

Ravichandran
Munirathinam
Michael R. Reed
Mary A. Marchant
*University of
Kentucky*

Effects of the Canada-U.S. Trade Agreement on U.S. Agricultural Exports

ABSTRACT: This paper investigates the effects of the Canada-U.S. Trade Agreement (CUSTA) on U.S. exports of agricultural products. Econometric analysis found that CUSTA has had a large impact on many U.S. agricultural export categories. All of the consumer-oriented products (except wine and beer), five of the intermediate products, and four of the bulk products had significant CUSTA effects. It is clear that the CUSTA effects have been larger for consumer-oriented food products. There is also evidence that U.S. affiliate sales in Canada have stimulated U.S. exports of consumer-oriented products and intermediate products.

INTRODUCTION

Debates about free trade agreements are increasingly commonplace these days, especially in the U.S. where there is talk of agreements with countries throughout South America. During the time that negotiations on the North American Free Trade Agreement (NAFTA) occurred there were many estimates of the impact that NAFTA would have on the U.S. economy. However, none of those estimates looked at past experience in free trade agreements to arrive at their conclusions. There was no discussion of the adjustments that had taken place because of the Canada-U.S. Trade Agreement (CUSTA), despite its obvious relevance. This paper investigates the effects of the CUSTA on U.S. agricultural exports.

The CUSTA was the first free trade agreement that the U.S. entered. When it was implemented on January 1, 1989, it created the world's largest free trading

bloc between the world's largest trading partners (Dixit and Roningen, 1989). The signing of this trade agreement was the precursor to the NAFTA, which went into effect in January 1994. According to CUSTA, all agricultural tariffs between the U.S. and Canada will be phased out over a 10 year period, market access for products from both countries will be improved, and use of subsidies will be limited.

When the CUSTA was announced, most people associated with agricultural industries felt that there would be little impact on U.S. and Canadian agriculture, since both countries were "mature" markets. However, those pre-agreement assessments were wrong; CUSTA has impacted U.S. and Canadian agriculture profoundly, but in different ways. Total agricultural exports increased dramatically in both countries and their export market share changed. Agricultural exporters in the U.S. increased their export share of consumer-oriented processed food products to Canada, while Canadian exporters shifted their exports to the U.S. toward bulk and intermediate products. Direct investment flows between the countries in the food industries have also climbed dramatically since CUSTA. United States foreign direct investment (FDI) in Canadian food processing industries increased from \$2.0 billion to \$5.4 billion between 1989 and 1996. During this same period, Canadian investment in U.S. food processing industries increased from \$894 million to \$7.6 billion in 1996 (all values in this paper are reported in current U.S. dollars).

Despite these large increases in U.S. agricultural exports and investment flows to Canada since the CUSTA, there has been little analysis of their causes. The Economic Research Service of the USDA (1987) provided an assessment of the NAFTA (of which CUSTA is a part) which included a commodity-by-commodity analysis and an aggregate analysis. In the aggregate analysis, they found that U.S. exports to Canada had increased by 7% due to NAFTA. In the commodity-by-commodity analysis, only U.S. exports of wheat and wheat products; vegetable oils; beef and veal; and processed tomatoes increased by more than 6 percent due to NAFTA. In contrast, Tweeten, Sharples, and Smith (1997) estimated that aggregate U.S. exports to Canada increased by \$2.38 billion (using U.S. data).

This paper's primary objective is to analyze the impact of CUSTA on U.S. exports of agricultural products. First, the paper provides an overview of CUSTA's effects. Second, specific effects of CUSTA on U.S. exports are analyzed by type of agricultural product (consumer-oriented, intermediate and bulk). Third, the export/FDI relationship is analyzed for U.S. direct investments in Canada's food industry to investigate whether there has been a complementary or substitute relationship.

U.S. EXPORTS AND INVESTMENT IN CANADA

Following the enactment of CUSTA, two-way trade between the U.S. and Canada increased substantially. Total agricultural exports from the U.S. to Canada increased from \$2.2 billion in 1989 to \$6.8 billion in 1997, an increase of 206%

Table 1. U.S. Agricultural Exports to Canada by Food Processing Categories (Millions U.S. Dollars)

Products	1989	1990	1991	1992	1993	1994	1995	1996	1997	% Change
Bulk	280	347	286	325	371	328	430	490	529	88
Intermediate	593	836	892	927	1038	1113	1131	1216	1392	135
Consumer	<u>1343</u>	<u>3005</u>	<u>3393</u>	<u>3675</u>	<u>3905</u>	<u>4112</u>	<u>4237</u>	<u>4423</u>	<u>4852</u>	261
Total	2217	4189	4571	4927	5314	5553	5798	6129	6773	206

Source: Trade and Economic Analysis Division, Foreign Agricultural Service, U.S. Department of Agriculture.

(Table 1). Examination of trade composition shows that exports of bulk, intermediate, and consumer-oriented processed food products from the U.S. to Canada increased by 88%, 135%, and 261%, respectively, between 1989 and 1997.

The United States, which exports primarily bulk commodities with low value-added to most of the world, has fallen behind other countries in exporting (consumer-oriented) processed food products with high value added. For processed food trade, growth in world trade greatly exceeds growth of U.S. agricultural exports. This decline in U.S. market share is partially explained by the tendency of large U.S. food firms to invest in foreign countries rather than export (Bredahl, Abbott, and Reed, 1995).

In contrast, U.S. exports of processed foods to Canada present a different picture, where the U.S. export share for consumer-oriented commodities to Canada increased from 61% in 1989 to 72% in 1997. During the same period, the export share for bulk commodities to Canada declined from 12% to 8%. Similarly, the share for intermediate products declined from 27% to 20%. This larger share for consumer-oriented products likely reflects similar cultures, proximity, closer integration by firms between the countries, and similar income levels. Lower trade barriers because of CUSTA are also a factor in the increased share of consumer-oriented products in recent years.

Looking at direct investment, the stock of U.S. investment in Canadian food industries increased from \$2.0 billion in 1989 to \$5.4 billion in 1996, an increase of 170%. Sales of Canadian affiliates of U.S. companies have grown much slower than investment, increasing from \$8.2 billion in 1989 to \$11.3 billion in 1996, or 38%. Trade theory suggests that with market liberalization and free trade agreements, multinational firms may choose to export to foreign countries (in this case Canada), rather than invest in processing facilities. Our empirical analysis will examine whether these strategies compete with or complement each other.

CANADIAN EXPORTS AND INVESTMENT IN THE U.S.

Canadian agricultural exports to the U.S. increased from \$2.9 billion in 1989 to \$7.4 billion in 1997, an increase of 155% (Table 2). Examination of trade composition shows that Canadian exports of bulk, intermediate, and consumer-oriented

Table 2. Canadian Agricultural Exports to the U.S. by Food Processing Categories (Millions U.S. Dollars)

<i>Products</i>	1989	1990	1991	1992	1993	1994	1995	1996	1997	% Change
Bulk	355	310	279	453	570	848	744	856	1005	183
Intermediate	1050	1196	1323	1750	1835	1948	2157	2669	2673	254
Consumer	<u>1507</u>	<u>1646</u>	<u>1702</u>	<u>1901</u>	<u>2213</u>	<u>2465</u>	<u>2685</u>	<u>3222</u>	<u>3710</u>	146
Total	2913	3150	3304	4104	4618	5261	5586	6747	7388	154

Source: Trade and Economic Analysis Division, Foreign Agricultural Service, U.S. Department of Agriculture.

products to the U.S. increased by 183%, 254%, and 146%, respectively. The Canadian export share of consumer-oriented processed foods imported by the U.S. declined from 52% in 1989 to 50% in 1997. Concurrently, Canadian exports of bulk and intermediate products to the U.S. increased marginally.

Canadian investment in U.S. food industries increased from \$894 million in 1989 to \$7.6 billion in 1996. The sales of Canadian food processing affiliates operating in the U.S. have stayed relatively constant since CUSTA, at \$5.1 billion in 1989 and \$5.2 billion in 1993.¹ Affiliate sales peaked at \$6.2 billion in 1990. Apparently, Canadian exports of bulk, intermediate and consumer-oriented products have cut into affiliate sales in the United States.

The time-related effects of CUSTA appear to differ between the U.S. and Canada. There was an immediate dramatic increase in U.S. agricultural exports to Canada in 1989 (the first year of the CUSTA), especially for intermediate and consumer-oriented products (Table 1). Yet for Canada, there appears to be a two-year lag before exports were positively affected—Canadian exports to the U.S. did not increase appreciably until 1991—and the increase was more gradual (Table 2). Sales by foreign affiliates have been larger than exports for both the U.S. and Canada in every year, but firms appear to be using both trade and foreign investment strategies to develop foreign markets.

EMPIRICAL MODEL

In a liberalized trade environment, producers use both exports and foreign direct investment strategies to operate in the international market. The equilibrium level of exports and FDI can be estimated by using a system of simultaneous equations.² However, this approach is not possible in this study because of severe data limitations. For example, the data on U.S. investment in Canada are not available prior to 1983. Due to these data limitations, the analysis is restricted to the impacts of CUSTA on U.S. agricultural exports by type (consumer-oriented, intermediate and bulk).

In this model, the supply of all agricultural products from the U.S. are assumed perfectly elastic—Canadian export patterns have no effect on U.S. agricultural prices—so U.S. export patterns are determined solely by Canadian demand pat-

terms. Equation (1) specifies the demand for U.S. agricultural products in Canada, where the dependent variable is U.S. exports of the i th sub-industry for agricultural products to Canada (EXPORTS). This variable (originally expressed in U.S. dollar terms) was deflated by a U.S. export price index so that it would be denominated in quantity units, rather than dollars.

The independent variables include real gross domestic product (GDP) of Canada as a measure of national income, which should have a positive coefficient; the deflated export price of U.S. exports (converted into Canadian dollars) as a price variable (XPRICE), which should have a negative coefficient; and foreign direct investment sales (SALES) by Canadian affiliates of U.S. food processing corporations to capture synergistic effects between trade and foreign direct investment. A positive coefficient on SALES indicates trade and foreign direct investment are synergistic marketing strategies; while a negative coefficient indicates that they are competing strategies. Additionally, a dummy policy variable (DUMMY) was used to capture the impact of CUSTA; 0 before 1989 and 1 for 1989 and after.

$$\text{EXPORTS}_i = \alpha_0 + \alpha_1 \text{GDP}_i + \alpha_2 \text{XPRICE}_i + \alpha_3 \text{DUMMY}_i + \alpha_4 \text{SALES}_i + \varepsilon_i \quad (1)$$

Equation (1) was fitted for three product classifications using time series and cross sectional observations. The cross sectional units were sub-industries within the classifications. Consumer-oriented products were broken into thirteen sub-industries; intermediate products were broken into eight sub-industries; and bulk products were broken into six sub-industries. Sub-industries accounting for less than \$10 million in U.S. exports were not included in the analysis. Poultry, dairy, and eggs were excluded from the analysis because these sub-industries are still heavily protected within Canada.

The analysis was performed using ordinary least squares (OLS) regression analysis and a covariance model. The cross sectional observations were treated as separate observations and dummy variables were included to allow different coefficients for independent variables (GDP, XPRICE, and SALES) by industry.

Two sets of regression analyses were performed on equation (1) for each product category. One analysis (*model 1*) used all data available (1976–95), but excluded the U.S. affiliate sales in Canada (data on affiliate sales were only available for a limited number of years). The other analysis (*model 2*) used the fully specified model, but with fewer observations (1982–93) due to data limitations. Both regressions pooled observations from the sub-industries within each product category. In all cases, the Durbin-Watson statistic indicated that no serial correlation was present at the one percent level of significance. Additionally, no multicollinearity was detected, since variance inflation factors for all coefficients were less than 10.

Table 3. Elasticities for the Consumer-Oriented Products (Model 1)

<i>Industry</i>	<i>GDP</i>	<i>Export Price</i>	<i>CUSTA</i>
Snack Foods	0.17	-0.19*	0.67***
Breakfast Cereals	0.28	-0.15	0.72***
Red Meats (Fresh)	-0.96***	-0.50***	0.87***
Red Meats (Prepared)	0.04	-0.22	0.64***
Fresh Fruit	-0.93***	-0.77***	0.64***
Fresh Vegetables	-0.52***	-0.48***	0.70***
Processed Fruit and Veg.	-0.46	-0.30**	0.69***
Fruits and Veg. Juices	-0.84	-0.45*	0.50***
Tree Nuts	-0.76	-0.79	0.69**
Wine and Beer	0.65	-0.24	0.45
Nursery Products	-1.09	-0.66	0.88***
Pet Foods	0.30	-0.28	0.64***
Other Processed Foods	0.42*	-0.13	0.51***

Notes: * indicates that elasticities are significant at the 10% level
 ** indicates that elasticities are significant at the 5% level
 *** indicates that elasticities are significant at the 1% level

DATA SOURCES

The data were collected for the period 1976–1995. Data on U.S. agricultural exports to Canada were collected from the Trade and Marketing Analysis Branch of the Foreign Agricultural Service, U.S. Department of Agriculture (annual reports). The Canadian gross domestic product (GDP), U.S. agricultural export price index (trade-weighted), and the real effective exchange rate data were collected from the *International Financial Statistics* published by the International Monetary Fund (various issues). Foreign direct investment data were collected from the *Survey of Current Business*, published by the Bureau of Economic Analysis (BEA annual reports). Data on sales of processed foods by foreign affiliates of their U.S. parent companies were collected from the following BEA publications: *U.S. Direct Investment Abroad: Operations of U.S. Parent Companies and Their Foreign Affiliates* (annual reports) and *Foreign Direct Investment in the U.S.: Operations of U.S. Affiliates of Foreign Companies* (annual reports).

ANALYSIS OF U.S. EXPORTS OF CONSUMER-ORIENTED PRODUCTS TO CANADA

There were 13 sub-industries for U.S. consumer-oriented exports to Canada. Empirical results are reported in Tables 3 and 4, with coefficients transformed into elasticities. Results for *model 1* (the regression without affiliate sales; Table 3) indicate that the CUSTA policy coefficients (DUMMY) had the correct sign and were significantly different from zero at the five percent level for all sub-industries except wine and beer.

Table 4. Elasticities for the Consumer-Oriented Products (Model 2)

<i>Industry</i>	<i>CUSTA</i>	<i>FDI Sales</i>
Snack Foods	0.22**	1.98***
Breakfast Cereals	0.23	2.06
Red Meats (Fresh)	0.45***	1.30**
Red Meats (Prepared)	0.28	1.48
Fresh Fruit	0.56***	0.15
Fresh Vegetables	0.39***	1.37***
Processed Fruit and Veg.	0.26**	1.76***
Fruits and Veg. Juices	0.29	0.89
Tree Nuts	0.37	1.13
Wine and Beer	0.26	0.64
Nursery Products	0.82*	0.24
Pet Foods	0.22	1.67
Other Processed Foods	0.10	1.38***

Notes: * indicates that elasticities are significant at the 10% level
 ** indicates that elasticities are significant at the 5% level
 *** indicates that elasticities are significant at the 1% level

The coefficients indicate that CUSTA alone increased U.S. consumer-oriented agricultural exports by 45% to 88%, depending on the product. These elasticities translate into increased annual export values (in nominal terms for 1993) from CUSTA ranging from \$26.6 million for wine and beer to \$506.5 million for fresh vegetables. Other large annual export increases due to CUSTA were for fresh fruits (\$389.9 million), fresh red meats (\$314.5 million), snack foods (\$266.1 million), and processed fruits and vegetables (\$248.5 million). Summing over all consumer-oriented products, U.S. exports increased by \$2.61 billion due to CUSTA for 1993.

The income coefficient (GDP) was negative in seven sub-industries and was significantly different from zero at the one percent level in three of those industries (fresh red meats, fresh fruits, and fresh vegetables). The magnitudes of these significant, negative elasticities were very large too. Looking at the raw data, though, it is clear that Canadian imports of fresh red meats, fruits, and vegetables jumped dramatically after the CUSTA agreement and have remained relatively constant since 1990. The income changes in Canada since CUSTA have been small and the income elasticities have likely been distorted because of the short time span. A longer observation period (which was not possible given the data), might have generated different results. Yet, given this data series, it seems that income has not been a major determinant of the growth in U.S. exports for most sub-industries.

The export price coefficient was negative for all sub-industries and significantly different from zero at the five percent level in four cases—fresh red meats, fresh fruits, fresh vegetables, and processed fruits and vegetables. The elasticity magnitudes vary from -0.13 to -0.79 , which are within reasonable ranges. Products with larger income elasticities (in absolute value) had larger price elasticities (in absolute value). Canadian imports are price responsive and these price responses are

larger than ordinary demand elasticities (as expected). The U.S. faces competition from other exporters and domestic producers in Canada.

Table 4, which has the empirical results for *model 2*, only includes coefficients on the CUSTA dummy variable and the affiliate sales (other results are available on request). All of the CUSTA elasticities are still positive, but most are no longer significantly different from zero. The sub-industries with significant elasticities at the five percent level are snack foods, fresh red meats, fresh fruits, fresh vegetables, and processed fruits and vegetables. The magnitudes for these significant coefficients indicate that CUSTA increased annual exports from 22% to 56%, or between \$16.2 million (for snack foods) and \$150.4 million (for fresh fruits). These values are generally lower than the magnitudes from *model 1*.

Sales of U.S. affiliates in Canada were found to influence positively U.S. consumer-oriented exports in all cases, however only five of the elasticities were significantly different from zero. United States affiliate sales were significantly related to exports of snack foods, fresh red meats, fresh vegetables, processed vegetables, and other processed foods. These elasticities were large in magnitude too (greater than one for all significant elasticities). More time-series observations for *model 2* might have reduced the error sums-of-squares enough to increase the significance level of most coefficients, but such data were not available.

These results indicate that U.S. direct investment in Canada has stimulated exports of some U.S. processed foods, which makes sense when the U.S. is exporting a product that is processed further in Canada, such as fresh vegetables and fresh red meats. The positive relationship between affiliate sales and exports can also be due to the very broad product lines of many U.S. firms. These firms can process one product line in Canada and sell another product line that is manufactured in the United States. These results lend support to the idea that FDI and exports are complementary and no support to the idea that FDI and exports are substitutes.

Another way to look at the results is on a sub-industry basis, especially since one would not expect CUSTA to have large impacts on all sub-industries. The model does a good job of explaining U.S. fresh red meat, fresh fruits and fresh vegetable exports, and these are the products that have shown a large increase over the 1989–1995 period. The other products have shown an increase, but *model 1* would attribute this solely to CUSTA (with some price influences for processed fruits and vegetables). The model might have performed better if the degree of trade liberalization could have been quantified by year, but such data are not available.

ANALYSIS OF U.S. EXPORTS OF INTERMEDIATE PRODUCTS TO CANADA

There were 8 sub-industries for U.S. intermediate product exports to Canada. Empirical results are reported in Tables 5 and 6, with coefficients transformed into elasticities. Results for *model 1* (the regression without affiliate sales; Table 5) indicate that the CUSTA policy elasticities (DUMMY) usually had a positive sign

Table 5. Elasticities for the Intermediate Products (Model 1)

Industry	GDP	Export Price	CUSTA
Soybean Meal	0.91***	-0.45***	-0.01
Other Vegetable Oils	0.36	0.01	0.35**
Feed and Fodder	2.20***	0.11	-0.01**
Live Animals	0.08	-0.10	0.55***
Hides and Skins	0.82*	-0.45***	-0.31***
Planting Seeds	0.21	-0.12	0.41***
Sugars and Sweeteners	0.73***	-0.21***	0.55***
Other Intermediate Products	0.54***	-0.11***	0.33***

Notes: * indicates that elasticities are significant at the 10% level

** indicates that elasticities are significant at the 5% level

*** indicates that elasticities are significant at the 1% level

and seven were significantly different from zero at the five percent level. Two of the significant elasticities were negative (for feed and fodder and hides and skins), while five were positive (for other vegetable oils, live animals, planting seeds, sugar and sweeteners, and other intermediate products).

The coefficients indicate that CUSTA alone increased U.S. exports of intermediate products by 30% to 50%, depending on the product (except for soybean meal and feeds and fodder where the CUSTA effects were virtually zero). These elasticities translate into increased export values (in nominal terms for 1993) from CUSTA ranging from -\$22.8 million for hides and skins to \$69.9 million for live animals. Other intermediate product and sugar and sweetener exports were increased by \$44.9 million and \$41.9 million, respectively, due to CUSTA. These impacts are smaller than for most consumer-oriented products. Summing over all intermediate products, U.S. exports increased by \$154.5 million due to CUSTA.

The hides and skins coefficient for CUSTA (with a large, significant negative sign) deserves a closer look. Canadian hide imports experienced a secular down trend through 1991 in the data set. After 1991, they have experienced a secular up trend. Both of these trends were consistent with overall U.S. hide exports, indicating that the Canadian imports were indicative of U.S. supply factors.

The income coefficient (GDP) was positive in all eight sub-industries and was significantly different from zero at the one percent level in four of those industries (soybean meal, feed and fodder, sugar and sweeteners, and other intermediate products). The magnitudes of these significant, positive elasticities were large, and in two cases (soybean meal and feeds and fodder) the income effect might be picking up some of the CUSTA effect. There was a trend during the 1990s away from Canadian imports of soybeans in favor of soybean meal imports.

The export price coefficient was negative for six sub-industries and significantly different from zero at the five percent level in four cases—soybean meal, hides and skins, sugar and sweeteners, and other intermediate products. These four elasticities ranged from -0.11 to -0.45, certainly within a reasonable range. None of the positive elasticities were significantly different from zero.

Table 6. Elasticities for the Intermediate Products (Model 2)

<i>Industry</i>	<i>CUSTA</i>	<i>FDI Sales</i>
Soybean Meal	-0.18**	0.34
Other Vegetable Oils	0.06	1.19
Feed and Fodder	0.31**	0.81*
Live Animals	0.11	1.75***
Hides and Skins	0.26	-3.23***
Planting Seeds	0.21	0.76
Sugars and Sweeteners	0.55***	0.11
Other Intermediate Products	0.10	1.15***

Notes: * indicates that elasticities are significant at the 10% level
 ** indicates that elasticities are significant at the 5% level
 *** indicates that elasticities are significant at the 1% level

Table 7. Elasticities for the Bulk Products (Model 1)

<i>Industry</i>	<i>GDP</i>	<i>Export Price</i>	<i>CUSTA</i>
Coarse Grains	1.12***	-0.41***	0.28***
Rice	0.06	-0.20	0.29***
Soybeans	-7.62***	-0.86*	0.50
Cotton	0.72**	0.06	0.01
Peanuts	-0.23	-0.24*	0.20**
Other Bulk Products	0.54	-0.10	0.24***

Notes: * indicates that elasticities are significant at the 10% level
 ** indicates that elasticities are significant at the 5% level
 *** indicates that elasticities are significant at the 1% level

The effects on elasticities when the U.S. affiliate sales variable is added (table 6) are similar to the effects with consumer-oriented products—one previously significant CUSTA elasticity turns negative, while another becomes insignificant. Three elasticities on U.S. affiliate sales are significantly different from zero, with hides and skins negative and live animals and other intermediate products positive. The three significant elasticities for affiliate sales are also rather large (all greater than one in absolute value). Again, it seems that *model 2* suffers from the short time series, diminishing the explanatory power of the model and resulting in some curious results.

When the analysis moves to a sub-industry basis, though, the results are a bit more clear. *Model 1* does a reasonable job of explaining U.S. exports of some products. United States soybean meal exports have been influenced by Canadian incomes and prices, while hides and skins, sugar and sweeteners, and other intermediate products have been influenced by all factors incorporated into *model 1*. United States exports of other vegetable oils, live animals, and planting seeds have mostly been impacted by the CUSTA liberalization.

On an *a priori* basis, one would have thought that U.S. affiliate activity would have had a larger impact on U.S. intermediate product exports than consumer-oriented products, but there was little evidence to support this idea. Most intermediate

Table 8. Elasticities for the Bulk Products (Model 2).

Industry	CUSTA	FDI Sales
Coarse Grains	0.24*	0.37
Rice	0.23	0.65
Soybeans	1.33*	-2.46
Cotton	0.01	1.65***
Peanuts	0.15	0.44
Other Bulk Products	-0.09	1.48

Notes: * indicates that elasticities are significant at the 10% level
 ** indicates that elasticities are significant at the 5% level
 *** indicates that elasticities are significant at the 1% level

product exports were not related to U.S. affiliate activity. When this outcome is coupled with the results for consumer-oriented products, there is support for the view that any synergistic effects from U.S. food multinationals in Canada is from selling product lines produced in the U.S. through their Canadian offices.

ANALYSIS OF U.S. EXPORTS OF BULK PRODUCTS TO CANADA

There were six sub-industries for U.S. bulk product exports to Canada. Empirical results are reported in Tables 7 and 8, with coefficients transformed into elasticities. Results for *model 1* (the regression without affiliate sales; Table 7) indicate that the CUSTA policy elasticities (DUMMY) had a positive sign in every case and four (coarse grains, rice, peanuts and other bulk products) were significantly different from zero at the five percent level.

All of the significant elasticities indicated that CUSTA increased exports by 20% to 30%. The results indicate that CUSTA increased exports (in nominal terms for 1993) from \$600 thousand for cotton to \$29.2 million for soybeans. The effect of CUSTA on bulk exports was less than for intermediate product exports, which, in turn, was less than consumer-oriented product exports. Summing over all bulk products, U.S. exports increased by \$92.1 million due to CUSTA.

The income coefficient (GDP) was positive in four sub-industries and was significantly different from zero at the one percent level in two of those sub-industries (coarse grains and cotton). The income elasticity was negative (very large in absolute value) and significantly different from zero for soybeans. It appears that the income elasticity for soybeans is picking up some of the substitution between corn and soybeans that has occurred due to lower relative corn prices in Canada. As stated earlier, soybean meal imports may be substituting for soybean imports too.

The export price coefficient was negative in every sub-industries except cotton, but was significantly different from zero at the five percent level in only one case—coarse grains. The magnitudes for elasticities were generally within the range expected, but the coefficients were simply not significantly different from zero. Bulk agricultural imports by Canada do not appear to be price responsive.

When the U.S. affiliate sales variable was added (table 8), the CUSTA coefficients which were significantly different under *model 1* were no longer significant, while one CUSTA coefficient (for soybeans) became significantly positive. These striking changes in the results indicate that the conceptual model does not fit the data on bulk products well. The only product with reasonable results is coarse grains, and that is only true with *model 1*.

The model does a good job of explaining U.S. coarse grain exports to Canada (being influenced by income, price and CUSTA), but results for other bulk sub-industries are suspect. Only peanuts has two coefficients that are of the expected sign and significantly different from zero. Rice and other bulk product exports are influenced only by CUSTA, while soybeans and cotton exports are not significantly affected by CUSTA.

SUMMARY AND CONCLUSIONS

This research should be helpful to those attempting to predict the effects of free trade agreements on trade patterns. There are considerable increases in trade between countries under a free trade pact, even when the trade pattern between countries is quite mature. There was a definite change in trade patterns for both the U.S. and Canada after the implementation of CUSTA. Total agricultural exports dramatically increased for each country—U.S. exports to Canada more than tripled, while Canadian exports to the U.S. went up 150% between 1989 and 1997. The rate of these effects varied by country, where U.S. industries adjusted immediately to the benefits of trade liberalization, while Canadian industries took two years before witnessing a dramatic increase in export volume.

The proportion of U.S. agricultural exports in the form of consumer-oriented products increased significantly, from 61% in 1989 to 72% in 1997, corresponding to a decline in the export share for both bulk and intermediate products. Whereas, Canada's export share for processed foods declined slightly from 52% to 50%, as its export share for both bulk and intermediate products slightly increased.

Econometric analysis found that CUSTA has had a large impact on many agricultural export categories. Total U.S. agricultural exports to Canada increased by \$2.86 billion due to CUSTA, which is slightly larger than the findings of Tweeten et al. Most of that increase (91%) in exports came from consumer-oriented products. All of the consumer-oriented products (except wine and beer), five of the intermediate products, and four of the bulk products had positive coefficients on the CUSTA dummy in *model 1*.

The models indicate that increases in U.S. exports of fresh red meats, fresh fruits, fresh vegetables, soybean meal, sugar and sweeteners, other intermediate products, and coarse grains can be explained by economic factors. However, increased U.S. exports for other products are not captured well by either model used in this study.

There is some evidence that U.S. affiliate sales in Canada have stimulated U.S. exports of consumer-oriented products and intermediate products, but there is little evidence that it has influenced U.S. bulk product exports. This is interesting, since one would normally believe that more processed product exports would face competition from U.S. affiliates operating in Canada. However, the existence of broad product lines by U.S. food processors and the fact that these U.S. multinationals own processing facilities in Canada allows the firms to sell products manufactured in the U.S. through their Canadian affiliates. If the U.S.-produced products do well, it is possible that those processors will choose to locate such manufacturing in Canada at a later date. This could be the key to the synergistic relationship between U.S. consumer-oriented exports and FDI.

NOTES

1. 1993 is the date of the latest Bureau of Economic Analysis survey for foreign direct investments in the United States.
2. This specification would add an equation which has FDI as a left-hand-side variable.

REFERENCES

- Bredahl, M.E., P. Abbott, and M. Reed. 1995. "Competitiveness of U.S. Agriculture and the Balance of Payments," *Council for Agricultural Science and Technology Report No. 125*, October.
- Dixit, P.M., and V. Roningen. 1989. "Quantitative Impacts of Creating an Agricultural Free Trade Area between the United States and Canada," *Canadian Journal of Agricultural Economics*, 37, 4, October: 1023-33.
- International Monetary Fund. *International Financial Statistics*. Various issues.
- Tweeten, L., J. Sharples, and L. Evers-Smith. 1997. "Impact of CFTA/NAFTA on U.S. and Canadian Agriculture. IATRC Working Paper 97-3.
- U.S. Department of Agriculture. 1997. Economic Research Service. NAFTA Situation and Outlook Series. WRS 97-2. September.
- U.S. Department of Agriculture. Foreign Agricultural Service, Trade and Marketing Analysis Branch, Washington, D.C., annual reports.
- U.S. Department of Commerce, Bureau of Economic Analysis. *Survey of Current Business*. Washington, D.C.: annual reports.
- U.S. Department of Commerce, Bureau of Economic Analysis. *U.S. Direct Investment Abroad: Operations of U.S. Parent Companies and Their Foreign Affiliates*. Washington D.C.: annual reports.
- U.S. Department of Commerce, Bureau of Economic Analysis. *Foreign Direct Investment in the U.S.: Operations of U.S. Affiliates of Foreign Companies*. Washington D.C.: annual reports.