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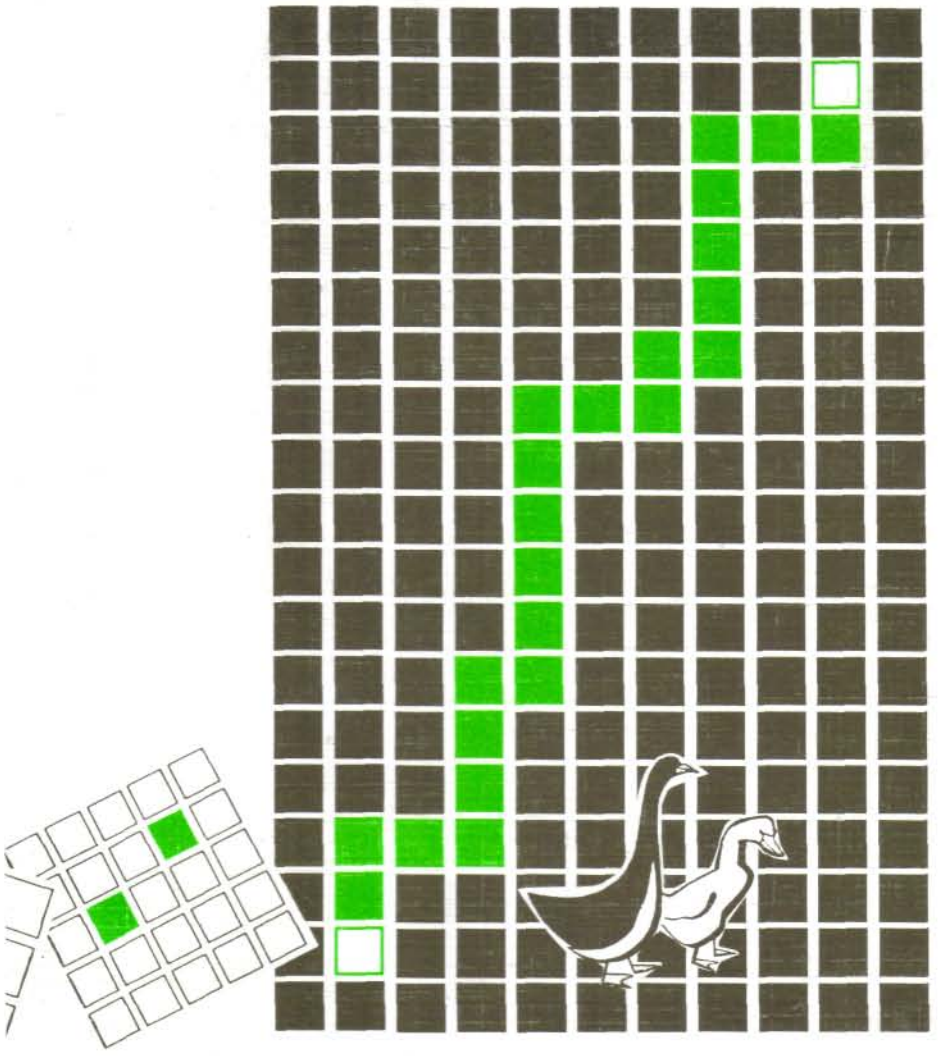
ISSN 1019 – 035 X

Farm & Business



Vol. 6, No.1, October 2003

The Journal of the Caribbean Agro-Economic Society

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Potential Effects of FTAA on US/CARICOM Fish Trade

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and **Curtis M. Jolly**[2]

Abstract

This paper explores the possible effects of the Free Trade Area of the Americas (FTAA) on United States fisheries imports from the Caribbean Community and Common Market (CARICOM) countries.With proposed adoption by 2005, implementation of the FTAA could have serious repercussions on fisheries exports from CARICOM countries to the United States.Presently non-member countries of CARICOM that may become part of the FTAA are fairly competitive and efficient in fisheries exports. An import demand function is estimated for CARICOM countries and its five major fisheries producing members (Grenada, Guyana, Jamaica, Suriname, and Trinidad/Tobago) for three groups of fisheries products (freshwater fish, marine fish, and shellfish).Indications from the data suggest that most fisheries products from non-member CARICOM Latin countries are potential complements for CARICOM fisheries products indicating no competition between the two exporting regions. But the FTAA could change this position. Therefore, it is essential that CARICOM countries examine their own production efficiency and pay close attention to decreases in competitors' fish product prices since expansion of imports by the United States brought about by a tariff reduction may not necessarily benefit CARICOM countries.

Keywords: Free Trade Area of the Americas, CARICOM

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INTRODUCTION

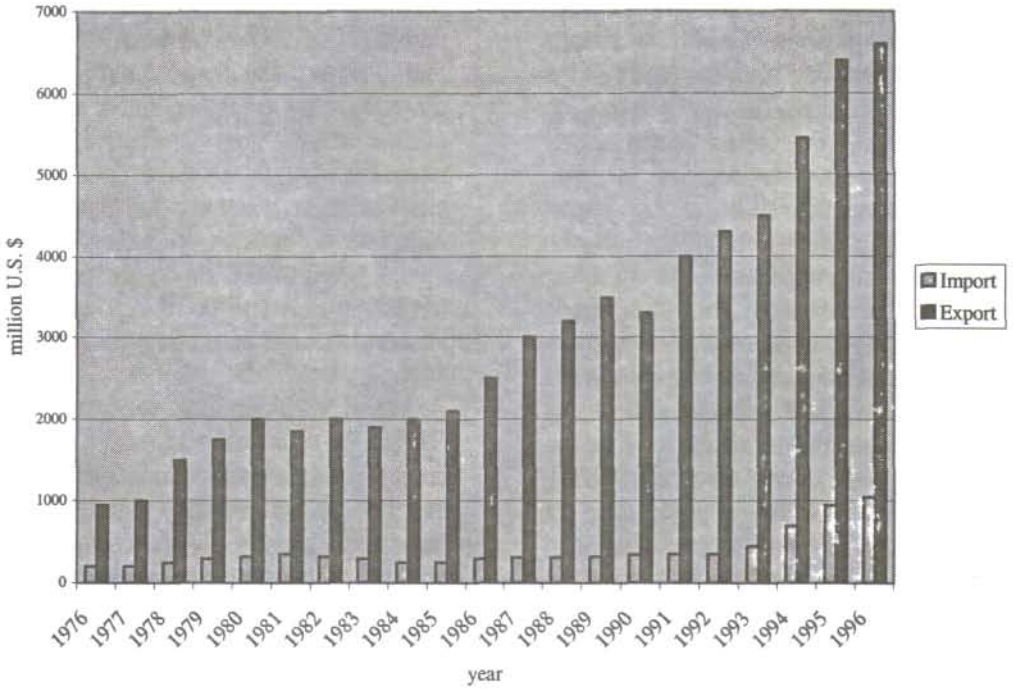
Fisheries in the United States in 2001/02 can be characterized by strong demand, accompanied by increased supply from various world regions. Growth in imports from major producing countries, such as the Latin American Countries (LAC)[1] outweigh exports, making the United States largely dependent on outside sources to meet domestic demand. With strong export markets for fisheries products, relative comparative advantage resulting from strong production efficiencies, and new trade agreements, LAC may shift market share away from small developing countries in the region that have less capacity and do not benefit from economies of scale. With the Free Trade Area of the Americas (FTAA), there is bound to be a reallocation of fisheries market shares among members; and thus a reduction of import demand for products of less efficient smaller states. This paper specifically explores the possible effects of the proposed FTAA on United States fisheries imports from major Caribbean Community and Common Market (CARICOM) exporting countries.

LATIN COUNTRIES FISHERIES

The annual growth rate for the value of world fish exports was 9.0% against 12.7% exported from Latin America and the Caribbean in 1996 (FAO 1996). As indicated by Figure 1, the value of exports from these two specific regions has grown faster than the value of world fisheries exports since 1991. Since the value of fish exports (a net earner of foreign currency for Latin American countries) is one of the most useful indicators for evaluating the economic importance of fisheries in the region, we can examine the value of exports in Latin American countries contrasted against that from the CARICOM countries. The premise that larger exporting Latin American countries may dominate and even extract market shares from CARICOM countries under the FTAA is examined. Latin American and Caribbean countries, combined, are net exporters of fisheries products as seen in Figure 1, but CARICOM countries alone are net importers, with little of their catch being exported to major consuming countries (FAO 1996).

With LAC being main exporters of fish, CARICOM countries that export significant quantities and are willing to increase exports to the United States may face stiff competition under a FTAA agreement due to potential production efficiencies existent in other member states. Suggestions have surfaced among food group advocates insinuating that the FTAA would favor Latin American producers that are likely to increase their exports to the United States (National Journal Group 2001). Relative average price ratios for 1996 to 2001 for the non-CARICOM LAC member's price over CARICOM members' price of fisheries exports is 0.82 which indicates that on the whole, non-CARICOM LAC members may be more efficient fish producers. Currently, LAC account for approximately 11.0% of world fish exports, with Chile exporting the largest amount of fish products to the Asian market, at a value of over $1000 million (FAO 1996).

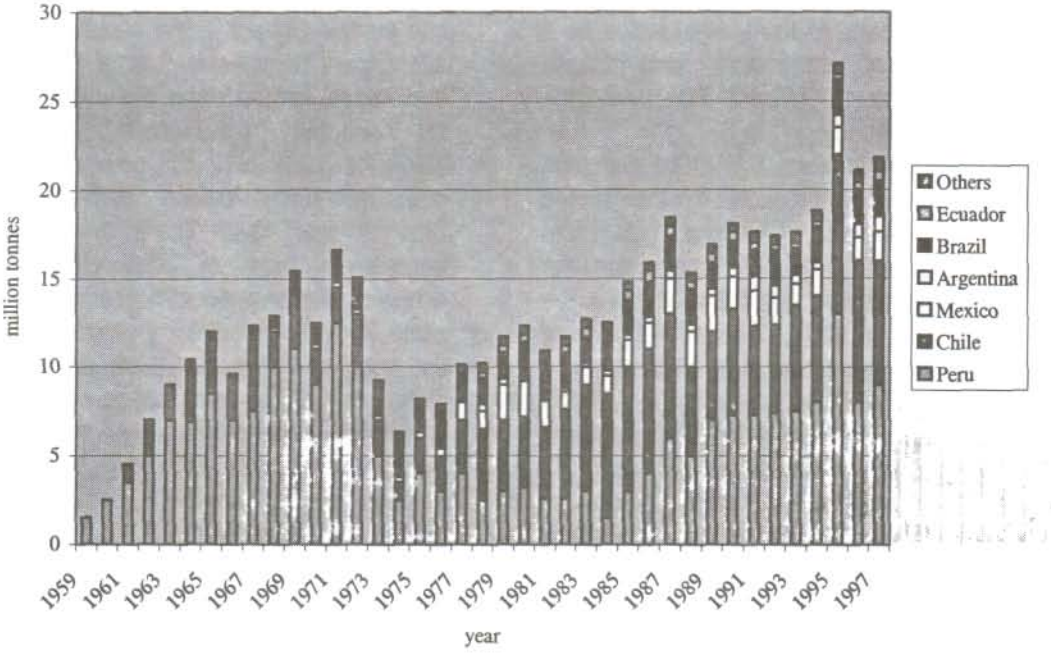
Figure 1. Latin America and Caribbean - value of fisheries imports and exports



As seen in Figure 2 below, countries in the Caribbean produce a small amount of fish products unlike Peru and Chile, so it is unlikely that they will have either the imports they desire or exports needed to earn net foreign currency. In the Caribbean, fish products have traditionally been an important contributor to food supply, and per capita consumption is well above the world average. Fish contribute a larger per capita amount of protein in the Caribbean than in other Latin countries where cultural values demand more animal products, rice, and beans over fish products.

Even though the largest exporter deals mainly in the Asian market, regional exports are concentrated in the United States, which serves as a natural outlet for its fisheries products, such as shrimp and tuna coming from Ecuador and Mexico. Of the 1,934,846 metric tons imported to the United States in 2001, 6.4% was imported from non-CARICOM LAC, while 1.9% was imported from the CARICOM (NMFS 2002). However,

Figure 2. Latin America and Caribbean - fishery production by country



as seen in Figure 3 over the period of 1996-2001, imports (shellfish products in particular) from non-CARICOM LAC have dropped by 1.9% thus, providing the CARICOM an opportunity to increase production and satisfy the existing shortfall or gap, if efficiency can be increased.

CARICOM FISHERIES

Although CARICOM's primary agricultural exports, in terms of volume and value, are sugar, bananas, citrus, cocoa, and coffee (Rampersad et al. 1997), these traditional products have lost their ability to compete in the international market, while non-traditional commodities have proven inadequate substitutes in terms of earnings and employment. Despite this dreary outlook for the CARICOM, non-traditional exports, such as fisheries, are on the rise. The National Marine Fisheries Service (NMFS) (2002) reports CARICOM fisheries imports of 36,530 metric tons to the United States in 2001, a 76% increase over the past five years. CARICOM fisheries as a percentage of agricultural GDP now stands at an average of 9-10%. Changes in institutional and governmental control, as well as economic growth from trade agreements,

could catapult fisheries products to the front of other export commodities as a viable and competitive source of revenue for Caribbean countries, as seen in Figure 4, where fisheries imports to the United States as a percentage of total imports have actually increased by 0.7% over the 1996-2001 production period.

Only a few select CARICOM countries export fisheries products to the United States. Grenada, Guyana, Jamaica, Suriname, and Trinidad/ Tobago are the largest exporters of fisheries products in the Caribbean. In 2001, Grenada's exports of marine fisheries products to North America and the Caribbean were worth US$3.5 million indicating that the industry is a major source of foreign exchange earnings (FAO 2000). Twenty-five to thirty percent of Grenada's production is exported, contributing approximately 2% towards total GDP. In 2001, Guyana's total fisheries export value (including freshwater, marine, and shellfish products) was $45.5 million, which equaled 6.2% of total GDP (FAO 2000). Given that only 13% of total fish landings were exported in 1997, there is potential for continued expansion of this trade. Jamaica, an important freshwater fish and shellfish product supplier, has grossed an average of $9,477,705 over the past six years exporting to the United States. Whereas, Suriname boasts $38.6 million in marine fisheries export value in 2001, with 30% of its products being exported to the United States, but it is Trinidad/Tobago that contribute a whopping 13% to agricultural GDP (and strangely enough, only 0.3% to total GDP) with an export value of only $14.2 million.

With all of the existing fisheries potential in the CARICOM for expansion of the fisheries industry, such as nearness to large and stable markets and proof that fisheries can provide at least some countries with a fair amount of revenue, it is of paramount importance that research pursuits examine the necessary production expansion and efficiency gains to remain competitive with major producing regions, such as Latin America and Asia. There are possible benefits in terms of efficiencies to be achieved with cost reductions, economies of scale from foreign direct investments, and the pending FTAA. But there are several questions that beg to be answered. Will the CARICOM fisheries industry be able to increase production efficiency enough to compete against non-CARICOM LAC? Will the establishment of the FTAA sufficiently lower costs to generate increases in import quantity from the major fisheries markets to bring forth a trade reversal where the CARICOM changes status from net importer to net exporter? Will FTAA harm or help the CARICOM industry?

Trade Agreements

The initial effect of a trade agreement is essentially creating trade by lowering or eliminating trade barriers (such as tariffs, quotas, or sanitary regulations) increasing efficiency of production; and increasing exports and imports between participating countries. Trade creation causes countries to place more emphasis on efficient production processes, thereby creating competition for those countries that are less efficient. However, if the agreement "shelters

high-cost producers within the group and excludes lower-cost goods from outside the area," trade diversion occurs, leading to less efficient resource allocation (ERS 1998).

Policies designed to open trade are important in promoting economic growth and convergence (Sachs and Warner 1995), thus creating a positive relationship between export growth and economic development. Trade liberalization objectives involve questions of economic efficiency, the relation between marginal cost and marginal revenue, and the premise that the return on investment should be favorable when compared with alternative investments.

The Uruguay Round of Multilateral Trade negotiations has caused an expansion of international trade in goods and services for CARICOM states (Rampersad et al. 1997). The additional growth in trade is projected to increase agriculture, forestry, and fisheries products more than 20%, paving the way for expansion of trade in the agricultural and fisheries sectors, but also increasing international competition. CARICOM countries have traditionally maintained smaller global fisheries market shares as compared to larger LAC such as Chile, Peru, and Colombia (NMFS 1996–2002), and therefore, have less opportunity to increase shares by taking advantage of new formed trade alliances.

Free Trade Area of The Americas

Formation of the FTAA trade agreement is set to occur by 2005 (ERS 1998). The trade agreement will include 34 Western Hemisphere nations and will seek to reduce or eliminate trade barriers among member countries, thereby enhancing production efficiency in these countries and increasing trade among all countries. The FTAA will ultimately level the playing field where other countries not included in the agreement have had the upper hand for years (Gale Group 2001). The creation of trade channels would in effect cause resources used in production to be reallocated toward more efficient uses (e.g., toward products or industries that are competitive), thus raising returns on investments and improving the overall economic welfare of the agreements' members. The Economic Research Service (ERS) of the United States Department of Agriculture predicts that since the hemisphere is a key recipient of US agricultural imports (50% of the US total imports), both exports and imports would be higher with US membership in FTAA (ERS 1998). Armed with this information, small developing countries such as CARICOM members that are large net importers could also witness an increase in the number of exports and imports from participating FTAA countries.

Twenty percent of all United States imports come from Central America, the Mercado Com'n del sur (MERCOSUR), and Andean countries, while only 1.0 % of total US agricultural imports (including fish) are supplied by the Caribbean (ERS 1998). These Latin countries (excluding the Caribbean) have long been competitive producers of different fish species imported to the United States, and while the members of CARICOM are not as competitive in fish trade, there is room for improvement with the FTAA. If it is true that competition is increased for countries that are not

participants in the FTAA, what will be the effect of decreased competition for members who are currently more efficient in their production processes? Rising fish imports due to the trade agreement would challenge less competitive countries and further encourage the reallocation of resources toward more competitive countries such as non-CARICOM LAC. The CARICOM could actually experience a decrease in the amount of fish they export to the United States due to the FTAA. Many opponents of the FTAA argue that smaller economies will be exploited with the need for increasing the attention given to these countries (Gale Group 2001).

The ERS has provided a general global equilibrium model to isolate the effects of FTAA on the US and other member nations. According to the results, US agricultural imports from MERCOSUR would increase by 30% showing the greatest gains in terms of trade value, while imports from CARICOM would only increase by 6%.This analysis aggregates all agricultural products and does not concentrate on specific specialized crops, such as fish. In order to draw attention to CARICOM's potential to increase fish trade to the United States once the FTAA is in place, and to examine all effects of the FTAA on the CARICOM fisheries industry, this paper introduces an import demand system designed to capture those market implications.

METHODOLOGY

An import demand system is estimated for CARICOM countries (combined) and its five major fisheries producing members (Grenada, Guyana, Jamaica, Suriname, and Trinidad/Tobago) using monthly production data from 1996 to 2001 for three groups of fisheries products (freshwater fish, marine fish, and shellfish). Import demand equations have historically been functions of three critical structural elements of a market that influence the growth of demand in a particular country: the ratio of the price of the imported good to the domestic price, the level of per capita United States income in the market, and the weighted average of prices of competing goods from non-CARICOM LAC. This study also includes the index of real foreign exchange rates from CARICOM countries (collectively and individually), and the lagged export quantity of the imported good to contain producer attitude effects, and habit formation in order to measure the US import demand for CARICOM fish products.

The first characterization used to describe the structure of the US import market is the ratio of the price of the imported good to the domestic price. Since we are examining the export structure of CARICOM, if import prices from CARICOM countries increase relative to domestic (US) prices for different fish products, import quantities are expected to increase, thus providing support for CARICOM producers to increase production. A second characterization of the market structure relates to the level of per capita US income allocated for fish expenditure to account for income consumption effects for fish products. Increases in income (other factors constant) should positively affect the quantity consumed of the different fish products should those products suggest normality. As

income increases, so should the demand for freshwater, marine, and crustacean products from CARICOM, as well as other exporting countries.

The weighted average of prices of competing goods from non-CARICOM LAC is developed as a third characterization. Since fish consumption has historically increased with increases in substitute prices, the expected sign is positive. As relative prices of substitute goods exported from competing countries increase, consumers in the United States are expected to adjust their consumption of fish products. If FTAA lowers all fish product prices for its member countries, and non-CARICOM LAC have a competitive edge over CARICOM countries, then import demand for fisheries products from the CARICOM countries are expected to decrease. A fourth structural component of this import demand function is the index of real foreign exchange rates from CARICOM countries (combined) and individual CARICOM producing countries designed to ascertain producers positions toward increasing production rates and price response. The exchange rate variable is expected to exhibit a negative sign. As exchange rates increase in the United States, CARICOM producers receive less money for their shrimp and will be less inclined to export to the United States.

Lastly, the export quantity of the imported good, lagged to express all inventory effects, is believed to have a positive relationship with import demand. If we envision export quantity as a demand indicator and it can be said that increases in consumer demand will pull fish production and increase the import quantity to the United States then export quantity will have a direct and positive relationship with production. Therefore, if CARICOM fish exports have increased in previous periods, production in the current period should increase, indicating habit formation by consumers and providing an indication of stock inventory, giving producers an incentive to increase exports to the United States.

A double log time series/cross sectional (TSCS) model by Fuller and Battese (1974) is applied to the import quantities, $Q_{if,}$ in which:

$$Q_{if} = \sum_{i=1}^{n=6} X_{if} + \mu_{if} + \theta_{if} \qquad (1)$$

where X_{if} is a vector of independent variables and μ_{if} is the error component for the model. According to the Fuller-Battese Variance Components Model,

$$2_{If} = 8_{ift} + v_{ift} + ,_{ift} \qquad \ldots\ldots (2)$$

in which 2_{if}, 8_{ift}, and $,_{ift}$ are inde-pendently distributed with zero means and positive variances: $2_{If} \sim N(0, \Phi_2^2)$, $8_{ift} \sim N(0, \Phi_8^2)$, $,_{ift} \sim N(0, \Phi_,^2)$. 8_{ift} represents the individual effects, v_{ift} represents the period effects, and $,_{ift}$ represents the remainder or the cross between the individual and period effects of the TSCS regression.

The Q_{if}s are used as the dependent variable in this model to identify factors responsible for US import demand of CARICOM fish products. Using previous knowledge of import demand equations, we achieve the following explicit model:

$$\ln Q_{if} = \alpha_0 + \alpha_1 \ln P_{if}/P_{us} + \alpha_2 \ln Y_{us} + \alpha_3 \ln P_{if} + \ln \alpha_4 ER + \alpha_5 \ln Q_{if,\ t-1} + \mu_{if} \ldots\ldots \quad (3)$$

Variable definitions and data sources are described in Table 1 while descriptive statistics are provided in Tables 2, 3, and 4 in Appendix A. Equation (3) suggests that $\forall_1 < 0$, $\forall_2 > 0$, $\forall_3 > 0$, and $\forall_4 > 0$ while $\forall_5$ is ambiguous and $_{if}$ is an error term. Subscript *i* denotes exporting country (*i, j=1,...,n*) and *f* denotes differentiated fish product groupings (*f, g=1,...,h*), based on the three categories (freshwater fish, marine fish. and crustaceans imports) stated above. Since several fish groupings are not imported by the United States from Grenada, Jamaica, Suriname, and Trinidad/Tobago, the model consists of twelve independently determined structural equations for six producing countries and three product groupings. From this double-log model, calculated import demand elasticities are used in a comparative analysis to determine relative magnitudes per variable. These elasticities will be used to evaluate the effects the FTAA on the US/CARICOM fish trade.

Table 1. Variable Definitions and Data Sources for Model Development

Variable Name	Definition	Data Source
Q_{if}	Measure of the quantity of US fisheries imports from the CARICOM in kg from 1996-2001 in metric tons	{1}
P_{is}/P_{US}	Measure of the price index ratio of import and US domestic product prices in US dollars ($)/kg	{1}
Y_{US}	Measure of the per capita US disposable income in $	{2}
P_{is}	Measure of the price index of competing goods from non-CARICOM Latin countries in $/kg	{1}
ER	Measure of the real foreign market exchange rate ratio from Grenada, Guyana, Jamaica, Suriname, and Trinidad/Tobago	{3}
$Q_{is,t-3}$	Measure of lagged dependent variable ranging from t-1 to t-3 measured in kg accounting for time lags and habit formation.	{1}

{1} National Marine Fisheries Service; {2} Bureau of Economic Analysis; {3} International Monetary Fund

In order to develop a rationale for using the proposed log-linear model, we will compare the predictive accuracy of the model with a linear model, using results of a procedure known as the Prediction Criterion (PC). The Prediction Criterion is defined as:

$$PC = \Phi^2 (1 + K_1/N) \ldots\ldots \quad (4)$$

where N is the sample size and K_1 is the number of regressors. Amemiya (1980) states that the PC can be used as a selection criterion when deciding upon a model that produces the most accurate forecast based on minimizing the unconditional mean square prediction error, which corrects for degrees of freedom to a greater extent than R^2. The PC is recorded below in Table 5 and Table 6 in Appendix B. A calculated log-linear PC with a smaller value than the linear PC indicates superiority of the non-linear model over the linear model.

Results and Discussion

Equation (3) is estimated for three product groups over six countries using a non-linear function with a time series/cross sectional (TSCS) model correcting for autocorrelation and heteroscedasticity. A cursory examination of the estimated correlation matrices indicates that multicollinearity does not appear to be a problem throughout the model. Table 5 reports the results of the TSCS analysis of the import demand equation for all three products in all CARICOM countries as well as individual product analyses. Table 6 in Appendix B reports the results of individual CARICOM country analyses. Model equations explained 76% to 98% of the variation in import demand from CARICOM and member countries. The R^2 is encouraging and quite high for the TSCS data. Thus, these equations contribute apparent support to explanation of US/CARICOM fish trade. The results of the Prediction Criterion and estimated values of Ramsey's RESET test, root MSE, and a Durbin Watson statistic are included. All verify that the functional form of the model is appropriate and is fully specified, contributing to the reliability and efficiency of all estimators.

Results of the import demand model in Table 5 contain eight statistically significant structural coefficients at the $\forall = 0.05$ level and all coefficients exhibit the expected signs. As anticipated, the price ratio coefficient was positive and significant for every equation. Specifically, an increase in import prices for all products relative to domestic prices causes imports to increase by 0.84%. Thus, the movement toward increased fisheries production from CARICOM countries to the United States depends largely on the price paid for the product relative to the domestic price received in the US. Heightened production efficiency with a rise in prices induces increases in imports reflecting potential increases in net foreign exchange earnings by the CARICOM fisheries industry. Relative efficiencies between freshwater/shellfish and marine/shellfish product markets (0.44 and 0.49) reveal potential production increases of both freshwater and marine products.

Positive relationships are established between import demand and the exchange rate for many of the equations. This is contradictory to the argument that as exchange rates increase in the US, producers in CARICOM countries receive less money for their shrimp and will be less inclined to export to the United States. As a price response variable, the exchange rate may be portraying the effects of price on import demand. As prices increase, so may

Table 5. TSCS Analysis of US Fish Imports from Combined CARICOM Countries

CARICOM Freshwater Marine, and Shellfish Products

Variable	Parameter Estimates	Standard Error	T-ratios
Constant	-0.98	0.22	4.27*
Import/domestic price	0.84	0.05	16.97*
Income	0.52	0.31	1.65
Price of substitutes from non-CARICOM LAC	-0.47	0.03	13.82*
Exchange rate	0.21	0.10	2.05*
Lagged dependent variable	0.04	0.05	0.80
Number of observations	213		
Number of cross sections	3		
Number of time series	71		
R^2	0.86		
Root MSE	0.29		
DW statistic	1.98		
Ramsey's RESET	0.65		
Prediction Criterion			
Non-linear PC	1.04		
Linear PC	2.92		

CARICOM Freshwater Fish Products

Variable	Parameter Estimates	Standard Error	T-ratios
Constant	-1.36	2.96	0.45
Import/domestic price	0.88	0.06	14.1*
Income	0.59	3.52	0.16
Price of substitutes from non-CARICOM LAC	-0.07	0.009	7.77*
Exchange rate	-0.41	0.16	2.46*
Lagged dependent variable	0.09	0.55	0.02
Number of observations	71		
R^2	0.82		
Root MSE	0.22		
DW statistic	1.90		
Ramsey's RESET	0.93		
Prediction Criterion			
Non-linear PC	1.05		
Linear PC	1.51		

CARICOM Marine Fish Products

Variable	Parameter Estimates	Standard Error	T-ratios
Constant	1.48	6.30	0.23
Import/domestic price	0.99	0.13	7.15*
Income	0.66	0.20	3.30*
Price of substitutes from non-CARICOM LAC	0.04	0.03	1.39
Exchange rate	0.32	0.21	1.54
Lagged dependent variable	0.68	4.92	0.13
Number of observations	71		
R^2	0.76		
Root MSE	0.36		
DW statistic	1.99		
Ramsey's RESET	0.23		
Prediction Criterion			
Non-linear PC	2.10		
Linear PC	4.27		

CARICOM Shellfish Products

Variable	Parameter Estimates	Standard Error	T-ratios
Constant	-7.48	3.80	1.96
Import/domestic price	0.57	0.10	5.72*
Income	0.88	0.41	2.14*
Price of substitutes from non-CARICOM LAC	-0.21	0.10	1.99*
Exchange rate	0.93	0.35	2.64*
Lagged dependent variable	0.21	0.16	1.29
Number of observations	71		
R^2	0.77		
Root MSE	0.26		
DW statistic	1.83		
Ramsey's RESET	0.19		
Prediction Criterion			
Non-linear PC	1.45		
Linear PC	1.92		

**Significant at ∀=0.05*

exchange rates, causing import quantity to the United States to increase as well.

Again seen in Table 5, a few coefficients were not statistically significant at the 5% level. Income is insignificant for the aggregated and freshwater products equations, but positive designating CARICOM fisheries products as a normal good that has little sensitivity to changes in income. Interestingly, when the products were disaggregated, the income variable showed significance in the marine and shellfish equations. Since income spent on the product is small and CARICOM countries might be operating in a niche market,

income increases may have little effect on quantity imported of all fisheries products.

In general, there are mixed results from the price of substitutes from non-CARICOM LAC variable. All equations show significance and exhibit negative signs except for the CARICOM marine equation indicating insensitivity and substitution among exporters from competing countries. Unanticipated is the negative relationship found between quantity and the weighted average price of non-CARICOM LAC for the CARICOM combined, freshwater, and shellfish import equations, indicating that those products are complements. This may be a sign that the United States imports as much shellfish as possible to alleviate the deficit in shellfish supply due to high demand. Caribbean countries are also expected to export a set amount of fisheries products to maintain current foreign exchange earnings, but can they expand production by increasing efficiency to compete with the LAC?

According to Table 6 found in Appendix B, there is a significant positive relationship between the price ratio and import quantity for all major fisheries producing CARICOM countries. For the major marine fisheries export countries (Guyana and Trinidad/ Tobago), a 1.0% increase in the price of imports relative to domestic prices will cause these countries to increase import quantity by 0.97% and 0.92%, respectively. The same pattern is found throughout all major producing countries and all fisheries products. Exchange rates for each freshwater fish exporting country were found to have a negative effect on import quantity as originally hypothesized. A 1% increase in the exchange rate between Guyana and the United States resulted in a 0.46% decrease in import quantity. But overall, the exchange rate for major producing countries in the CARICOM results in a positive relationship. Greater exchange rates imply an increasing demand for imported products from the CARICOM, suggesting that countries should produce more as exchange rates increase.

Ultimately, the weighted average of fisheries products (freshwater, marine, and shellfish) from non-CARICOM LAC has perhaps the most intriguing effect on US/CARICOM fish trade. With an upward trend in demand, the overall price received by producers for fisheries products has improved. It has been speculated that non-CARICOM LAC have a competitive advantage in the fisheries industry, in particular, in the importation process to the United States. Arguably, own-price elasticity has a greater effect on import demand than prices received by producers in non-CARICOM LAC. Own-price variables for each equation were all significant and exhibited the anticipated sign unlike the cross-price variables. Overall, a 1% increase in the price for the three fisheries products represented in the model from non-CARICOM LAC causes anywhere from a 0.02% to 0.47% increase or decrease in CARICOM import quantity demanded as compared to an own-price elasticity range of 0.57% to 1.57%. With own-price elasticity appearing to have a greater effect on import demand, the question remains: should the CARICOM fishery industry be concerned with the Free Trade Area of the Americas and the competitive advantage possessed by these other LAC?

exchange earnings and maintaining CARICOM as a net fish importer.

Conclusion

Trade liberalization objectives involve questions of efficiency, cost and value relations, and the possible favorable return on investment. With the advent of the FTAA, CARICOM should see a decrease in tariffs or subsequent restrictions, possible increases in fisheries exports to the United States, and potential efficiency gains from highly competitive fish producers in non-CARICOM LAC. This study has attempted to answer the following questions: will the CARICOM fisheries industry be able to increase production efficiency enough to compete against non-CARICOM LAC? Will the FTAA lower costs enough to increase import quantity and change the status of the CARICOM from net importer to net exporter? Will the FTAA harm or help the CARICOM industry? This study examines the possible effects of the FTAA on CARICOM freshwater, marine, and shellfish products imported to the United States by calculating import demand elasticities and comparing their relative magnitudes per variable. Estimates of own-price elasticities show that their magnitudes are much greater and more significant to import quantity than non-CARICOM LAC. Other variables appear to play a role in import demand determination but to a lesser extent than the price ratio and weighted average of non-CARICOM LAC fisheries prices. The income variable seems to lag behind import demand while the exchange rate variable seems to be capturing yet another price response.

However, the results do suggest that variables such as price, income, the exchange rate, and prices of competing goods are essential in explaining the import demand for CARICOM fish products and its major producing member countries. These factors should be considered in any strategy to combat the possible detrimental effects of the FTAA, such as increased imports from non-CARICOM LAC due to lower costs. Present levels of imports from non-CARICOM LAC do not appear to pose a threat to CARICOM fish producers and import cross-price elasticities are currently not affecting the US import quantities. But should things change due to the FTAA, CARICOM could see an expansion of fish exports to the United States especially if production and efficiency is increased before its onset. Increases in production may not be possible due to governmental and institutional control. A more likely scenario may well demonstrate a severe decrease due to increased competition and domination of the US fisheries import market from the non-CARICOM LAC.

Further research is obviously needed to ascertain specific product reactions to the FTAA and lower costs as well as the strength of fisheries demand in the United States in order to obtain a complete understanding of the overall effects the FTAA will have on US/CARICOM fish trade.

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Appendix A. Table 2. Freshwater Variable Descriptive Statistics

CARICOM Freshwater Products

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Q_{lf}	58863.4	3749.5	8685	168392
P_{ls}/ P_{US}	3.98	141.4	3.05	6.16
Y_{US}	8096.8	167.6	6405	10224
P_{ls}	1.33	1218.7	1.18	3.17
ER	295.5	19.8	158	627

Guyana Freshwater Products

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Q_{lf}	40377.4	5305.9	2395	162986
P_{ls}/ P_{US}	2.46	1141.4	1.31	3.88
Y_{US}	8096.8	167.6	6405	10224
P_{ls}	1.33	1218.7	1.18	3.17
ER	220.1	2.5	186	249

Jamaica Freshwater Products

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Q_{if}	17946.8	1106.4	26506	64850
P_{is}/ P_{US}	5.54	743.4	3.26	6.14
Y_{US}	8096.8	167.6	6405	10224
P_{is}	1.33	1218.7	1.18	3.17
ER	53.3	0.4	48.5	60.7

Table 3. Marine Variable Descriptive Statistics

CARICOM Marine Products

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Q_{if}	962287.7	62092.1	62814	3524626
P_{is}/ P_{US}	4.40	1759.7	3.00	5.89
Y_{US}	8096.8	167.6	6405	10224
P_{is}	2.93	2807.3	1.71	4.53
ER	295.1	19.8	158	627

Grenada Marine Products

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Q_{if}	33480.7	2395.3	4985	93674
P_{is}/ P_{US}	4.72	147.3	3.98	5.37
Y_{US}	8096.8	167.6	6405	10224
P_{is}	2.93	2807.3	1.71	4.53
ER	3.66	0.02	3.3	3.9

Guyana Marine Products

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Q_{if}	110507.2	5371.2	21000	235774
P_{is}/ P_{US}	2.61	135.9	2.45	3.25
Y_{US}	8096.8	167.6	6405	10224
P_{is}	2.93	2807.3	1.71	4.53
ER	220.1	2.5	186	249

Suriname Marine Products

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Q_{if}	267434.8	13549.8	56004	551065
P_{is}/ P_{US}	3.87	6360.7	2.53	4.10
Y_{US}	8096.8	167.6	6405	10224
P_{is}	2.93	2807.3	1.71	4.53
ER	1195.3	98.7	533	2902

Trinidad/Tobago Marine Products

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Q_{if}	510124.5	18057.3	179649	1170817
P_{is}/ P_{US}	5.45	987.2	4.04	5.96
Y_{US}	8096.8	167.6	6405	10224
P_{is}	2.93	2807.3	1.71	4.53
ER	8.4	0.05	5.5	8.9

Table 4. Shellfish Variable Descriptive Statistics

CARICOM Shellfish Products

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Q_{if}	1063668	50593	235487	1992379
P_{is}/ P_{US}	8.92	402	7.08	10.34
Y_{US}	8096.8	167.6	6405	10224
P_{is}	5.95	2019	4.40	7.52
ER	295	20	158	628

Guyana Shellfish Products

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Q_{if}	546645.4	32878.1	25446	1200637
P_{is}/ P_{US}	5.15	155.5	4.33	5.59
Y_{US}	8096.8	167.6	6405	10224
P_{is}	5.95	2019	4.40	7.52
ER	220.1	2.5	186	249

Jamaica Shellfish Products

Variable	Mean	Standard Deviation	Minimum Value	Maximum Value
Q_{if}	78112.7	9904.6	3743	375587
P_{is}/ P_{US}	8.30	5001.6	5.66	12.80
Y_{US}	8096.8	167.6	6405	10224
P_{is}	5.95	2019	4.40	7.52
ER	53.3	0.4	48.5	60.7

Appendix B. Table 6. Individual CARICOM Countries Regression Analysis

Guyana Freshwater Fish Products

Variable	Parameter Estimates	Standard Error	T-ratios
Constant	12.92	6.44	2.00*
Import/domestic price	0.88	0.05	15.82*
Income	1.57	0.76	2.06*
Price of substitutes from non-CARICOM LAC	0.30	0.13	2.34*
Exchange rate	-0.46	0.08	5.89*
Lagged dependent variable	0.49	0.48	1.00
Number of observations	71		
R^2	0.92		
Root MSE	.028		
DW statistic	2.04		
Ramsey's RESET	0.25		
Prediction Criterion			
Non-linear PC	0.31		
Linear PC	2.34		

Jamaica Freshwater Fish Products

Variable	Parameter Estimates	Standard Error	T-ratios
Constant	-2.74	0.31	8.90*
Import/domestic price	0.88	0.06	14.66*
Income	0.01	0.34	0.03
Price of substitutes from non-CARICOM LAC	-0.13	0.06	2.20*
Exchange rate	-0.76	0.14	5.42*
Lagged dependent variable	0.52	0.73	0.71
Number of observations	71		
R^2	0.98		
Root MSE	0.13		
DW statistic	1.86		
Ramsey's RESET	0.47		
Prediction Criterion			
Non-linear PC	1.22		
Linear PC	2.74		

Grenada Marine Fish Products

Variable	Parameter Estimates	Standard Error	T-ratios
Constant	5.19	4.26	1.22
Import/domestic price	1.02	0.04	23.29*
Income	0.82	0.31	2.59*
Price of substitutes from non-CARICOM LAC	-0.08	0.12	0.69
Exchange rate	-0.75	1.23	0.61
Lagged dependent variable	0.57	0.81	0.70
Number of observations	71		

R^2	0.90
Root MSE	0.21
DW statistic	1.93
Ramsey's RESET	0.24
Prediction Criterion	
Non-linear PC	0.86
Linear PC	1.49

Guyana Marine Fish Products

Variable	Parameter Estimates	Standard Error	T-ratios
Constant	-0.57	2.19	0.26
Import/domestic price	0.97	0.05	18.25*
Income	0.57	0.21	2.69*
Price of substitutes from non-CARICOM LAC	0.02	0.10	0.20
Exchange rate	1.04	0.39	2.61*
Lagged dependent variable	0.85	1.04	0.81
Number of observations	71		
R^2	0.85		
Root MSE	0.18		
DW statistic	1.95		
Ramsey's RESET	0.42		
Prediction Criterion			
Non-linear PC	1.49		
Linear PC	2.16		

Suriname Marine Fish Products

Variable	Parameter Estimates	Standard Error	T-ratios
Constant	0.93	2.05	0.45
Import/domestic price	0.84	0.06	14.00*
Income	0.13	0.24	0.54
Price of substitutes from non-CARICOM LAC	-0.08	0.01	8.00*
Exchange rate	0.04	0.008	5.00*
Lagged dependent variable	0.01	0.006	1.66
Number of observations	71		
R^2	0.94		
Root MSE	0.12		
DW statistic	1.98		
Ramsey's RESET	0.40		
Prediction Criterion			
Non-linear PC	1.37		
Linear PC	2.53		

Trinidad/Tobago Marine Fish Products

Variable	Parameter Estimates	Standard Error	T-ratios
Constant	-0.46	0.13	3.53*
Import/domestic price	0.92	0.08	10.69*
Income	0.46	0.07	6.57*
Price of substitutes from non-CARICOM LAC	0.07	0.02	3.52*
Exchange rate	0.03	0.20	0.15
Lagged dependent variable	0.17	0.25	0.68
Number of observations	71		
R^2	0.90		
Root MSE	0.09		
DW statistic	2.01		
Ramsey's RESET	0.39		
Prediction Criterion			
Non-linear PC	0.42		
Linear PC	1.22		

Guyana Shellfish Products

Variable	Parameter Estimates	Standard Error	T-ratios
Constant	-1.10	0.33	3.30*
Import/domestic price	0.96	0.05	17.93*
Income	0.62	0.27	2.29*
Price of substitutes from non-CARICOM LAC	0.12	0.09	1.39
Exchange rate	0.02	0.49	0.06
Lagged dependent variable	0.48	0.76	0.64
Number of observations	71		
R^2	0.89		
Root MSE	0.23		
DW statistic	2.01		
Ramsey's RESET	0.14		
Prediction Criterion			
Non-linear PC	1.80		
Linear PC	3.03		

Jamaica Shellfish Products

Variable	Parameter Estimates	Standard Error	T-ratios
Constant	5.17	7.46	0.69
Import/domestic price	1.57	0.08	18.95*
Income	1.77	0.46	3.86*
Price of substitutes from non-CARICOM LAC	0.21	0.20	1.02
Exchange rate	0.75	0.34	2.20*
Lagged dependent variable	1.39	1.46	0.95
Number of observations	71		
R^2	0.87		
Root MSE	0.44		
DW statistic	2.06		

Ramsey's RESET	0.37
Prediction Criterion	
Non-linear PC	1.59
Linear PC	2.65

**Significant at ⊬=0.05*
Footnotes: [1]Latin American Countries (LAC) include all mainland and Caribbean countries.

Figure 3. U.S. fisheries imports from non-CARICOM Latin countries

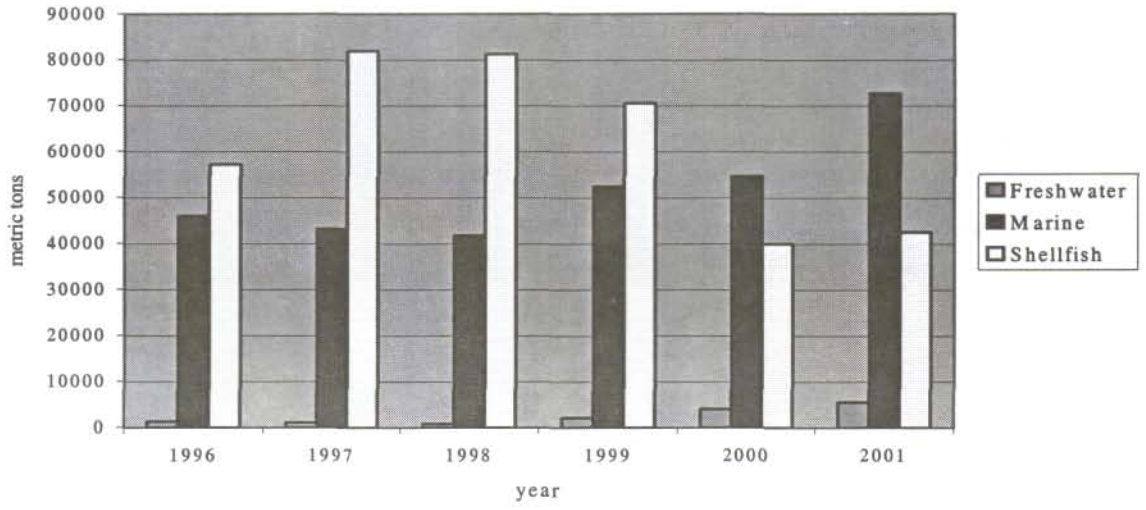

Figure 4. U.S. fish product imports from CARICOM