74%, surpassing total US poultry meat exports worldwide (AMS 2009). In 2009 alone, approximately 79% of all poultry meat imported into the Caribbean was sourced from the United States (Agritrade 2011). The Caribbean was the 5th largest export market for US poultry meat and products in 2012 (FAS, 2014), with US poultry exports to the region valuing $444 million – a record high (Gonzalez 2013). According to the Agricultural Marketing Service (2013), the region ranked 4th for US turkey meat and 5th for US broiler and other poultry meat exports, respectively, in 2013. Poultry meat is also imported from Brazil, the European Union, and Canada, making it one of the top food products that is sourced from outside the region. The United States dominates the market, accounting for nearly 80%; Brazil accounts for about 12%; and Canada and the EU account for less than 5% each (see Table 2).

Table 2 shows summary statistics for monthly poultry meat product imports into the CARICOM territories for the January 2002 to July 2014 period. These are based on data from the Global Trade Atlas for poultry products (broiler meat, turkey meat and meat from other birds) sourced from the United States, Brazil, Canada and the European Union. The US was the main supplier over the period, supplying the market with approximately 24 million pounds monthly on average, ranging from roughly 11 million pounds to 43 million pounds. Brazil, Canada and the EU supplied considerably less on average. Per expenditure shares of poultry meat consumed

from the various exporting countries, the US dominated in this respect, accounting for 79% of CARICOM's import expenditure on poultry meat over the period on average. Brazil accounted for 12%, and the EU and Canada for roughly 5% and 3%, respectively, on average. The summary statistics reveal considerable range in CARICOM's import expenditures from the different source countries over the period, particularly for the US and Brazil. The European Union had the highest average unit value at $ 0.74 per pound, and the Canada the lowest at $0.42 per pound.

Table 2. Summary Statistics of CARICOM Countries Poultry Products Imports 2002-2014.

	Mean	**Std. Dev**	**Min**	**Max**
		Quantity (million pounds)		
European Union	0.806	0.491	0.066	3.463
Brazil	3.091	0.960	1.356	10.022
Canada	1.085	0.415	0.258	3.243
United States	23.685	8.484	10.942	42.509
		Unit Value ($/pound)		
European Union	0.74	0.20	0.32	1.12
Brazil	0.55	0.22	0.15	1.06
Canada	0.42	0.17	0.18	1.08
United States	0.46	0.08	0.29	0.59
		Expenditure Share		
European Union	4.92%	3.74%	0.46%	20.67%
Brazil	12.31%	4.34%	4.86%	42.97%
Canada	3.33%	1.30%	0.85%	7.44%
United States	79.44%	6.12%	46.29%	89.44%

Figures 1 through 4 show the mix of poultry products exported to CARICOM between 2002 and2013. With the exception of Canada, all other source countries supply mostly chicken meat to CARICOM, and other poultry meats to a far lesser extent. Canada's poultry meat exports to the region have comprised mostly turkey meat, although it has decreased in recent years while chicken meat imports have increased. Other poultry meat (ducks and geese) imports have been negligible over the time period shown.

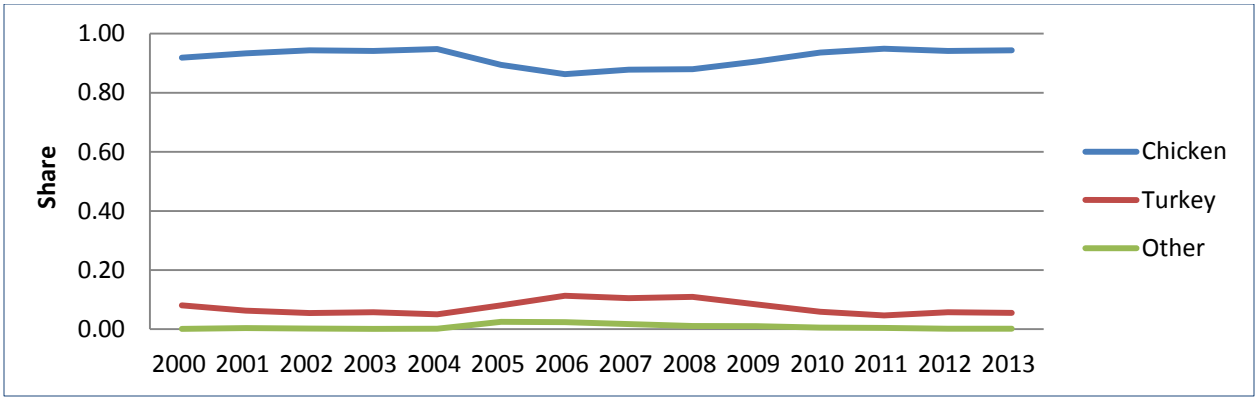

Figure 1. United States: Poultry meat exports to CARICOM by product share 2002-2013.
Source. Global Trade Atlas 2014.

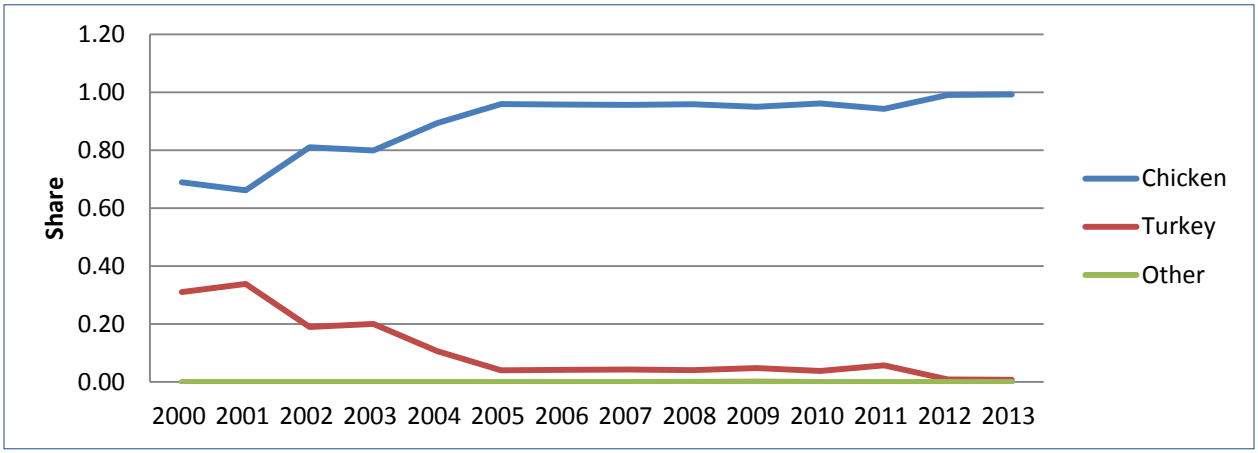

Figure 2. Brazil: Poultry meat exports to CARICOM by product share 2002-2013.
Source. Global Trade Atlas 2014.
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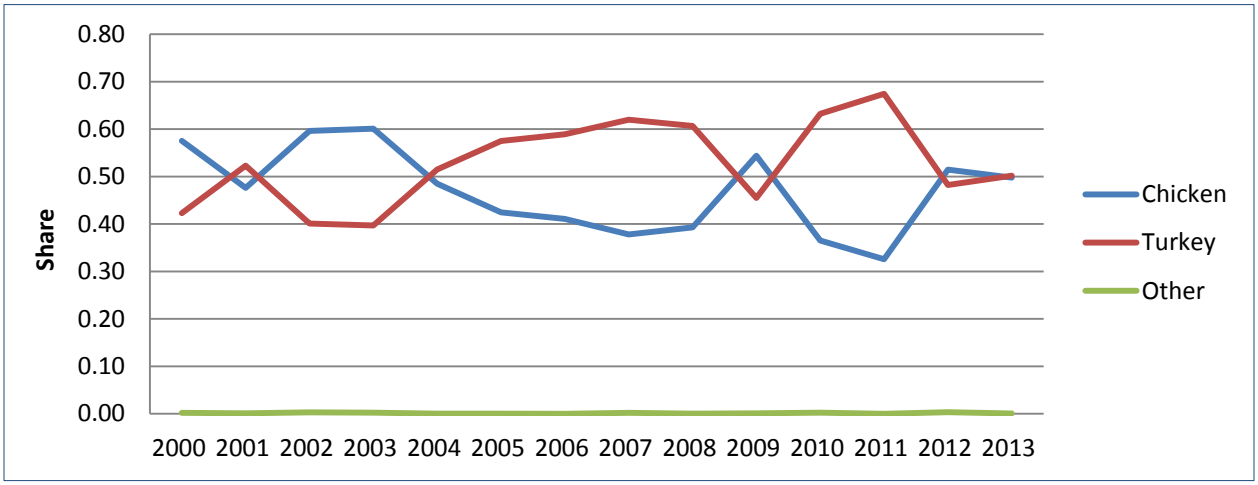

Figure 3. Canada: Poultry meat exports to CARICOM by product share 2002-2013
Source. Global Trade Atlas 2014.

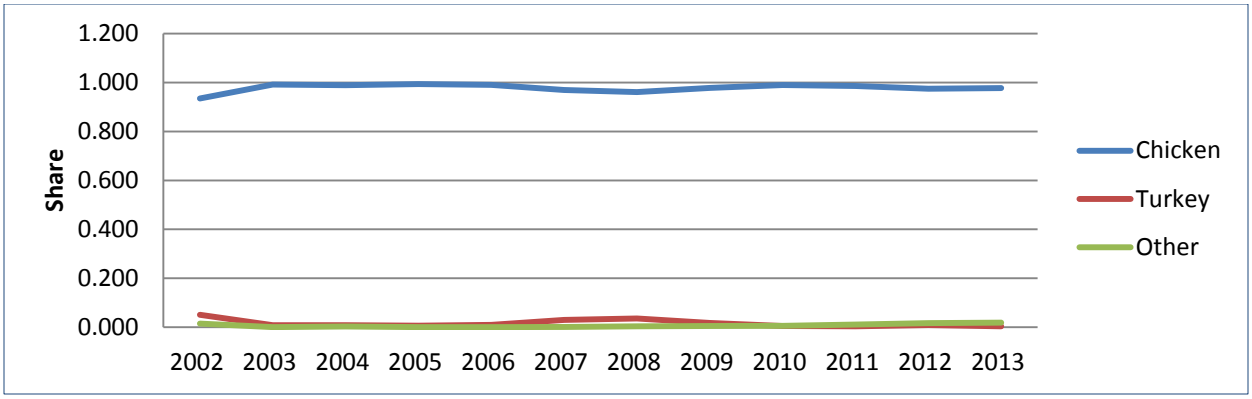

Figure 4. European Union: Poultry meat exports to CARICOM by product share 2002-2013.
Source. Global Trade Atlas 2014.

Key Issues Affecting the Caribbean Poultry Industry

The poultry industry is the largest agro-industrial enterprise across the region, with approximately US$650 million in sales annually (Agritrade 2011). Average annual production is estimated at 200,000 metric tons of meats, less than half of the total poultry meat consumed by the CARICOM community. Although most CARICOM countries engage in some domestic production, the bulk of production occurs in a few countries. Between 2004 and 2008, Jamaica, Trinidad and Tobago, Guyana, Barbados and Belize accounted for 90.3% of total output regionally, with individual contributions of 46%, 21.6%, 10.3%, 6.4% and 6%, respectively (Caribbean Agribusiness, 2014). The industry employs over 75, 000 persons throughout the region, and is the largest generator of small business and rural entrepreneurship, particularly for women (Agritrade 2011; FAO 2011). It plays a significant role in the promotion of food security throughout CARICOM (Caribbean Agribusiness 2014). The significance of these contributions signals why the industry continues to seek protected status despite ongoing trade liberalization efforts[2].

The industry faces myriad challenges relating to production that increase production costs and risks, and that place it at a competitive disadvantage relative to global competitors[3]. Feed costs comprise roughly 65% of the cost of producing broilers (Feed Info 2012). Aside from Belize, Guyana and Suriname, most countries lack the capacity to produce the raw materials that are typically used for feed and must import feedstocks; this dependency increases the sector's vulnerability to increasing global grain prices and unfavorable exchange rate movements (Agritrade 2012). In countries such as Barbados that manufacture poultry feed, costs for inputs such as fuel, electricity and water that are used in local feed manufacturing have reportedly increased in recent years (Barbados Advocate 2013). Caribbean governments have sought to mitigate these issues by launching initiatives to develop poultry feed supply chains within the region. Belize is self-sufficient in feed corn, and has supplied poultry operations in Jamaica and

[2] In fact, the poultry sector was excluded from tariff liberalization commitments under the Economic Partnership Agreement with the European Union (CRNM 2008; Agritrade 2013).
[3] The inability to compete with imports is a noted problem across many Caribbean industries, given that agricultural producers face major competitiveness constraints at all points of the food value chain (FAO 2013).

Guyana in recent years. Similar initiatives are being explored for Suriname and Guyana, which have the capacity for feed corn and soybean production. Pilot projects for feed production are also being evaluated in Trinidad and Tobago, Jamaica and Barbados (Agritrade 2011b; GFAR 2013). It would appear that regional self-sufficiency in poultry feed production is a major goal, as it may bolster the regional poultry industry and future expansion.

Additionally, the lack of mechanisms for food safety and production standards certification has adversely affected poultry meat trade between CARICOM member states, and between CARICOM and other countries. The Caribbean Poultry Association (CPA) argues that the lack of standards has permitted importation of low quality parts and barred entry of Caribbean poultry meat exports into certain markets (Agritrade 2011). As such, it has been lobbying for the development of appropriate legal and regulatory frameworks that could help with export certification, and for establishment of National Agricultural Health and Food Safety Agencies in member states. Such agencies would be charged with regulating imports and requiring that they meet SPS standards (Agritrade 2011).

The CPA has also actively pushed for other related measures including: (a) implementation of safeguard mechanisms linked to import licensing arrangements; (b) prohibitions on frozen products that are thawed and sold as fresh chilled products; (c) the introduction of country of origin labelling; (d) prohibitions on repackaging of imported frozen poultry parts; and (e) harmonization and strengthening of Caribbean SPS regulatory systems that apply to poultry products (Agritrade 2011). In 2012, the Caribbean Regional Standard for Poultry & Poultry Products was approved by the CARICOM Council for Trade and Economic Development (COTED). It specifies certain requirements relating to several of the aforementioned measures, and is seen as an important step toward removal of non-tariff barriers to poultry trade within the region (Agritrade 2013).

Tariffs are the main policy instruments that are used to protect the regional industry. Imports into CARICOM territories face a Common External Tariff (CET) and, in some cases, applicable surcharges are also applied. The CET is designed to protect trade sensitive domestic industries and provide a harmonized coding system and consistent tariff structure for importation of products from countries that are not members of CARICOM. The agricultural sector is accorded separate treatment[4] in the form of higher protection (40%) for imported commodities, whereas inputs are not subject to tariffs. Member states have broad scope for suspensions and reductions, as well as for national derogations from the CET as authorized by COTED via Article 83 of the Revised Treaty. In the CET Schedule (tariff heading 02.07), fresh, chilled or frozen poultry meat that is not cut in pieces is subject to the highest rate (40%).

Methodology and Data

The Central Bureau of Statistics (CBS) differential demand system derived by Keller and Van Driel (1985) is chosen to estimate Caribbean import demand parameters for poultry meat,

[4] Arguments that were advanced in support of tariff protection have been agriculture's role in employment creation, rural development, generation of foreign exchange earnings and the need for protection from dumping are arguments (ECLAC 1999).

differentiating by source (United States, Brazil, Canada, and the European Union). The CBS model combines attractive features from both the Almost Ideal Demand Systems (AIDS) model and the Rotterdam model: It includes the non-linear expenditure effects of the AIDS (Deaton and Muellbauer 1980) and the price effect of the Rotterdam model (Theil 1966; Barten 1969).

Following Kesvan et al. (1993) and Jones, Harvey, Hahn and Muhammad (2008), a dynamic specification of the general CBS model was used to capture both the short-run and long-run relationships in CARICOM countries' poultry products import demand, which can be written as:

$$(1) \quad w_{it} \cdot \left[\partial Lnq_i - \sum_j w_j \partial Lnq_j \right] = a_i + \sum c_{ij} \partial Lnp_{jt} + \sum d_{ij} \partial Lnp_{jt-1} + b_{i1} dBQ_t + b_{i2} dBQ_{t-1} + e_{it}$$

where W_{it} is the expenditure share of poultry products consumed from the i^{th} source country, p_j is the differential price based on the unit value of imports, a, c_{ij}, d_{ij}, b_1, and b_2 are parameters to be estimated, and e_{ij} is the disturbance term. The lagged quantity adds the dynamic element to the model. The source countries/regions included in the model are: United States, Brazil, Canada, and the European Union. Meat from broilers, turkeys and other birds were aggregated into one product denoted "poultry" primarily to eliminate the zeros for months when specific meats were not imported. The United States equation was omitted to avoid singularity. By construction, the endogenous variables of the CBS demand system sum to 0 in every time period, which makes the error terms sum to 0 also. To avoid singularity therefore, an equation is dropped in the estimation process and retrieved at the end of the process since the estimates will be invariant to the dropped equation. In order for the system of equations to be theoretically consistent, the following restrictions on the coefficients must hold:

$$(2) \quad \sum_i c_{ij} = \sum_j c_{ij} = \sum_i b_i = \sum_i a_i = 0,$$

$$(3) \quad c_{ij} = c_{ji}, \forall i, j$$

Equation 2 implies that the coefficients sum to zero when added over all the inputs and that the CBS model is homogeneous of degree 0, and consistent with the budget constraint. Equation 3 ensures that Slutsky symmetry conditions are satisfied. Own-price, cross-price, and expenditure elasticities, η are calculated for country-specific import demand:

$$(4) \quad \eta_{ij} = \frac{(c_{ij} - d_{ij} + w_i w_j) dLnp_j}{w_i} \quad \text{Own-price and cross-price elasticities}$$

$$(5) \quad \eta_{iy} = 1 + \frac{\beta_i}{w_i} \quad \text{Expenditure elasticity}$$

Data for this analysis was sourced from the Global Trade Atlas. The source countries are the United States, Brazil, Canada and the European Union. We would have liked to include domestic consumption of CARICOM produced poultry in the model to capture a total poultry product demand, but corresponding data on monthly consumption of domestic poultry products and prices were unavailable. Monthly quantities and values of poultry meat imported into the

CARICOM member states were obtained for the 2002-2014 period.[5] More than 99% of poultry meat imported by CARICOM countries came from the source countries modeled.

Results

Tables 3 through 7 report the results of our model. Tables 3 and 4 report the parameter estimates and matrix of AR-1 processes, respectively. Tables 5 and 6 report the estimated short run and long run elasticities for poultry products imported into CARICOM over the 2002-2014 period. The calculated cross price elasticities account for the substitution and expenditure effects of price. Positive cross price elasticities denote some degree of substitution between the poultry meat imports sourced by CARICOM from the various countries. For example, a cross-price elasticity of 0.503 for Canada with the EU implies that a 10% increase in the price of Canadian poultry meat would cause a 5% increase in poultry meat imports from the EU. A negative cross-price elasticity signals that the expenditure effects of a price change dominate pure substitution effects – as shown in the case of the US with all the other competitors in the CARICOM poultry meat market.

In both the short run and long run, calculated own price elasticities have the expected negative sign and are statistically significant. Own price elasticities for the EU, Canada and the United States were elastic, implying that an increase their poultry price would result in a more than proportionate decrease in the quantity of poultry products demanded from CARICOM countries. As for Brazil, an increase in its poultry price would result in a less than proportionate decrease in demand from CARICOM countries. Thus, any price reductions brought about by liberalized trade agreements could be expected to trigger greater than proportional changes in CARICOM's import demand for poultry meat from those source countries. The calculated results for Brazil show that it would be the exception in this case.

The results indicate that CARICOM countries are highly price responsive to poultry meat imports from the United States: the short run elasticity of -1.738 suggests that a 10% reduction in the import prices of US poultry meat products would increase CARICOM's demand for poultry meats by 17.38%. The long run elasticity shows that this would remain virtually unchanged in the long run. Per Canada and the EU, a 10% reduction in their import poultry meat prices would decrease import demand in CARICOM countries by 12.22% and 12.69%, respectively, in the short run. In a long run context, there is increased responsiveness to import price changes, particularly for poultry meat sourced from the EU. A 10% increase in import prices would reduce CARICOM import demand by almost 20%. Finally, Brazil has a statistically significant own price elasticities in both the short run (-0.709) and the long run (-0.990). These estimates point to an inelastic poultry meat demand relative to the other source countries, where a 10% increase in prices of poultry meat sourced from Brazil would have a less than proportional decrease in demand by CARICOM countries.

[5] Not all of the members listed are net importers of poultry meat; for example, Belize is self-sufficient in poultry meat. Associate members of CARICOM were also excluded from the model.

Table 3. CBS Model Parameter Estimates for CARICOM Poultry Meat Import Demand.

Parameter	Coefficient	Standard Error	t Value
a_1	0.000	0.001	0.08
b_1	-0.022	0.012	-1.86
C_1	-0.012	0.012	-1.01
g_{11}	-0.012	0.013	-0.89
g_{12}	-0.027	0.009	-3
g_{13}	0.017	0.007	2.67
g_{14}	0.042	0.027	1.54
h_{11}	-0.034	0.013	-2.69
h_{12}	0.021	0.009	2.35
h_{13}	-0.001	0.006	-0.23
h_{14}	-0.067	0.027	-2.49
a_2	0.000	0.002	-0.08
b_2	0.008	0.029	0.27
c_2	0.044	0.029	1.53
g_{22}	0.052	0.022	2.32
g_{23}	0.003	0.006	0.45
g_{24}	-0.086	0.065	-1.32
h_{22}	-0.029	0.022	-1.31
h_{23}	-0.003	0.006	-0.49
h_{24}	0.034	0.065	0.52
a_3	0.000	0.001	0.02
b_3	-0.021	0.009	-2.46
c_3	-0.018	0.008	-2.17
g_{33}	-0.007	0.006	-1.1
g_{34}	0.028	0.019	1.42
h_{33}	-0.004	0.006	-0.6
h_{34}	0.005	0.019	0.24

Table 4. Matrix of AR-1 Processes

	European Union	Brazil	Canada
European Union	-0.309	0.254	-0.014
	(0.085)	0.200)	(0.060)
Brazil	-0.031	-0.412	0.005
	(0.035)	(0.081)	(0.024)
Canada	0.002	-0.180	-0.469
	(0.111)	(0.266)	(0.079)

Table 5. Estimated Short Run Elasticities for CARICOM Poultry Products Import Demand

	European Union	Brazil	Canada	United States	Expenditure
European Union	**-1.269*****	-0.619***	0.335**	0.416	0.543**
	(0.272)	(0.189)	(0.132)	(0.541)	(0.245)
Brazil	-0.273*******	**-0.709*****	-0.012	-1.541***	1.064***
	(0.074)	**(0.186)**	(0.052)	(0.519)	(0.234)
Canada	0.503***	0.042	**-1.222*****	0.538	0.365
	(0.196)	(0.196)	**(0.190)**	(0.572)	(0.258)
United States	-0.020	-0.152***	-0.049*******	**-1.738*****	1.045***
	(0.022)	(0.032)	(0.014)	**(0.106)**	(0.042)

Note. Asymptotic standard errors are in brackets. ***<0.01, **<0.05, *<0.10.

Table 6. Estimated Long-Run Elasticities for CARICOM Poultry Products Import Demand

	European Union	Brazil	Canada	United States	Expenditure
European Union	**-1.956*****	-0.164	0.313	0.757	0.297
	(0.412)	(0.267)	(0.199)	(0.764)	(0.377)
Brazil	-0.121	**-0.990*****	-0.049	-1.551**	1.420***
	(0.106)	**(0.256)**	(0.071)	(0.699)	(0.351)
Canada	0.486*	0.017	**-1.319*****	1.116	-0.185
	(0.292)	(0.264)	**(0.281)**	(0.751)	(0.377)
United States	-0.002	-0.140***	-0.038******	**-1.715*****	1.092***
	(0.032)	(0.045)	(0.019)	**(0.144)**	(0.052)

Note. Asymptotic standard errors are in brackets. ***<0.01, **<0.05, *<0.10.

Short run and long run expenditure elasticities are also reported in Tables 5 and 6. They capture the degree to which the amount of poultry meat sourced from each supplying country changes when overall demand for poultry meat in CARICOM countries change. Brazil has the largest expenditure elasticities in the short run and the long run, 1.064 and 1.420, respectively. The interpretation here is that a 10% increase in overall poultry meat import demand by CARICOM would increase demand for Brazilian poultry meat imports by 10.64% in the short run, and by 14.20% in the long run, respectively.

Table 7 reports the overall impact of the CARICOM's Common External Tariff (CET) on import quantities sourced from the various countries. Short run and long run estimates of percentage changes in poultry meat imports into CARICOM show that Brazil and the US would benefit significantly from removal of the CET. In the short run, poultry imports from Brazil would increase by 129.5% and those from the US would increase 100%, over current imported quantities. Imports from Brazil into CARICOM would increase by an additional 9% in the long run, whereas the United States' poultry meat imports would dip slightly by 3.27% (to 96.8%) in the long run. In the long run, CARICOM importers would be able to reassess all import sources. Given an increased market price and decreased demand, importers may shift import composition to meet market demand, which implies that there could be changes in proportions sourced from the various exporting countries. Poultry meat imports sourced from the EU would increase by

roughly 58% in the short run, and by 55% in the long run. Relative to the other source countries, poultry meat imports from Canada would increase the least (7.10%) in the short run if the CET were removed, and decrease by 15.3% in the long run.

Table 7. Overall Impact of the External Tariff on Import Quantity

	Removal of the External Tariff		**Doubling of the External Tariff**	
	Short-Run	Long-Run	Short-Run	Long-Run
European Union	58.08%	53.64%	-38.26%	-35.33%
Brazil	129.49%	138.48%	-85.30%	-91.22%
Canada	7.10%	-15.32%	-4.68%	10.09%
United States	100.07%	96.80%	-65.91%	-63.76%

Note. Current external tariff averages 40 percent.

Recent discussions between Caribbean poultry industry stakeholders and governments have focused mostly on maintaining tariff protection, with a tendency towards increasing it. An increase in the current rate to 80% has been suggested by the Caribbean Poultry Association on the grounds that it would permit domestically produced poultry meat to be more competitive in domestic markets. This informs our second scenario which evaluates the impact of a doubling of the CET from 40% to 80% on imported poultry meat from source countries. The underlying assumption is that the elasticities that are generated by the model takes the tariff into account in the CIF unit value of each country's poultry imports. Our short run results suggest that this would decrease import quantities from all source countries, with Brazil exhibiting the largest reduction (85.3%). The United States would have the second largest reduction (65.9%), and poultry meat sourced from the EU would decline by 38.3% in the short run. Meat sourced from Canada would only decrease by roughly 4.7% over current levels (in the short run). In a long run context however, poultry meats sourced from Canada are shown to increase despite a doubling of the CET. Given that Canada was shown to have the lowest average price for poultry products, and that all source countries face the same CET, the expenditure effect would outweigh the substitution effect with importers opting to expand poultry imports from the cheapest source. The largest long run impact is noted for Brazil, in that poultry meats sourced from that country would continue to decline (91%). In the long run, imported poultry meat from the US would decline approximately 64%.

Discussion

Owing to data limitations, CARICOM's domestic demand for domestically produced poultry meat is unaccounted for in this model, and its substitution effects that could have arisen under the two CET scenarios cannot be directly assessed. However, had this assessment been possible and demand for domestically produced poultry were found to be inelastic, then regional producers would gain higher revenues with increased market prices. In a small country context however, the regional producers would essentially be price takers and exert no influence over market prices. Bearing in mind that CARICOM poultry producers have little control over the cost of production, margins can only be increased through increased revenues. Maintaining the CET serves to increase poultry meat prices in the CARICOM market in general, leading to increased revenues for regional producers since prices are elevated over what would typically be observed.

Although our model did not calculate welfare effects of the various scenarios, several potential impacts can be discussed nonetheless. In the light of an elastic demand for poultry meat imports, increased poultry prices stemming from an increased CET would cause imports to decrease. While some trade diversion may occur, it does not necessarily follow that regional producers would be able to adequately meet any deficits in the domestic market – and essentially utilize the displaced trade. Additionally, an increase in tariff rates on poultry meat imports may also serve to keep marginal producers in the regional industry, whereas if the rates were decreased or eliminated altogether, only efficient producers would remain in business. As per CARICOM poultry meat consumers, an increased CET could be expected to adversely impact consumer surplus given increased poultry meat prices.

Our results suggest that an expansion or a removal of the CET creates some substitution and diversion of trade. The source countries each export different proportions of various poultry meats to CARICOM. Poultry imports increase following removal of the tariff, but clearly not all source countries benefit from the same proportional increase in imports (Table 7). Our results show that highly efficient producers, such as Brazil and the United States benefit significantly, which is expected.

Conclusions

The major objective of this paper was to estimate CARICOM import demand parameters for poultry meat products, taking into account the different countries that compete in the regional market. The own price elasticities reveal that Caribbean poultry import demand is highly price responsive in both the short run and the long run. Any significant increases in imported poultry prices could be expected to trigger greater than proportional decreases in quantities demanded from the United States, Canada and the European Union. Brazil was the sole exception in this regard, where an inelastic demand for poultry meat imports into the Caribbean was noted. These findings were also apparent in the long run, and with an increased responsiveness to price changes, except in the case of the US. The price sensitivity noted in relation to several of the source countries would seem to imply that those that offer the most competitive prices could garner larger shares of the market.

A secondary objective of our paper was to gauge how poultry meat imports into CARICOM countries would change under two scenarios: (a) removal of the CET and (b) doubling of the CET to 80%. Given our findings, the implications for source countries, and for producers and consumers in the Caribbean region are of interest. Although these can be discussed in general terms, an important caveat is that our model does not calculate welfare effects of changes in CARICOM's tariff policy. The scenarios evaluating removal and an increase in the CET rates show that if either were implemented as policy, poultry meat trade would be affected. Complete removal of the CET would clearly impact countries that export poultry meat to the Caribbean (US, EU, Brazil and Canada), and these countries would be able to expand on poultry meat exports in the long run. The results for Canada show the opposite effect, possibly indicating that the other source countries would be better able to compete in the Caribbean market. Caribbean consumers of poultry meats would likely benefit from CET removal as it would result in lower prices for imported poultry meat and products. The likely losers from this scenario would be Caribbean poultry producers; our results suggest that imports would dramatically increase, particularly from the two largest global competitors – the US and Brazil. Caribbean poultry

producers currently face myriad problems stemming from high production costs and risks, and are unable to efficiently compete in domestic and international markets. CET removal could likely adversely affect the regional poultry industry, which would be hard pressed to respond competitively due to existing constraints.

The alternative case – a doubling of the CET to 80% – could benefit Caribbean poultry producers given that poultry meat imports would decline significantly, and from Brazil and the US in particular. Exports from source countries would decline, and Caribbean consumers would face higher prices on imported poultry meat. As noted in the previous section however, that poultry imports would decrease does not mean that Caribbean producers would be able to respond and meet any deficits. The adverse effects could be disconcerting for Caribbean consumers of poultry, especially if producers are unable to meet domestic demand. Poultry meat – broiler meat in particular – is the most widely consumed meat and the major protein source in the region. In sum, whether CARICOM member states choose to increase the CET on poultry imports or completely remove it, there may be important ramifications for exporting countries, and for stakeholders in the Caribbean poultry industry and for Caribbean consumers. Indeed, how to reconcile growing consumer demand for low-cost protein with local poultry producers' lobbying for tariff protection will likely remain a key challenge for the regional poultry industry and policymakers alike.

In closing, despite its contribution to the literature, this study specifies one model, assumes one functional form and utilizes one data set. Therefore, our results should be viewed as preliminary. Future research on this topic, and that specifically addresses the welfare effects of CET changes, could therefore be instructive.

References

Asche, F., H. Bremnes, and C.R. Wessells. 1999. Product Aggregation, Market Integration and Relationships between Prices: An application to world salmon markets. *American Journal of Agricultural Economics* 81(3):568–81.

Agritrade. 2011a. Poultry producers call for concerted action to address threats to the Caribbean industry. Technical Centre for Agricultural and Rural Cooperation (ACP-EU) (CTA). http://agritrade.cta.int/Agriculture/Commodities/Poultry/Poultry-producers-call-for-concerted-action-to-address-threats-to-the-Caribbean-industry [Accessed July 2014].

Agritrade. 2011b. Securing the future of the Caribbean poultry sector. Technical Centre for Agricultural and Rural Cooperation (ACP-EU) (CTA). http://agritrade.cta.int/Agriculture/Commodities/Poultry/Poultry-Focus/Securing-the-future-of-the-Caribbean-poultry-sector [Accessed July 2014].

Agritrade. 2012. Executive Brief Update 2012: Poultry sector. Technical Centre for Agricultural and Rural Cooperation (ACP-EU) (CTA). http://agritrade.cta.int/Agriculture/Commodities/Poultry/Executive-Brief-Update-2012-Poultry-sector [Accessed July 2014].

Agritrade. 2013. Executive Brief Update 2013 – Caribbean: Agricultural Trade policy debates and developments. Technical Centre for Agricultural and Rural Cooperation (ACP-EU) (CTA). http://agritrade.cta.int/en/layout/set/print/Agriculture/Regions/ACP/Caribbean/Executive-Brief-Update-2013-Caribbean-Agricultural-trade-policy-debates-and-developments. [Accessed July 2014]

Agritrade. 2013. Executive Brief Update – 2013: Poultry Sector. [Accessed September 2014].

Agricultural Marketing Service (AMS). 2009. Poultry Programs, Market News & Analysis Branch *International Egg and Poultry Review* 12(46).

Agricultural Marketing Service (AMS). 2013. Livestock, Poultry & Grain Market News. *International Egg and Poultry Review* 16(50).

Barbados Advocate. 2013. Processors Speak Out on Impact of Imports. http://www.barbadosadvocate.com/newsitem.asp?more=business&NewsID=32540 [Accessed July 2014].

Barten, A.P. 1969. Maximum Likelihood Estimation of a Complete Demand System of Equations. *European Economic Review* 1: 7-73.

Caribbean Agribusiness. 2014. Poultry. CARICOM Secretariat. http://www.agricarib.org/primary-dropdown/poultry. [Accessed July 2014]

Caribbean Regional Negotiating Machinery (CRNM). 2008. Office of Trade Negotiations. CARICOM Secretariat. http://www.crnm.org/. [Accessed July 2014]

CARICOM Secretariat. 2008. Tariff suspensions approved by COTED. http://www.caricom.org/jsp/pressreleases/pres59_08.jsp [Accessed July 2014].

CARICOM Secretariat. 2014. CARICOM Member States. http://www.caricom.org/jsp/community/member_states.jsp?menu=community [Accessed August 2014].

Deaton, A.S. and J. Muellbauer. 1980. *Economics and Consumer Behavior*. New York, NY: The Cambridge University Press.

Economic Commission for Latin America and the Caribbean (ECLAC). 1999. Trade Policy in CARICOM: Overview of the main trade policy measures. Caribbean Development and Cooperation Committee.

Food and Agriculture Organization (FAO). 2011. Regional Consultation On Policy And Programmatic Actions To Address High Food Prices In The Caribbean: Summary of Proceedings. Subregional Office for the Caribbean, Barbados.

Food and Agriculture Organization (FAO). 2013. CARICOM Food Import Bill, Food Security and Nutrition Issue Brief 5 (October). Subregional Office for the Caribbean, Barbados.

Foreign Agricultural Service (FAS). 2014. BICO Reports. http://apps.fas.usda.gov/Gats/default.aspx [Accessed September 2014]

Feed Info. 2012. http://www.feedinfo.com/newsroom.aspx [Accessed August 2014]

Global Forum on Agricultural Research (GFAR). 2013. Executive Brief Update – 2013: Poultry Sector. http://www.egfar.org/news/imported/executive-brief-update-2013-poultry-sector [Accessed July 2014].

Global Trade Atlas. 2014. https://www.gtis.com/gta/. [Accessed September 2014]

Gonzalez, O. 2011. Tourism Increases Demand for US Foods. USDA - Foreign Agricultural Service. GAIN Report CB1101.

Gonzalez, O. 2012. Caribbean Basin Exporter Guide. USDA- Foreign Agricultural Service. *GAIN Report* CB1224.

Gonzalez, O. 2013. Trinidad and Tobago Imposes Surcharge on Poultry. USDA- Foreign Agricultural Service. GAIN Report CB1305.

Gonzalez, O. and K. Nishiura. Caribbean Environment for U.S. Agricultural Exports. USDA-Foreign Agricultural Service. GAIN Report CB1303.

Jones, K. and D. Blayney. 2014. Assessing Changes in Dairy Product Import Demand: The Case of South Korea with Implementation of the KORUS FTA. *Agribusiness, An International Journal* 30(1):74-84.

Jones, K, D. Harvey, W. Hahn and A. Muhammad. 2008. U.S. Demand for Source-Differentiated Shrimp: A Differential Approach. *Journal of Agricultural and Applied Economics* 40(2):609-621.

Kesvan, T., Z. Hassan, H. Jensen, and S. Johnson. 1993. Dynamics and Long-run Structure in U.S. Meat Demand. *Canadian Journal of Agricultural Economics*, 41:139-153.

Keller, W. J. and J. Van Driel. 1985. Differential Consumer Demand Systems. *European Economic Review* 27: 375–390.

Muhammad, A. and K. Jones. 2011. Source-Based Preferences and U.S. Salmon Imports. *Marine Resource Economics* 26(3):191-209.

Theil, H. 1966. *Applied Economic Forecasting.* Amsterdam, Holland: North-Holland Publishing Co.

