U.S. Agricultural Trade with Latin American Countries and Effects of the Free Trade Area of the Americas on Specific Commodities

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Abstract

Trade with Latin American countries is an increasingly important issue, as negotiations progress for a Free Trade Area of the Americas (FTAA). The objectives of this study are to analyze U.S. agricultural trade with Latin American countries, determine factors influencing agricultural trade with these countries, and estimate possible effects of trade liberalization under the FTAA on U.S. agricultural trade. This study analyzes U.S. exports of wheat, corn, rice, soybeans, soybean meal, beef, pork, and poultry meat to 16 Latin American countries; U.S. imports of bananas, coffee, grapes, fruit and vegetable juice, sugar, pineapples, avocados, mangos, prepared or preserved meat, crustaceans, and fish fillets or meat from these countries are also analyzed.

An econometric model is developed and estimated to determine factors influencing U.S. agricultural trade with these countries. Results from the model show that there is a negative relationship between U.S. exports and foreign tariffs, price, exchange rates, and foreign production, while there is a positive relationship between U.S. exports and foreign real GDP. U.S. imports have a negative relationship with U.S. tariffs and price and a positive relationship with the exchange rate. U.S. tariffs on imports of agricultural products from Latin American countries, though, are small or nonexistent in many cases. This would suggest that trade liberalization could have a larger effect on U.S. exports than on imports. Trade creation and trade diversion effects of tariff removal under the FTAA are calculated. Trade creation effects, overall, are higher for U.S. exports to these countries than they are for U.S. imports. The trade diversion effects, especially for exports, are small because most agricultural imports in the hemisphere are from other countries within the hemisphere, indicating that the FTAA will not significantly affect trade of the agricultural commodities under analysis with third-party, non-member countries. The United States could significantly increase exports of meat products, corn, and rice, and imports of fruit juice and grapes, under the FTAA.

Keywords: Free Trade Area of the Americas, agricultural trade, trade creation, trade diversion

U.S. Agricultural Trade with Latin American Countries and Effects of the Free Trade Area of the Americas on Specific Commodities

Jeremy W. Mattson and Won W. Koo[*]

INTRODUCTION

Trade with Latin American countries is an increasingly important issue as negotiations progress toward a Free Trade Area of the Americas (FTAA). The free trade agreement the United States currently shares with Canada and Mexico could be extended to include the entire Western Hemisphere. Such an agreement could have significant effects on U.S. agriculture. Some agricultural industries may benefit as foreign markets are opened, while others may be harmed as cheaper imports displace domestic production. The types of agricultural products imported from Latin America are mostly horticultural products or tropical products, such as coffee, while U.S. exports to Latin America consist largely of grains and oilseeds, although the value of U.S. agricultural exports to these countries is small compared with exports to Canada and Mexico. The United States has an agricultural trade deficit with South and Central America. The FTAA could increase existing trade flows and change trade patterns. U.S. exports of grains, oilseeds, and meats could increase, while the United States could import more horticultural products as well as sugar and tropical products.

The objectives of this study are to 1) analyze U.S. agricultural trade with Latin American countries, 2) determine factors influencing agricultural trade with these countries, and 3) estimate possible effects of trade liberalization under the FTAA on U.S. agricultural trade. The next section will present information regarding U.S. agricultural trade with Latin American countries. An econometric model is developed and presented in the third section and is used to estimate factors influencing U.S. agricultural trade with these countries. The results of this model are discussed in the fourth section, and the fifth section of the paper analyzes trade creation and trade diversion effects of tariff removal under the FTAA. Conclusions are discussed in the final section of the paper.

PROGRESS OF FTAA NEGOTIATIONS

On November 1, 2002, trade ministers from each of the 34 democratic countries in the Western Hemisphere met in Ecuador to advance negotiations for the FTAA. Negotiations for the FTAA began when the heads of state of the 34 Western Hemisphere countries met during the 1994 Summit of Americas. Deadlines have been set to complete negotiations by January 2005 and to implement the agreement by December 2005. Since the initial Summit of the Americas in 1994, negotiations for the FTAA have continued at seven trade ministerial meetings, including the most recent in Ecuador, and at the second and third Summits of the Americas. The free trade agreement would eliminate tariffs and create common trade and investment rules among the Western Hemisphere countries. A draft text of the FTAA agreement was made available to the public on July 3, 2001, and a second draft was released at the November 1, 2002 meeting.

During the 1998 Santiago Summit of the Americas, nine negotiating groups were established: market access (which includes non-agricultural tariffs and non-tariff barriers, rules of

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origin, customs procedures, standards, and safeguards); agriculture (which includes agricultural tariffs and non-tariff barriers, agricultural subsidies and other trade-distorting practices, and sanitary and phytosanitary procedures); services; investment; government procurement; intellectual property; subsidies, antidumping, and countervailing duties; competition policy; and dispute settlement. These negotiating groups meet regularly throughout the year.

The trade bill signed by President George W. Bush on August 6, 2002, could significantly improve the possibility of an FTAA that includes the United States becoming a reality. This legislation gives the president trade promotion authority, also known as fast-track, which allows the president to negotiate trade agreements that Congress can either approve or reject, but not amend. Trade promotion authority makes it easier for the administration to negotiate trade agreements, and one of President Bush's goals is to create an FTAA which includes every country in the Western Hemisphere except Cuba by 2005. There is growing opposition to the agreement, however, in Brazil. Brazil has warned it will not join the agreement unless the United States makes concessions on agricultural subsidies. The United States may need to make large concessions on sugar, citrus, and steel in order to reach an agreement acceptable to Brazil.

U.S. - LATIN AMERICA AGRICULTURAL TRADE

Agricultural trade with Canada and Mexico has increased significantly under the North American Free Trade Agreement (NAFTA) and the Canada - United States Trade Agreement (CUSTA). Agricultural trade with other Western Hemisphere countries has also grown, but at a slower rate. Figures 1-3 show U.S. agricultural trade with South America, Central America, and the Caribbean in nominal U.S. dollar terms since 1989. As these figures show, the United States has an agricultural trade deficit with South America and Central America, but a trade surplus with the Caribbean.

U.S. agricultural exports to South America increased from $1.1 billion in 1989 to $2.6 billion in 1997, but then decreased to $1.7 billion in 2001. Agricultural imports from South America followed a similar pattern, increasing from $3.6 billion in 1989 to $5.4 billion in 1997, then decreasing to $4.4 billion in 2001. The agricultural trade deficit with South America during this time period ranged from $1.8 billion in 1995 to $3.4 billion in 1999.

U.S. agricultural exports to Central America increased from $460 million in 1989 to $1.2 billion in 2001, while imports increased from $1.2 billion to $1.9 billion during the same period. The agricultural trade deficit with Central America during this period ranged from $680 million in 2001 to $1.2 billion in 1997.

Figure 1. U.S. Agricultural Trade with South America
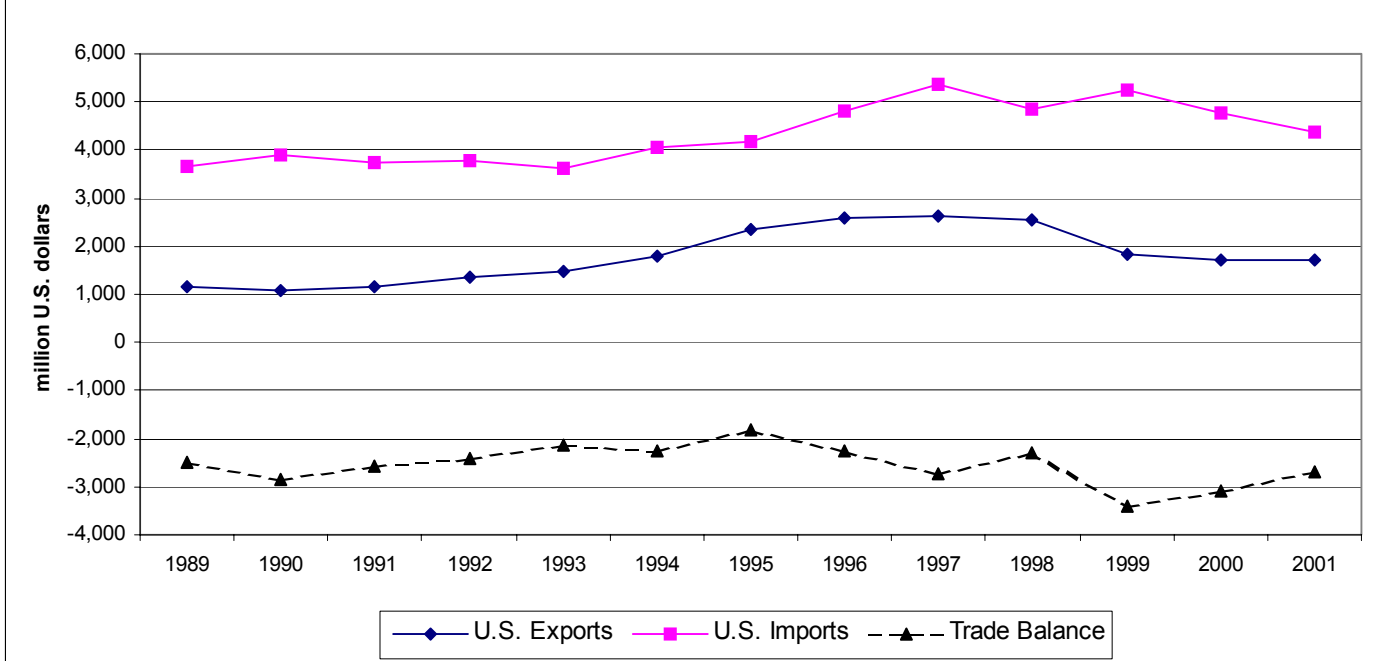
Source: Foreign Agricultural Trade of the United States, ERS/USDA

Figure 2. U.S. Agricultural Trade with Central America
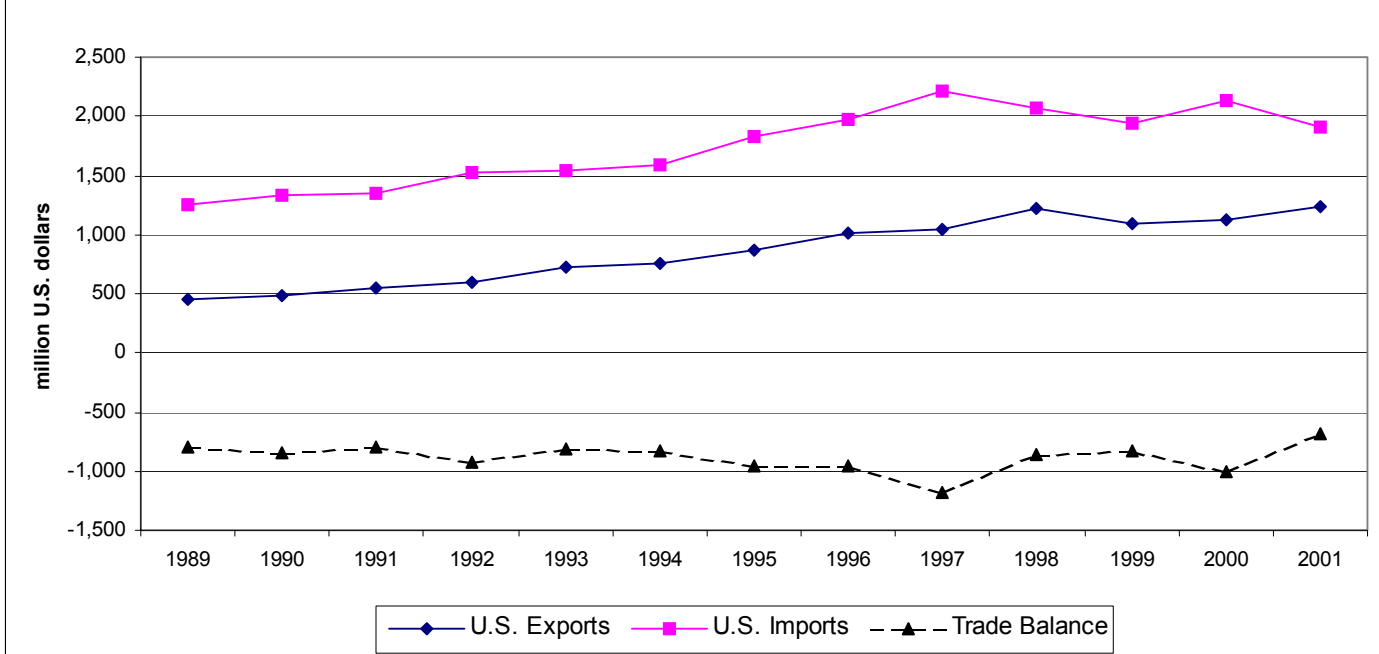
Source: Foreign Agricultural Trade of the United States, ERS/USDA

Figure 3. U.S. Agricultural Trade with the Caribbean
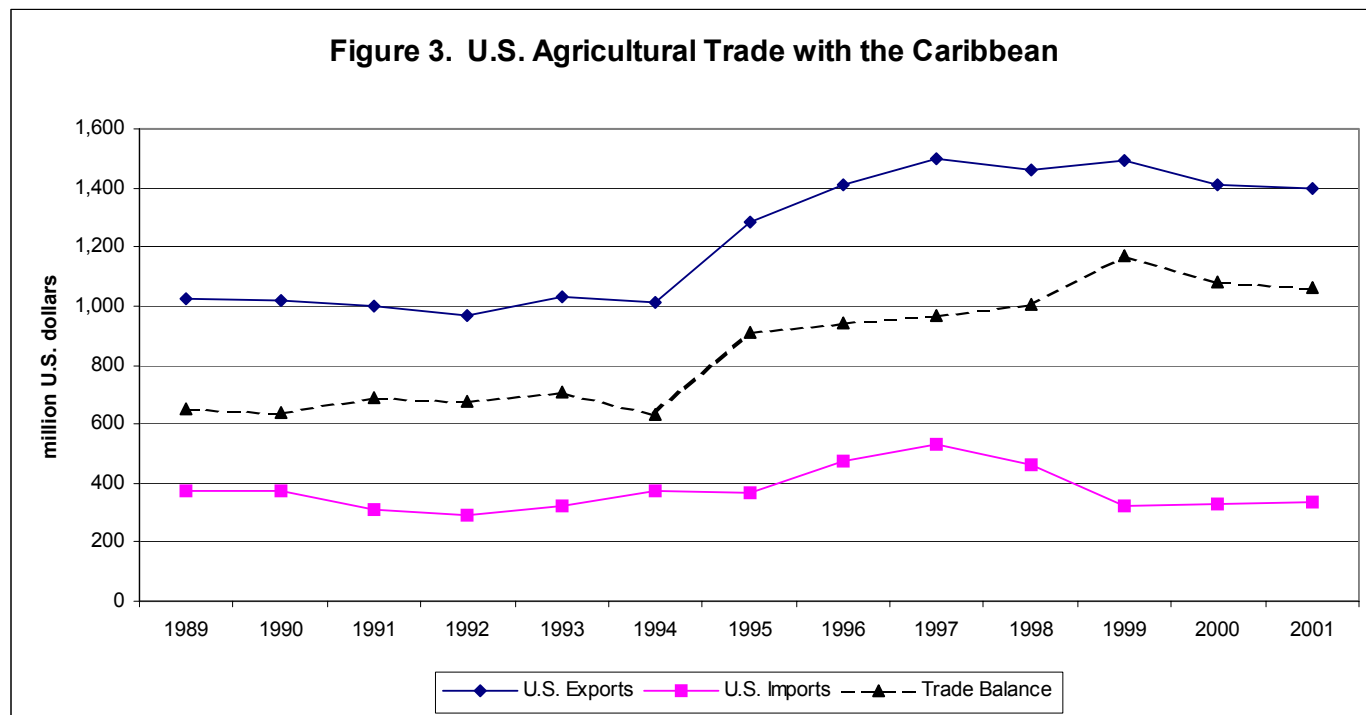
Source: Foreign Agricultural Trade of the United States, ERS/USDA

U.S. agricultural trade with the Caribbean has exhibited the slowest growth. Exports increased from $1.0 billion in 1989 to $1.5 billion in 1999, but then decreased to $1.4 billion in 2001. Imports increased from $370 million in 1989 to $530 million in 1997, but then decreased to $340 million in 2001. The trade surplus with the Caribbean ranged from $630 million in 1994 to $1.2 billion in 1999.

These figures show that there was some growth in agricultural trade with Latin America during the early- and mid-1990s, but, since about 1997, trade has not increased and has actually declined for some countries. The decline in trade since 1997 may be related to declining Latin American economies. The GDPs in a number of South American countries have fallen since 1997.

Latin American countries are more important as sources of agricultural imports than they are as destinations for agricultural exports from the United States. Only 9 percent of U.S. agricultural exports during the 1997-2001 period were sent to Latin American countries other than Mexico (Figure 4). Four percent of exports went to South America, 3 percent to the Caribbean, and 2 percent to Central America. By contrast, 19 percent of U.S. agricultural imports during this period were from Latin American countries other than Mexico (Figure 5). South America was the source for 13 percent of U.S. imports, while 5 percent of imports were from Central America, and 1 percent were from the Caribbean.

Figure 4. U.S. Agricultural Exports by Destination, 1997-2001

Oceania 1%
Africa 4%
Other 1%
Canada 14%
Mexico 12%
Central America 2%
Caribbean 3%
South America 4%
Europe 17%
Asia 42%
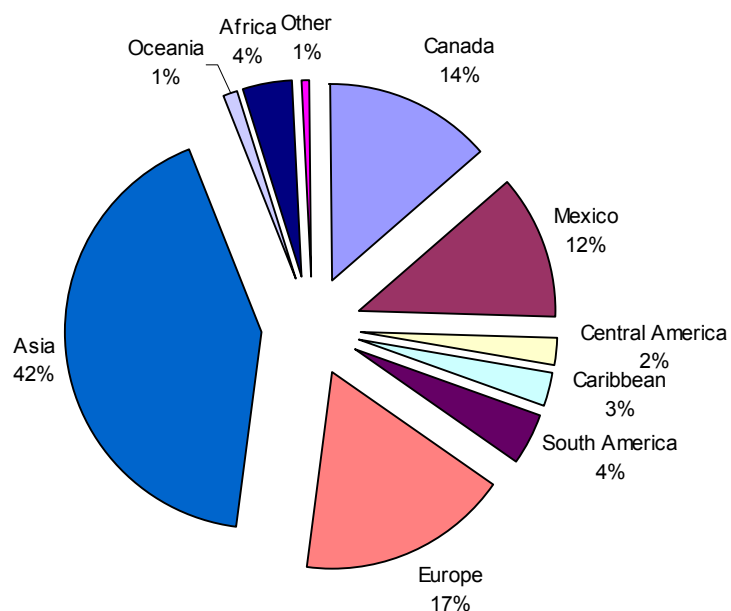
Source: Foreign Agricultural Trade of the United States, ERS/USDA

Figure 5. U.S. Agricultural Imports by Source, 1997-2001

Oceania 6%
Africa 2%
Other 0%
Canada 23%
Mexico 13%
Central America 5%
Caribbean 1%
South America 13%
Europe 22%
Asia 15%

Source: Foreign Agricultural Trade of the United States, ERS/USDA

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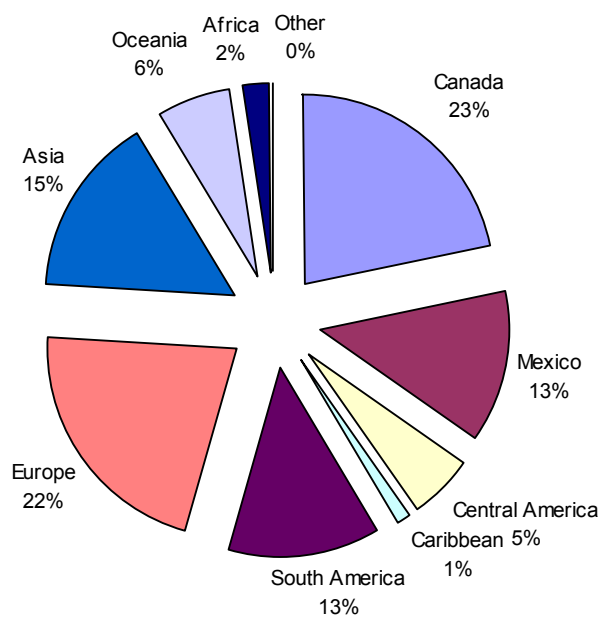
Table 1 shows the most important Latin American agricultural trading partners, excluding Mexico, for the United States. The leading destinations for U.S. exports are the Dominican Republic, Colombia, Venezuela, Guatemala, El Salvador, Brazil, and Peru. Corn is the top product exported to most of these countries, followed by wheat, and some of these countries import soybean meal or soybeans. The leading exporters to the United States are Chile, Brazil, Colombia, Costa Rica, Argentina, Guatemala, and Ecuador. Over half of the agricultural imports from Chile consist of fresh fruit, and a large percentage of these imports from Chile consist of grapes. Fresh fruit is also the leading agricultural product imported from Costa Rica, Guatemala, and Ecuador. Chile also exported a significant quantity of wine and wine products to the United States. Coffee is the leading agricultural product exported by Brazil and Colombia to the United States. Brazil also exports sugar, nuts, and some beef to the United States, while Colombia exports a significant quantity of cut flowers. Argentina's top products exported to the United States include fruit and vegetable juices and beef. Table 1 also shows the percentage of non-competitive imports from each country. Non-competitive agricultural products are those not produced domestically in the United States, such as bananas and coffee. Only 1 percent of agricultural imports from Chile are products not produced in the United States, whereas non-competitive products comprise over half of the imports from Colombia and Costa Rica.

Data segregated by the Harmonized System (HS) 4-digit codes show the type of products traded with Latin American countries. Tables 2 and 3 show the top agricultural products classified by HS 4-digit codes that are traded with Latin American countries not including Mexico. The USDA defines agricultural products as those contained in chapters 1-24, 33, 40, and 51-52 of the HS classification. That is, any commodity with an HS code beginning with those digits is considered an agricultural good. The USDA, however, excludes fishery products in chapters 3 and 16. Discussion in the previous paragraph and the data presented in Table 1 and Figures 1-5 exclude fishery products, but Tables 2 and 3 include these products. The top agricultural products exported in 2001 to Latin American countries (excluding Mexico) in dollar terms were corn, wheat, woven cotton fabric, food preparations, and soybean meal. The leading agricultural or fishery imports from these countries were bananas, crustaceans (shrimp and lobsters), coffee, fish fillets or meat, and dried cut flowers.

Since 1989, Venezuela, Colombia, Peru, Ecuador, the Dominican Republic, and El Salvador have been the leading Latin American export destinations, other than Mexico, for U.S. wheat. Figure 6 shows U.S. exports to South and Central America and the Caribbean from 1989-2001.

Colombia, Venezuela, and the Dominican Republic have been the most important export markets for corn in this region. Corn exports to these countries, as well as to the Central American countries of Costa Rica, Guatemala, and El Salvador, have grown rather significantly since 1989 (Figure 7).

Table 1. U.S. Agricultural Trade with Latin American Countries (excluding Mexico)

U.S. Exports (thousand U.S. dollars)			*U.S. Imports (thousand U.S. dollars)*			
Country of Destination	2001	Average 1996-2000	Country of Origin	2001	Percent non-competitive	Average 1996-2000
Dominican Republic	497,933	496,947	Chile	1,022,782	1%	843,283
Colombia	452,152	517,875	Brazil	999,076	30%	1,333,471
Venezuela	409,081	475,752	Colombia	925,948	55%	1,233,942
Guatemala	293,994	254,815	Costa Rica	804,490	54%	768,670
El Salvador	241,061	215,374	Argentina	609,677	11%	681,172
Brazil	221,065	413,381	Guatemala	609,093	69%	707,838
Peru	212,494	264,853	Ecuador	484,521	65%	524,661
Costa Rica	199,010	194,758	Dominican Republic	254,221	18%	334,543
Honduras	198,075	166,336	Honduras	237,474	63%	252,053
Jamaica	180,566	189,870	Peru	206,232	29%	214,945
Haiti	179,002	199,422	Nicaragua	92,445	48%	89,539
Panama	176,765	179,126	El Salvador	87,319	42%	130,653
Bahamas, The	126,908	120,166	Uruguay	58,525	1%	60,398
Argentina	116,034	201,295	Jamaica	52,384	14%	49,536
Trinidad and Tobago	114,032	110,673	Belize	39,108	0%	28,730
Ecuador	109,263	144,799	Panama	39,030	38%	87,505
Nicaragua	102,754	70,394	Venezuela	33,967	26%	81,635
Chile	98,343	131,126	Bolivia	16,380	9%	16,289
Netherlands Antilles	88,089	106,323	Paraguay	15,188	15%	13,675
Leeward-Winward Isl.	64,970	73,094	Trinidad and Tobago	14,409	5%	17,224
Bermuda	51,950	64,835	Haiti	6,167	37%	9,949
Barbados	49,234	45,755	Guyana	5,632	0%	11,264
Cayman Islands	31,687	34,238	Bahamas, The	3,803	2%	2,667
Uruguay	22,941	14,508	Leeward-Winward Isl.	2,594	70%	4,578
Guyana	22,122	24,302	Netherlands Antilles	1,106	64%	2,315
Belize	21,206	16,982	Cayman Islands	941	0%	241
Suriname	18,748	21,244	Barbados	731	1%	634
Bolivia	15,384	26,629	French West Indies	689	0%	7
French West Indies	5,644	7,380	Bermuda	48	0%	403
Turks and Caicos Isl.	4,779	5,900	Suriname	19	0%	170
Paraguay	4,723	18,542				
Cuba	4,574	51				
French Guiana	442	964				
Latin America Total (excluding Mexico)	4,335,060	4,807,708	Latin America Total (excluding Mexico)	6,623,998	37%	7,502,019
Western Hemisphere Total	19,860,415	17,487,050	Western Hemisphere Total	21,751,992	16%	19,740,157
World Total	53,658,259	53,793,533	World Total	39,365,978	17%	36,640,018

Source: Foreign Agricultural Trade of the United States, USDA/ERS

Table 2. U.S. Agricultural Exports to Latin America (excluding Mexico) by HS 4-digit
Classification (thousand dollars)

HS Class	Commodity Description	2001	Average 1997-2000
1005	Corn	622,600	637,474
1001	Wheat	490,372	475,105
5208	Woven Cotton Fabric	320,116	105,811
2106	Food Preparations, NESOI	283,560	283,226
2304	Soybean Meal	256,307	344,369
2309	Animal Feed Preparations	186,997	146,084
1006	Rice	163,914	283,244
5201	Cotton, not carded	145,170	216,663
0207	Poultry Meat	134,013	146,705
1201	Soybeans	108,766	205,468
5205	Cotton yarn	96,650	39,118
2401	Tobacco, unmanufactured	92,167	134,724
1507	Soybean Oil	63,716	104,097
5209	Woven Cotton, NES	60,041	44,883
1806	Chocolate	59,707	38,033
5211	Woven Fabric, <85%	57,095	17,561
4104	Bovine Leather	55,913	64,389
1209	Seed, Fruit, Spores	52,460	65,104
2303	Starch, Sugar, Brew	51,735	21,994
1502	Fats, Bovine, Sheep	51,250	89,737
2009	Fruit & Vegetable Juices	50,658	54,726
1901	Malt Extract, Flour	49,957	41,458
1905	Baked Bread, Pastry	48,083	57,513
2103	Sauce, Mustard, Etc.	44,176	36,521
0713	Vegetables, Dried	42,838	48,715

Source: U.S. Trade Internet System, FAS/USDA

Table 3. U.S. Agricultural and Fishery Imports from Latin America (excluding Mexico) by HS 4-digit
Classification (thousand dollars)

HS Class	Commodity Description	2001	Average 1997-2000
0803	Bananas	1,128,375	1,114,920
0306	Crustaceans	958,674	1,108,657
0901	Coffee, Coffee Husks	935,741	1,885,083
0304	Fish Fillets, Meat	559,050	383,178
0603	Cut Flowers, Dried	428,169	473,693
0806	Grapes	394,110	318,062
4104	Bovine Leather	351,254	388,169
2009	Fruit & Vegetable Juices	334,382	393,123
1701	Solid Cane or Beet Sugar	328,593	464,333
2402	Cigars, Cigarettes	276,548	306,558
0804	Pineapples, avocados, mangos	258,219	182,400
2401	Tobacco, Unmanufactured	243,661	271,824
0302	Fish, Whole Fr/Ch	205,544	247,939
2204	Grape Wines	174,436	149,569
1602	Prepared Meat	171,002	187,776
0807	Melons, Watermelons	159,994	126,360
1005	Corn	105,889	94,618
0801	Coconuts, Brazil Nuts	104,397	136,100
0808	Apples, Pears	93,243	68,376
1604	Fish, Prepared	92,039	86,386
0809	Stone Fruit, Fresh	91,525	63,691
0303	Fish, Frozen, Whole	82,538	75,878
0511	Animal Products, NES	80,906	64,005
0714	Manioc, Arrowroot	76,936	68,552
2008	Fruit, Nut, Preparations	71,752	66,340

Source: U.S. Trade Internet System, FAS/USDA

Figure 6. U.S. Wheat Exports

Source: U.S. Trade Internet System, FAS/USDA

Figure 7. U.S. Corn Exports
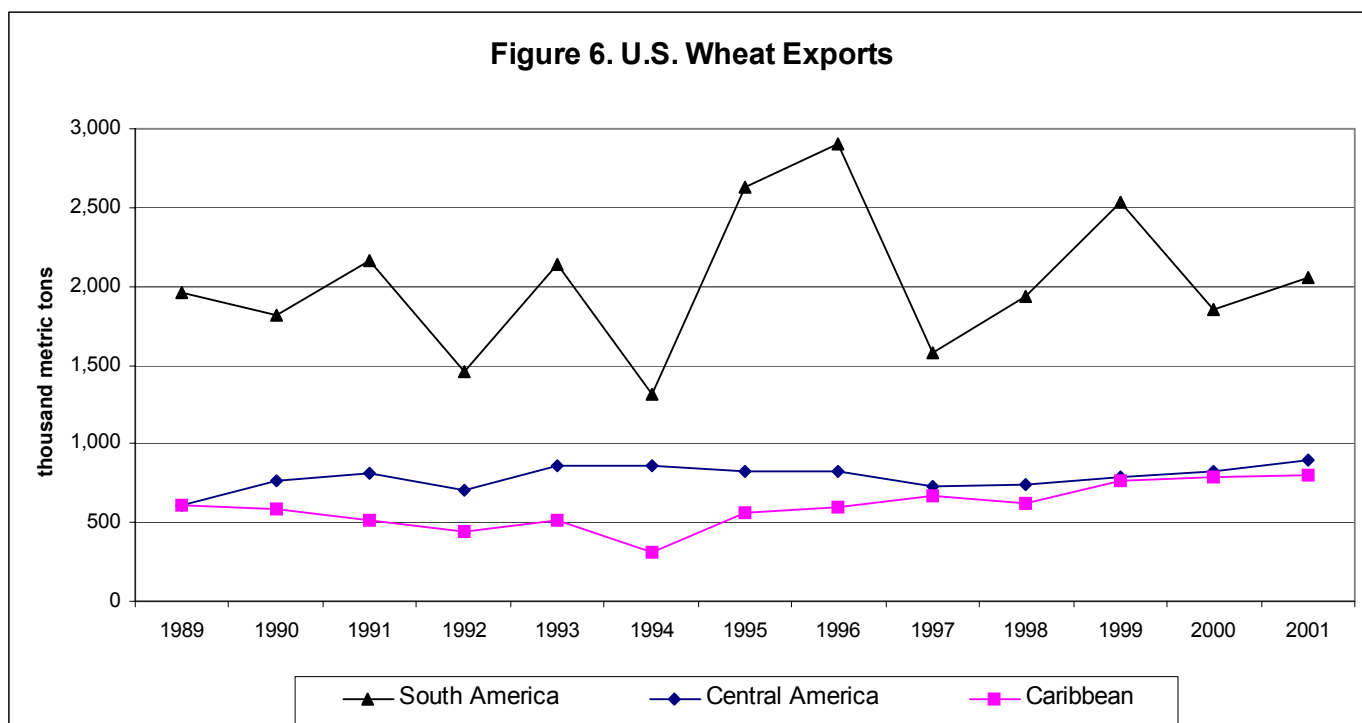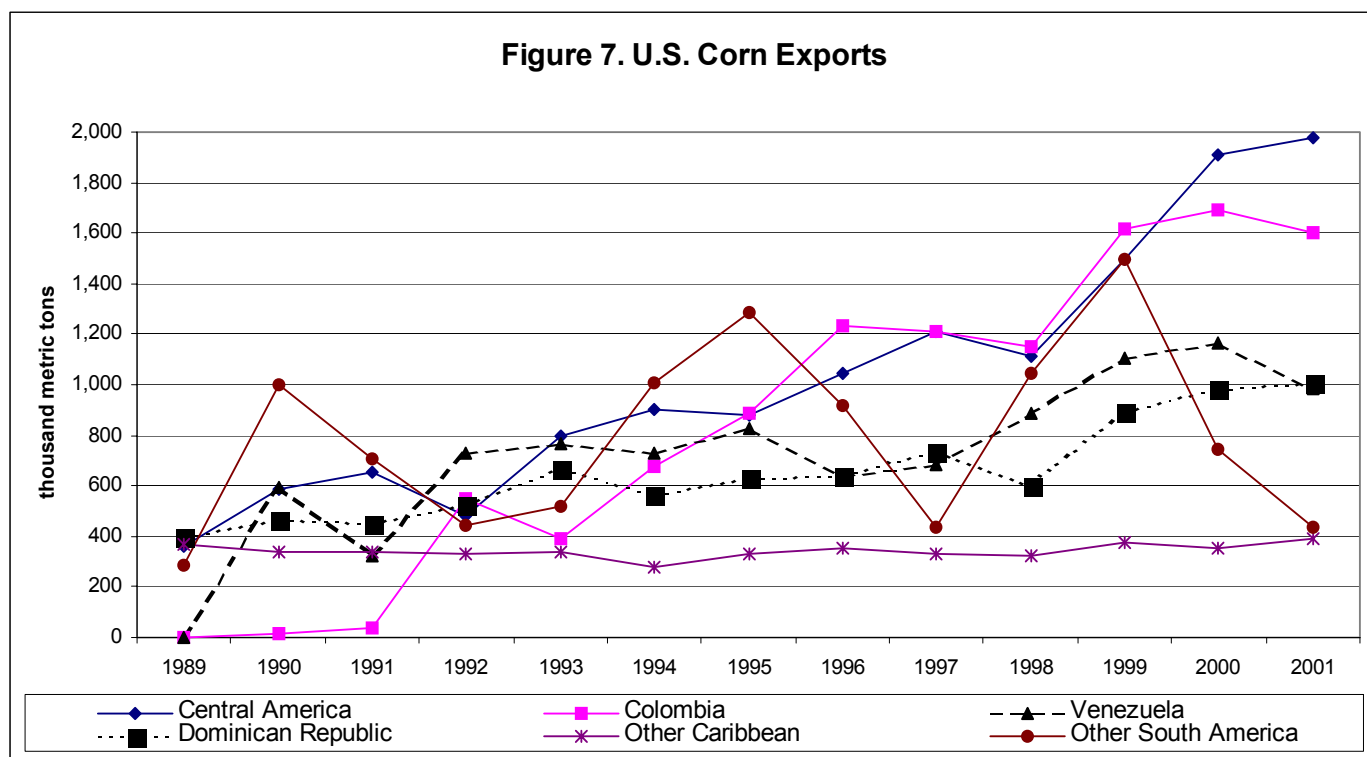
Source: U.S. Trade Internet System, FAS/USDA

Haiti has been the most significant market for rice in the region. In some years, Brazil has been the largest export market in the region, but it is an inconsistent market, and exports to the country have been minimal since 1999. U.S. rice exports to Nicaragua, Honduras, and El Salvador have grown rather significantly in recent years. Figure 8 plots U.S. rice exports to South America, Central America, and the Caribbean during the 1989-2001 period. Rice exports to South America in 1998 were substantially greater than in other years. About half of these exports were shipped to Brazil; Colombia, Ecuador, and Peru were also major importers of U.S. rice in 1998. The substantially greater level of U.S. exports to these countries in 1998 may be related to a decline in rice production in 1997/98 in Brazil and a few other countries. Rice output in several of the major importing countries in 1997 and early 1998 was severely diminished due to adverse weather related to El Nino (FAO 1998).

Soybean markets in the region have been inconsistent. Brazil was the largest market in the region for U.S. soybean exports in 1994 and 1997, but, in most years, exports to Brazil have been minimal. Venezuela has been one of the more important markets in the region, though exports to the country have decreased in recent years. U.S. soybean exports to Costa Rica and Colombia have increased rather significantly in recent years (Figure 9). Nearly all of the U.S. soybean exports to Central America have been sent to Costa Rica, and a majority of soybean exports to the Caribbean are imported by Trinidad and Tobago.

Venezuela had been the most important market in the region for soybean meal exports until 2000, when exports to the Dominican Republic surpassed those to Venezuela (Figure 10). Exports to the Central American countries of Guatemala and El Salvador have also grown in recent years.

Figure 8. U.S. Rice Exports
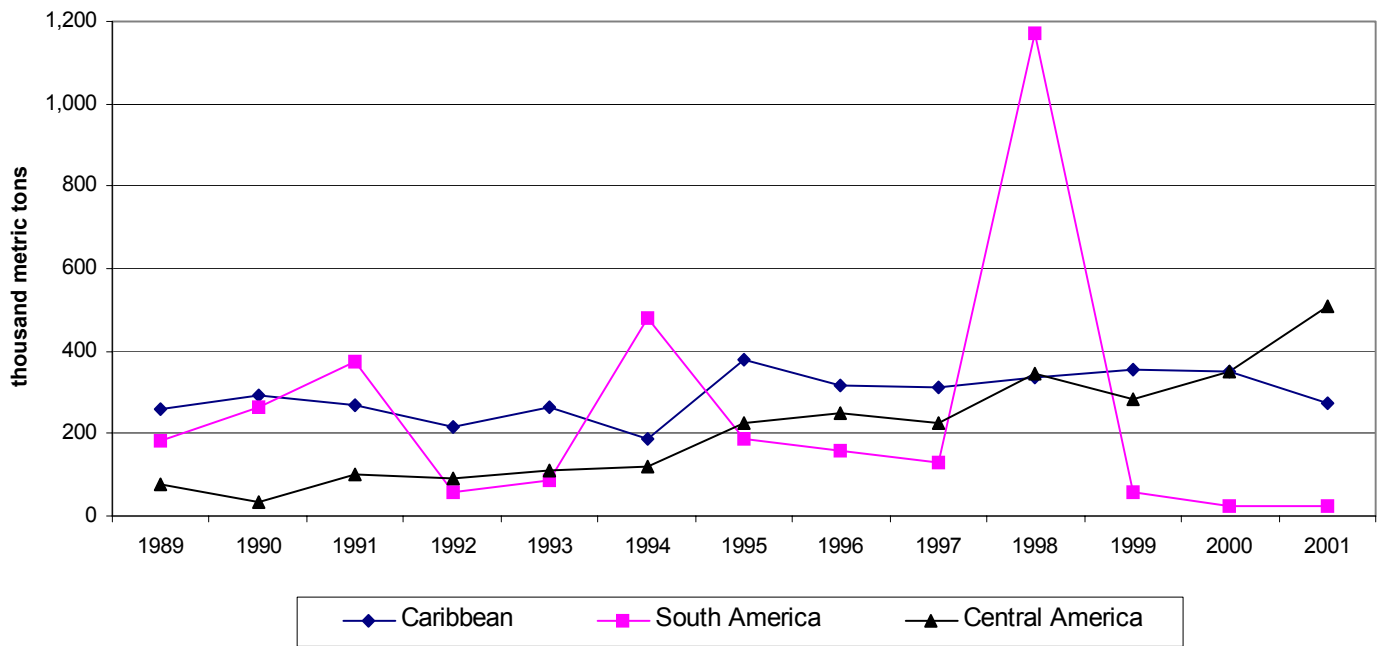
Source: U.S. Trade Internet System, FAS/USDA

Figure 9. U.S. Soybean Exports
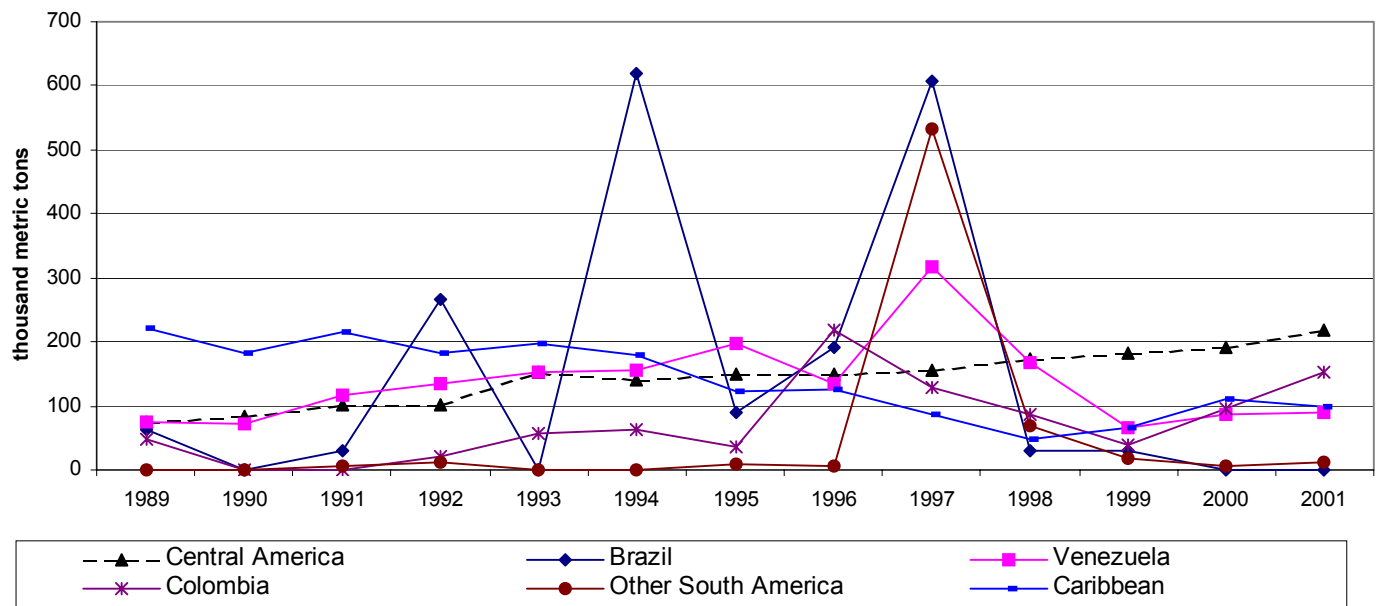
Source: U.S. Trade Internet System, FAS/USDA

Figure 10. U.S. Soybean Meal Exports
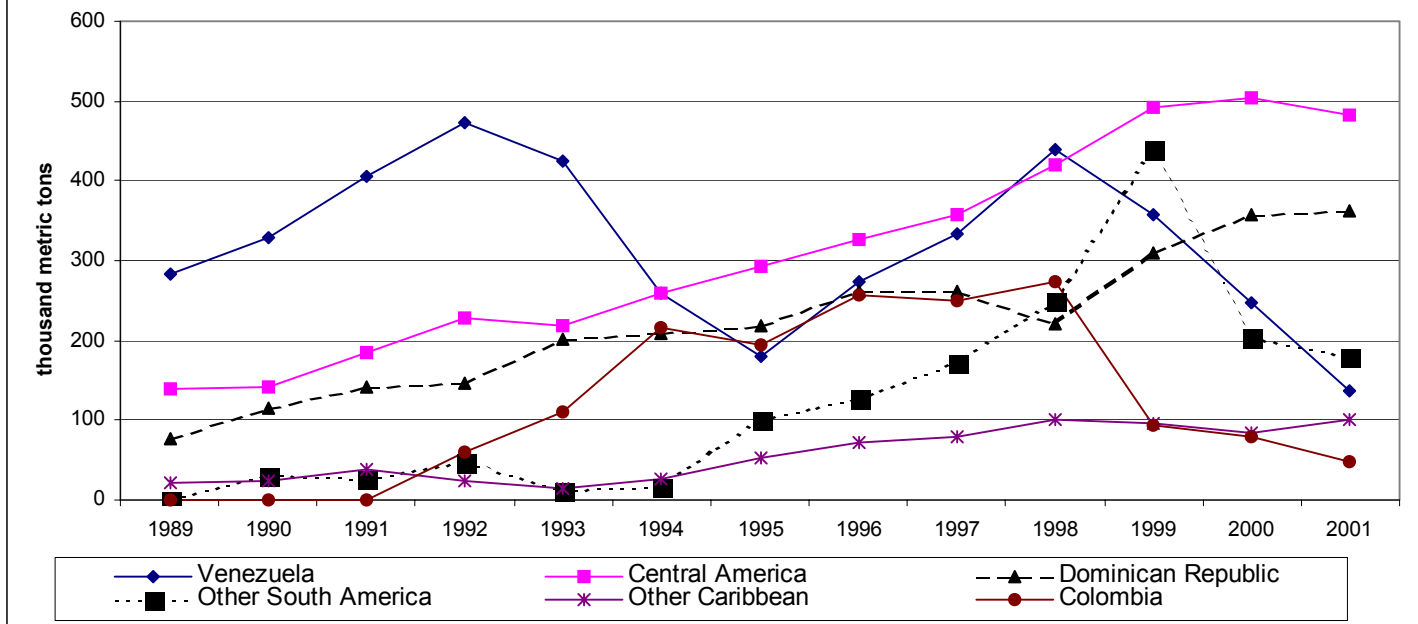
Source: U.S. Trade Internet System, FAS/USDA

Caribbean countries such as the Bahamas, the Cayman Islands, Bermuda, and the Netherlands Antilles have been the most important export markets for U.S. beef in the region (Figure 11). Caribbean countries such as Jamaica, the Leeward-Windward Islands, and Haiti have been important markets in the region for U.S. poultry meat exports (Figure 12). U.S. poultry meat exports to Guatemala have increased rapidly in recent years, making Guatemala the leading importer of U.S. poultry meat in the region. Small quantities of U.S. pork are exported to countries such as Colombia, Guatemala, Honduras, the Dominican Republic, the Bahamas, and Haiti. Figure 13 plots U.S. pork exports to South America, Central America, and the Caribbean since 1989.

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Figure 11. U.S. Beef Exports
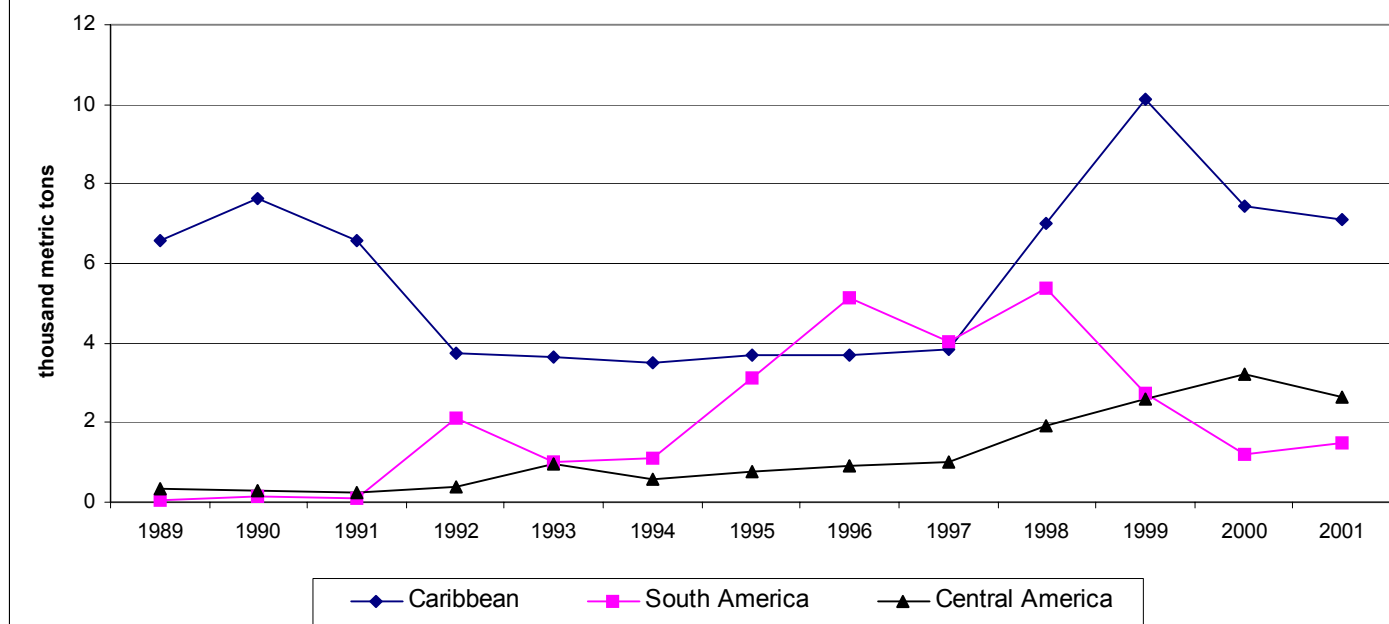
Source: U.S. Trade Internet System, FAS/USDA

Figure 12. U.S. Poultry Meat Exports
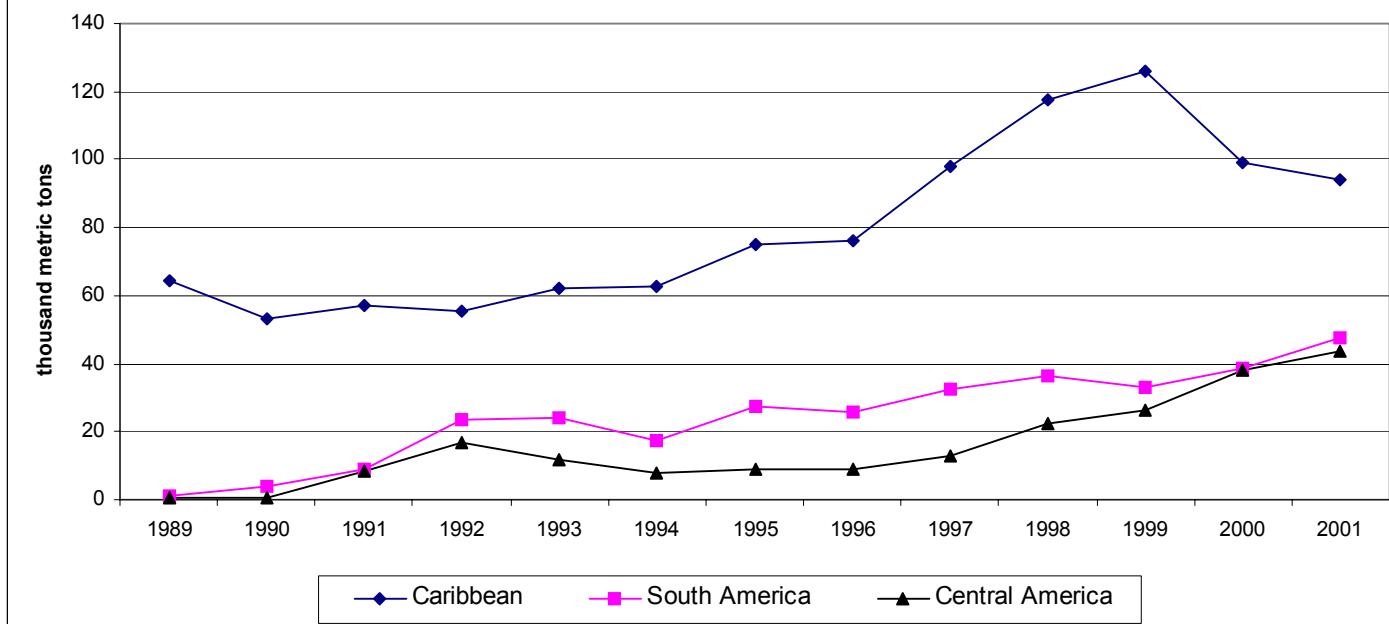
Source: U.S. Trade Internet System, FAS/USDA

Figure 13. U.S. Pork Exports
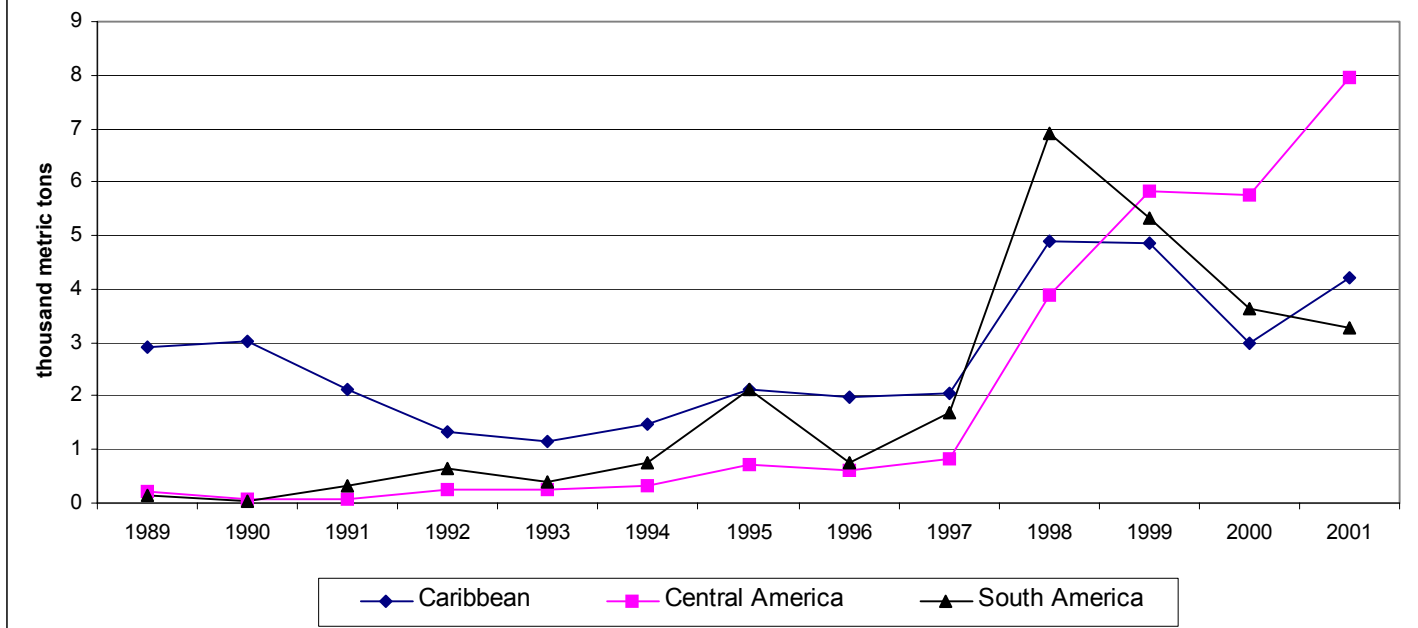
Source: U.S. Trade Internet System, FAS/USDA

DEVELOPMENT OF AN EMPIRICAL MODEL

This study analyzes U.S. exports of wheat, corn, rice, soybeans, soybean meal, beef, pork, and poultry meat to a number of Latin American countries. These commodities are selected because they are major commodities produced in and exported by the United States. The study also analyzes U.S. imports of bananas, coffee, grapes, fruit and vegetable juice, sugar, pineapples, avocados, mangos, prepared or preserved meat, crustaceans, and fish fillets or meat. These commodities are selected because they are the major agricultural or fishery products imported from Latin American countries.

Sixteen Latin American countries are chosen for the analysis: Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Nicaragua, Panama, Peru, Uruguay, and Venezuela. These countries represent the major agricultural trading partners for the United States in the region. Most of the South American and Central American countries are included, as well as the two most important trading partners in the Caribbean.

Export and Import Equations

An econometric model is specified and estimated utilizing panel data from these 16 countries over 13 years, 1989-2001, to determine the factors affecting U.S. exports and imports of the selected commodities.

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U.S. exports are estimated as a function of real GDP in the importing country, the real exchange rate between the U.S. dollar and the currency of the importing country, the real export price, tariffs in the importing country, domestic production in the importing country, and dummy variables for trading blocs as follows:

$$X_{it} = f(RGDP_{it}, RER_{it}, RP_{it}, TAR_{it}, PROD_{it}, D_{Cen}, D_{Car}, D_{Andean}, D_{Mercosur}) \qquad (1)$$

where X_{it} $\quad$ = U.S. exports to country i in time t
$\quad\quad$ $RGDP_{it}$ = Real GDP in country i in time t (in U.S. dollars)
$\quad\quad$ RER_{it} $\quad$ = Real exchange rate between the United States and country i in time t (measured as an index)
$\quad\quad$ RP_{it} $\quad$ = U.S. export price in country i in time t
$\quad\quad$ TAR_{it} $\quad$ = Tariffs in country i in time t
$\quad\quad$ $PROD_{it}$ = Domestic production in country i in time t
$\quad\quad$ D_{Cen} $\quad$ = Dummy variable for Central American countries
$\quad\quad$ D_{Car} $\quad$ = Dummy variable for Caribbean countries
$\quad\quad$ D_{Andean} = Dummy variable for Andean Pact countries
$\quad\quad$ $D_{Mercosur}$ = Dummy variable for Mercosur countries.

Real GDP in Latin American countries is expected to have a positive effect on U.S. exports. Appreciation of the U.S. dollar should have a negative effect on U.S. exports because an appreciating dollar makes U.S. goods more expensive in foreign markets. Since real exchange rate is measured as foreign currency per U.S. dollar, it is expected to have a negative effect. The real price of U.S. exports and tariffs imposed by the foreign countries are also expected to have negative effects on U.S. exports. Domestic production by the importing country should have a negative effect on U.S. exports to that country. For example, wheat exports to a country such as Argentina are expected to be small because Argentina produces a significant quantity of wheat.

Dummy variables are included for the region or trade bloc that each country belongs to. One dummy variable represents the Central American countries - Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, and Panama - who, except for Panama, also belong to the Central American Common Market (CACM) trade group; the second dummy variable is for the Caribbean countries of the Dominican Republic and Jamaica; the third dummy variable represents the countries in the Andean Group trade bloc - Colombia, Ecuador, Peru, and Venezuela (Bolivia is also a member of this group); and the fourth dummy variable is for the countries who are part of the Mercosur trade agreement - Argentina, Brazil, and Uruguay (Paraguay is also a member of this group). Chile does not belong to any of these groups, although it is an associate member of Mercosur, and is used as the reference to avoid perfect multicollinearity.

U.S. imports are specified as a function of the real exchange rate, U.S. tariffs, real import price, a trend variable, and the regional dummy variables as follows:

$$M_{jt} = f(RER_{jt}, RP_{jt}, USTAR_{jt}, ES_{jt}, Trend_t, D_{Cen}, D_{Car}, D_{Andean}, D_{Mercosur}) \qquad (2)$$

where M_{jt} = U.S. imports from country j in time t
RER_{jt} = Real exchange rate between the United States and country j in time t (measured as an index)
RP_{jt} = U.S. import price from country j in time t
$USTAR_{jt}$ = U.S. tariffs imposed on country j in time t
ES_{jt} = Excess supply, a proxy for resource endowment, in country j in time t (domestic production less domestic consumption)
$Trend_t$ = Trend variable.

The exchange rate is expected to have a positive effect on U.S. imports since an appreciating dollar makes foreign goods cheaper in the U.S. market. The import price and U.S. tariffs should have negative effects on imports. The excess supply variable is a proxy for resource endowment in the exporting country and is included in the sugar import model. This variable is measured as the domestic production in the Latin American exporting country less domestic consumption. It is expected to have a positive effect on U.S. imports. A similar variable was not included in the other import models due to a lack of data. The same regional dummy variables used in the export models are also used in the import models.

Estimation Procedure

The models utilize panel data for 16 countries with annual observations from 1989 to 2001, for a total of 208 observations. A pooling technique, the process of combining cross-section and time series data, is used in the analysis. The Parks method (Parks 1967), which assumes a first-order autoregressive error structure with contemporaneous correlation between cross sections, is used. Assuming a linear relationship between dependent and independent variables, the following are the specified export and import equations:

$$X_{it} = a_0 + a_1 RGDP_{it} + a_2 RER_{it} + a_3 RP_{it} + a_4 TAR_{it} + a_5 PROD_{it} + \quad\quad (3)$$
$$a_6 D_{Cen} + a_7 D_{Car} + a_8 D_{Andean} + a_9 D_{Mercosur} + e_{it}$$

$$M_{jt} = b_0 + b_1 RER_{jt} + b_2 RP_{jt} + b_3 USTAR_{jt} + b_4 ES_{jt} + b_5 Trend_t + \quad\quad (4)$$
$$b_6 D_{Cen} + b_7 D_{Car} + b_8 D_{Andean} + b_9 D_{Mercosur} + e_{it} \, .$$

The equations are estimated for each commodity.

Data

U.S. imports and exports to and from each country are obtained from the USDA on the U.S. Trade Internet System created by the Foreign Agricultural Service. The original source of these data is the Department of Commerce, U.S. Census Bureau, Foreign Trade Statistics. Annual import and export data from 1989 to 2001 are collected in both quantity and value terms. The dependent variable in the models is the quantity of imports or exports in metric tons, except for juice imports, which is measured in kiloliters. The trade data used in the models are data classified by the HS 4-digit classification. Table 4 shows the HS 4-digit classification for the commodities analyzed in this study.

Table 4. HS 4-Digit Classifications

Export Commodity	HS Code	Import Commodity	HS Code
Frozen Beef	0202	Fish Meat	0304
Pork	0203	Crustaceans	0306
Poultry Meat	0207	Bananas	0803
Wheat	1001	Pineapples, Avocados, Mangos	0804
Corn	1005	Grapes	0806
Rice	1006	Coffee	0901
Soybeans	1201	Prepared Meat	1602
Soybean Meal	2304	Sugar	1701
		Fruit & Vegetable Juice	2009

HS-class 0804 groups together dates, figs, pineapples, avocados, guavas, and mangos. U.S. imports in this category from Latin America consist mostly of pineapples, avocados, and mangos. Costa Rica is the major supplier of products in this category, while Chile, Brazil, Ecuador, and Peru are also significant exporters to the United States. Most of the U.S. imports from Costa Rica of HS-class 0804 products consist of pineapples, while Chile exports avocados, and Brazil, Ecuador, and Peru export mangos to the United States.

Prices used for this study are unit values for exports and imports, calculated by dividing the value of trade by the quantity of trade. The prices are converted into real prices using the Consumer Price Index (CPI). GDP data in U.S. dollars for each country are obtained from the International Monetary Fund's *World Economic Outlook Database* (April 2002). Data denoted in U.S. dollars are necessary to maintain a common unit of measurement in the panel data. The GDP data are converted to real terms using the CPI.

Real exchange rates between the U.S. dollar and each foreign currency are obtained from the Economic Research Service (ERS), USDA. These data are measured as the foreign currency per U.S. dollar. The exchange rates are converted to an index, which is necessary because in the panel data, the exchange rate variable includes rates for 16 different countries with different units of measure, and this variable needs a consistent unit of measure to be meaningful. The exchange rates are indexed by dividing the exchange rate for each country in each year by the average exchange rate for that country over the 1989-2001 period. This measure shows how the exchange rate with each country has changed over time, with a value of 1 equaling the average for each country.

The production data used in the export models are obtained from the Foreign Agricultural Service's Production, Supply and Distribution (PS&D) online database. The domestic production and consumption data used in the sugar import model are also obtained from the PS&D database.

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Production data are not included in the pork and poultry export models due to lack of available data.

The tariff data are obtained from the Hemispheric Trade and Tariff Database. This database has been developed by the Inter-American Development Bank (IDB), as a member of the Tri-partite Committee, at the request of the governments of the countries participating in the FTAA. The data are compiled from the official submissions of the countries involved in the FTAA negotiations.[1] Tariffs for most countries are available by HS code from 1997 to 2001. The database also notes any tariff preferences that may be given to certain countries. Since data are not available prior to 1997, and since five years of data do not provide enough time series observations, it is assumed that tariffs prior to 1997 equal the 1997 tariff rates. This assumption is not unreasonable since tariff rates vary more between countries than they do over time. Foreign tariffs for all export commodities are measured as a percentage. Tariffs on U.S. imports of pineapples, avocados, and mangos are measured as cents per kilogram; tariffs on grape imports are measured as dollars per cubic meter; tariffs on juice imports are measured as cents per liter; and the remaining tariffs are measured in percentage terms. Some import commodities, such as bananas and coffee, do not face tariffs. The Hemispheric Trade and Tariff Database is also used to obtain Latin American imports from other countries in order to calculate trade diversion effects for U.S. exports.

RESULTS OF EXPORT AND IMPORT MODELS

Table 5 shows the results from the export models with calculated elasticities. As expected, the exchange rate, tariffs, prices, and foreign production have negative effects on U.S. exports, while foreign GDP has a positive effect. The exchange rate has the greatest effect on rice and soybean exports and the smallest effect on wheat exports. Tariffs and prices have the largest effects on beef and pork exports and the smallest effects on wheat and soybean meal exports. According to the calculated elasticities, a 10 percent reduction in foreign tariffs would result in increases in exports of 9.6 percent for beef, 7.8 percent for pork, 5.6 percent for poultry meat, 4.2 percent for corn, 2.5 percent for rice, 1.5 percent for soybeans, 0.5 percent for soybean meal, and 0.4 percent for wheat. A 10 percent increase in the real exchange rate results in decreases in exports of 19.3 percent for rice, 12.5 percent for soybeans, 6.8 percent for beef, 4.7 percent for pork, 2.9 percent for corn, 2.0 percent for soybean meal, 1.9 percent for poultry meat, and 1.2 percent for wheat. A 10 percent increase in foreign real GDP results in increases of exports of 10.9 percent for beef, 9.7 percent for soybeans, 2.3 percent for rice, 1.8 percent for wheat, 0.8 percent for corn, 0.7 percent for pork, and 0.4 percent for soybean meal. The real GDP elasticity for poultry meat is negative, though it is very close to zero, indicating that poultry meat is a slightly inferior good.

The regional dummy variables are highly significant, indicating that there are significant regional differences in export behavior after accounting for the other variables. An additional

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[1]This database is accessible from the official website of the of the FTAA process: http://www.ftaa-alca.org/alca_e.asp.

dummy variable for Jamaica was included in the poultry meat model because of a relatively high volume of exports to Jamaica.

Table 6 shows the results from the import models. As expected, the real exchange rate has a positive effect on imports, while tariffs and price have negative effects. Since the United States does not impose tariffs on imports of bananas, coffee, fish meat, and crustaceans, tariffs are not included in those import models. Tariffs are also not included in the sugar import model because these imports are influenced more by quotas than by tariffs. According to the estimated elasticities, a 10 percent decrease in U.S. tariffs would result in increases in imports of 8.3 percent for fruit and vegetable juice; 2.1 percent for grapes; 1.2 percent for pineapples, avocados, and mangos; and 0.1 percent for prepared meats. The estimated elasticities for exchange rates, prices, and tariffs are, on average, higher for U.S. exports than they are for imports, which indicates that exports are somewhat more price-sensitive than imports.

Table 5. Results from U.S. Export Models

Wheat Exports	Estimate	p-value	elasticity
Intercept	107011	0.0001	
RGDP	408	0.0001	0.178
RER	-22490	0.0001	-0.120
TAR	-836	0.0001	-0.035
RP	-4349	0.0208	-0.005
PROD	-4.86	0.0001	-0.028
Central Am	49417	0.0001	
Caribbean	97630	0.0001	
Andean	293660	0.0001	
Mercosur	-125147	0.0001	
R^2 = .9928			

Rice Exports	Estimate	p-value	elasticity
Intercept	76413	0.0001	
RGDP	95.38	0.0319	0.232
RER	-64630	0.0001	-1.929
TAR	-321	0.095	-0.248
RP	-24799	0.0001	-0.314
PROD	5.904	0.2837	0.128
Central Am	39129	0.0001	
Caribbean	42130	0.0001	
Andean	21386	0.0079	
Mercosur	-3311	0.7802	
R^2 = .8005			

Corn Exports	Estimate	p-value	elasticity
Intercept	404061	0.0001	
RGDP	248	0.0001	0.077
RER	-77760	0.0001	-0.294
TAR	-8503	0.0001	-0.424
RP	-12585	0.0002	-0.017
PROD	-3.77	0.0002	-0.045
Central Am	-235127	0.0001	
Caribbean	114220	0.0011	
Andean	222327	0.0004	
Mercosur	-185305	0.0001	
R^2 = .8173			

Soybean Exports	Estimate	p-value	elasticity
Intercept	30579	0.0339	
RGDP	445.82	0.0001	0.976
RER	-46741	0.0001	-1.254
TAR	-687	0.5918	-0.147
RP	-6369	0.0001	-0.083
PROD	-4.61	0.0001	-0.329
Central Am	29204	0.0272	
Caribbean	40196	0.0049	
Andean	60066	0.0001	
Mercosur	21207	0.483	
R^2 = .8856			

Soybean Meal Exports	Estimate	p-value	elasticity
Intercept	30014	0.0001	
RGDP	32.13	0.0001	0.037
RER	-14189	0.0001	-0.201
TAR	-375	0.0791	-0.051
RP	-19842	0.0001	-0.088
PROD	0.812	0.1046	0.018
Central Am	27847	0.0007	
Caribbean	25509	0.0545	
Andean	59940	0.0001	
Mercosur	-35379	0.0001	
R^2 = .6172			

Beef Exports	Estimate	p-value	elasticity
Intercept	205	0.0001	
RGDP	2.77	0.0001	1.092
RER	-141	0.0001	-0.681
TAR	-10.34	0.0001	-0.958
RP	-21.48	0.0001	-0.421
PROD	-0.2	0.0001	-0.622
Central Am	328	0.0001	
Caribbean	633	0.0001	
Andean	387	0.0001	
Mercosur	84	0.4354	
R^2 = .9409			

Pork Exports	Estimate	p-value	elasticity
Intercept	351	0.0001	
RGDP	0.243	0.0174	0.067
RER	-139	0.0001	-0.471
TAR	-10.04	0.0001	-0.775
RP	-25	0.0001	-0.212
Central Am	421	0.0001	
Caribbean	419	0.0003	
Andean	318	0.0001	
Mercosur	-73.35	0.0303	
R^2 = .6867			

Poultry Meat Exports	Estimate	p-value	elasticity
Intercept	2612	0.0001	
RGDP	-1.11	0.0001	-0.024
RER	-701	0.0001	-0.189
TAR	-88	0.0001	-0.560
RP	-336	0.0001	-0.142
Central Am	2400	0.0052	
Caribbean	4578	0.0001	
Andean	2941	0.0001	
Mercosur	550	0.0001	
Jamaica	20773	0.0001	
R^2 = .9416			

Table 6. Results from U.S. Import Models

Banana Imports

	Estimate	p-value	elasticity
Intercept	-23746	0.0001	
Trend	1391	0.0001	
RER	14721	0.0001	0.065
TAR			
RP	-222	0.0001	-0.001
Central Am	441927	0.0001	
Caribbean	1298	0.0918	
Andean	601998	0.0001	
Mercosur	1568	0.0305	
$R^2 = .9965$			

Dates, Figs, Pineapple Imports

	Estimate	p-value	elasticity
Intercept	12065	0.0001	
Trend	1620	0.0001	
RER	7952	0.0001	0.582
TAR	-986	0.0001	-0.122
RP	-1579	0.0001	-0.119
Central Am	-2767	0.2559	
Caribbean	-16493	0.0001	
Andean	-24475	0.0001	
Mercosur	-15578	0.0001	
$R^2 = .9997$			

Fruit & Vegetable Juice Imports

	Estimate	p-value	elasticity
Intercept	-41800	0.0001	
RER	60077.3	0.0001	0.573
RP	-9.4522	0.0146	0.000
TAR	-73112	0.0001	-0.834
Argentina	693965	0.0001	
Brazil	1611316	0.0001	
Chile	417928	0.0001	
Central Am	-4620.4	0.051	
Caribbean	-12711	0.0001	
Brazil trend	-59119	0.0001	
$R^2 = .9752$			

Grape Imports

	Estimate	p-value	elasticity
Intercept	297849	0.0001	
Trend	699	0.0001	
RER	4830	0.0001	0.260
TAR	-11817	0.0001	-0.210
RP	-102	0.0364	-0.007
Central Am	-306425	0.0001	
Caribbean	-306462	0.0001	
Andean	-303502	0.0001	
Mercosur	-294001	0.0001	
$R^2 = .9867$			

Coffee Imports

	Estimate	p-value	elasticity
Intercept	-40409	0.0001	
Trend	-159	0.0001	
RER	40604	0.0001	0.919
TAR			
RP	-54.57	0.0001	-0.005
Central Am	37765	0.0001	
Caribbean	235	0.8849	
Andean	162440	0.0196	
Mercosur	206211	0.0001	
$R^2 = .9998$			

Fish Meat Imports

	Estimate	p-value	elasticity
Intercept	41939	0.0078	
Trend	346	0.0001	
RER	2112	0.0001	0.496
TAR			
RP	-20	0.0001	-0.008
Central Am	-45302	0.0041	
Caribbean	-45871	0.0038	
Andean	-42910	0.0069	
Mercosur	-36525	0.0196	
$R^2 = .9858$			

Sugar Imports

	Estimate	p-value	elasticity
Intercept	-5800.3	0.333	
Trend			
RER	-2913	0.4012	-0.040
TAR			
RP	-18201	0.0001	-0.132
ES	20.463	0.0001	0.1229
US ES	-55.406	0.0001	1.1771
$R^2 = .8686$			

Prepared/Preserved Meat Imports

	Estimate	p-value	elasticity
Intercept	-2294	0.0001	
Trend	-7.72	0.0409	
RER	2356	0.0001	0.578
TAR	-33.26	0.3579	-0.014
RP	1.060	0.7148	0.001
Central Am	-24.25	0.9141	
Caribbean	-16.37	0.9427	
Andean	-109	0.6543	
Mercosur	30424	0.0001	
$R^2 = .9434$			

Crustacean Imports

	Estimate	p-value	elasticity
Intercept	160.66	0.7039	
Trend	334.554	0.0001	
RER	-451.22	0.0681	-0.077
TAR			
RP	-62	0.0001	-0.128
Central Am	4011.18	0.0001	
Caribbean	-610.38	0.1417	
Andean2	3388.92	0.0001	
Ecuador	48710.4	0.0001	
Ecu 00/01	-30606	0.0001	
Mercosur	4856.66	0.0002	
$R^2 = .9714$			

The regional dummy variables and the trend variables are significant in most of the models, indicating there are regional differences in U.S. import behavior and trends over time that are not accounted for by the other variables. In the juice import model, separate dummy variables are included for Argentina, Brazil, and Chile because these countries are the major suppliers of U.S. juice imports. These three dummy variables are positive and highly significant. In this model, Uruguay is used as the reference to avoid perfect multicollinearity. In the crustacean import model, a separate dummy variable is included for Ecuador because the country is the dominant supplier of U.S. crustacean imports. The Andean dummy variable includes the Andean countries other than Ecuador. Another dummy variable for Ecuador in 2000 and 2001 is included because crustacean imports from the country in these two years dropped to half the level of previous years. Most of the crustacean imports from Ecuador consist of shrimp, and disease problems in Ecuador led to decreased shrimp production in 2000 and 2001 (FAO 2002). The dummy variables are not included in the sugar model because they are insignificant.

The trend is significant and positive for U.S. imports of bananas; pineapples, avocados, and mangos; grapes; fish meat; and crustaceans. The trend is significant and negative for imports of coffee and prepared meat. U.S. juice imports from Brazil, the largest supplier, have also trended downward during this period.

The excess supply variable in the sugar model is positive and significant as expected, indicating that the United States imports more from countries with larger available supplies to export. A U.S. excess supply variable is also included in this model (which is measured as U.S. production less U.S. consumption). This variable is always negative, as more sugar is consumed in the United States than is produced. The variable has a negative and significant effect, which indicates the United States imports more when domestic production decreases or consumption increases.

TRADE CREATION AND TRADE DIVERSION EFFECTS

Free trade agreements can have three types of effects on trade: trade creation effects, trade diversion effects, and income effects. Trade flows may increase due to the elimination or reduction of tariffs or other trade barriers. Trade creation occurs when trade volume between two countries increases as a result of the displacement of domestic production. When trade creation occurs, resources are reallocated toward more efficient uses, which increases returns on investment and improves the overall economic well-being of the member countries (ERS, April 1998). Trade diversion occurs when increases in trade with one country displaces trade with third-party countries. Trade diversion leads to less efficient allocation of resources in the global economy, and directly harms other countries outside the agreement (ERS, April 1998).

If tariffs are removed, the snapshot effects on trade can be analyzed by examining the trade creation and diversion effects. There are also dynamic effects such as the income effect. Free trade agreements generally lead to increased income in the member countries; this increase in income positively affects imports. The FTAA would likely increase income throughout the Western Hemisphere. Trade liberalization can boost economic growth by stimulating investment

and reallocating capital and other resources toward more productive uses (ERS, November 1998). The increased economic well-being of trade partners would result in an increase in demand for U.S. agricultural products and a further increase in U.S. exports.

If tariffs between Western Hemisphere countries are removed under the FTAA while tariff protection from countries outside the FTAA remain at current levels, trade volume between the United States and Western Hemisphere countries will increase through trade creation and trade diversion effects. Total trade expansion resulting from tariff removal can be calculated by using the estimated import demand elasticities with respect to tariffs as follows:

$$TE_{ij} = M_{ij} \, h_{ij} \, (Dt_{ij} \, / \, t_{ij}) \tag{5}$$

where TE_{ij} = trade expansion effects in country i for commodity j
M_{ij} = initial level of imports in country i of commodity j
h_{ij} = the import demand elasticity with respect to tariffs in country i for commodity j
Dt_{ij} = changes in tariffs in country i for commodity j
t_{ij} = initial level of tariffs in country i for commodity j

Since h_{ij} is calculated using the average tariff for all countries used in the panel data, Equation 5 is re-calculated as follows:

$$TE_{ij} = M_{ij} \, h_{ij} \, (Dt_{ij} \, / \, avg \, t_j) \tag{6}$$

where avg t_j is the average initial tariff rate of all countries used in the panel data for commodity j.

The trade expansion effect can be divided into the trade creation and trade diversion effects as follows:

$$TE_{ij} = TC_{ij} + TD_{ij} \tag{7}$$

where TC_{ij} and TD_{ij} are the trade creation and diversion effects, respectively, in country i for imports of commodity j.

One method of calculating trade diversion effects (Baldwin and Murray 1977) is

$$TD_{ij} = TC_{ij} \, (M_{Nij} \, / \, V_{ij}) \tag{8}$$

where M_{Nij} is imports of commodity j by country i from non-member countries and V_{ij} is total domestic production of commodity j in country i. Alternatively, Verdoorn (1960) used the following formula to approximate trade diversion effects:

$$TD_{ij} = TC_{ij} \, (M_{Nij} \, / \, M_{Tij}) \tag{9}$$

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where M_{Nij} / M_{Tij} is the ratio of imports from non-member countries to the country's total imports of commodity j.

For empirical applications, the use of the Baldwin and Murray method requires domestic production, which is frequently unavailable. The Verdoorn formula, therefore, has been more frequently used to compute trade diversion. This study also uses the Verdoorn method to calculate trade diversion effects.

By substituting Equation 9 into Equation 7, the trade creation effect can be calculated as follows:

$$TC_{ij} = TE_{ij}/(1+(M_{Nij} / M_{Tij})) .$$ (10)

Calculated trade creation, trade diversion, and trade expansion effects of tariff removal under the FTAA on U.S. exports of agricultural commodities to 16 Latin American countries, as well as the 2001 export levels, are shown in Table 7. Trade creation, diversion, and expansion effects of tariff removal on U.S. imports, as well as 2001 imports, are shown in Table 8. Since there are no tariffs imposed on bananas, coffee, fish meat, and crustaceans, and since tariffs are not included in the sugar model, there are no trade creation or trade diversion effects from tariff removal on imports of these commodities.

For U.S. exports, the trade creation effect is greatest, in percentage terms, for beef and pork. Beef and pork face higher tariffs than wheat, corn, soybeans, or soybean meal, and estimated tariff elasticities are highest for beef and pork. In quantity terms, the trade creation effect is greatest for corn exports, which also increase significantly in percentage terms. The trade creation effect is also significant for rice and poultry meat exports. The trade creation effect is smaller for exports of wheat, soybeans, and soybean meal due to lower tariffs and lower tariff elasticities, but the effect is not insignificant. Trade diversion effects for exports are small because, in most cases, the Latin American countries import nearly all of their agricultural products from FTAA countries.

Trade creation effects are greater for U.S. exports to these countries than they are for U.S. imports because foreign tariffs are generally higher than U.S. tariffs and the tariff elasticities are slightly higher for exports than for imports. Trade diversion effects, however, are smaller for U.S. exports than for U.S. imports. Trade diversion effects can be more significant for imports because the United States imports a higher percentage of agricultural products from non-FTAA countries. About 55 percent of total U.S. agricultural imports are from FTAA countries, whereas 70-90 percent of total agricultural imports by the other Western Hemisphere countries are already from FTAA countries. For the commodities under consideration, however, the United States imports a higher percentage from the FTAA countries than it does for all agricultural commodities. Almost all grapes, bananas, pineapples, avocados, and mangos, and 65-80 percent of coffee, sugar, prepared meat, and juice imports, come from FTAA countries. For the export commodities under analysis, over 95 percent of Latin American imports are from FTAA countries in a majority of the cases. Therefore, trade diversion effects are low.

Table 7. Trade Creation and Trade Diversion Effects of FTAA on U.S. Exports

Wheat

Export Destination	2001 U.S. Exports (MT)	Trade Creation (MT)	Trade Diversion (MT)	Trade Expansion (MT)	Percent Increase
Argentina	63	2.1	1.4	3.5	6%
Brazil	82,383	4,602	0	4,602	6%
Chile	39,715	1,420	0	1,420	4%
Colombia	562,395	34,955	2,745	37,700	7%
Costa Rica	150,053	0	0	0	0%
Dominican Republic	280,123	9,389	0	9,389	3%
Ecuador	139,928	6,253	0	6,253	4%
El Salvador	228,604	0	0	0	0%
Guatemala	125,782	1,124	0	1,124	1%
Honduras	171,699	767	0	767	0%
Jamaica	180,639	0	0	0	0%
Nicaragua	84,974	0	0	0	0%
Panama	113,889	509	0	509	0%
Peru	612,203	68,398	0	68,398	11%
Uruguay	27	2	0	2	6%
Venezuela	531,711	35,642	2	35,643	7%
Total	3,304,188	163,063	2,748	165,812	5%

Soybeans

Export Destination	2001 U.S. Exports (MT)	Trade Creation (MT)	Trade Diversion (MT)	Trade Expansion (MT)	Percent Increase
Argentina	2,841	549	0	549	19%
Brazil	51	10	0	10	19%
Chile	0	0	0	0	0%
Colombia	151,070	37,221	4,506	41,726	28%
Costa Rica	205,001	0	0	0	0%
Dominican Republic	16	1	0	1	6%
Ecuador	9,899	2,734	0	2,734	28%
El Salvador	550	0	0	0	0%
Guatemala	13,198	0	0	0	0%
Honduras	0	0	0	0	0%
Jamaica	111	0	0	0	0%
Nicaragua	420	0	0	0	0%
Panama	0	0	0	0	0%
Peru	0	0	0	0	0%
Uruguay	0	0	0	0	0%
Venezuela	90,981	25,129	0	25,129	28%
Total	474,138	65,644	4,506	70,150	15%

Corn

Export Destination	2001 U.S. Exports (MT)	Trade Creation (MT)	Trade Diversion (MT)	Trade Expansion (MT)	Percent Increase
Argentina	1,663	559	2	561	34%
Brazil	791	267	0	267	34%
Chile	12,781	3,287	0	3,288	26%
Colombia	1,598,870	761,055	10,180	771,235	48%
Costa Rica	489,085	141,550	0	141,550	29%
Dominican Republic	1,011,104	162,573	0	162,573	16%
Ecuador	147,907	70,587	758	71,345	48%
El Salvador	437,692	70,162	213	70,375	16%
Guatemala	484,132	311,369	0	311,369	64%
Honduras	224,454	141,932	2,426	144,357	64%
Jamaica	218,992	0	0	0	0%
Nicaragua	72,357	23,268	0	23,268	32%
Panama	265,404	68,278	0	68,278	26%
Peru	237,162	110,585	0	110,585	47%
Uruguay	4	1	0	1	34%
Venezuela	987,174	475,260	916	476,176	48%
Total	6,189,570	2,340,735	14,495	2,355,230	38%

Soybean Meal

Export Destination	2001 U.S. Exports (MT)	Trade Creation (MT)	Trade Diversion (MT)	Trade Expansion (MT)	Percent Increase
Argentina	275	13	0	13	5%
Brazil	0	0	0	0	0%
Chile	0	0	0	0	0%
Colombia	49,128	3,182	774	3,955	8%
Costa Rica	208	5	0	5	2%
Dominican Republic	363,502	19,509	0	19,509	5%
Ecuador	114,316	9,203	0	9,203	8%
El Salvador	131,437	1,760	3	1,764	1%
Guatemala	148,422	3,983	0	3,983	3%
Honduras	72,710	1,170	0	1,171	2%
Jamaica	73,818	0	0	0	0%
Nicaragua	24,743	664	0	664	3%
Panama	101,792	0	0	0	0%
Peru	43,916	2,828	0	2,828	6%
Uruguay	0	0	0	0	0%
Venezuela	136,093	10,956	0	10,956	8%
Total	1,260,361	53,274	777	54,051	4%

Table 7. (continued) Trade Creation and Trade Diversion Effects of FTAA on U.S. Exports

Rice

Export Destination	2001 U.S. Exports (MT)	Trade Creation (MT)	Trade Diversion (MT)	Trade Expansion (MT)	Percent Increase
Argentina	18	2	0	2	12%
Brazil	662	74	5	79	12%
Chile	203	16	0	16	8%
Colombia	22,692	4,348	0	4,348	19%
Costa Rica	57,648	19,323	8	19,331	34%
Dominican Republic	14,734	2,823	0	2,823	19%
Ecuador	0	0	0	0	0%
El Salvador	103,646	38,006	1,715	39,721	38%
Guatemala	47,066	8,862	157	9,019	19%
Honduras	135,573	58,409	42	58,452	43%
Jamaica	26,249	6,274	13	6,287	24%
Nicaragua	158,221	92,396	1,591	93,986	59%
Panama	7,284	8,584	0	8,584	118%
Peru	417	100	0	100	24%
Uruguay	0	0	0	0	0%
Venezuela	340	37	28	65	19%
Total	574,752	239,254	3,560	242,814	42%

Pork

Export Destination	2001 U.S. Exports (MT)	Trade Creation (MT)	Trade Diversion (MT)	Trade Expansion (MT)	Percent Increase
Argentina	0	0	0	0	0%
Brazil	0	0	0	0	0%
Chile	2	0	0	0	27%
Colombia	3,086	2,101	0	2,102	68%
Costa Rica	173	283	0	283	163%
Dominican Republic	811	690	0	690	85%
Ecuador	39	27	0	27	68%
El Salvador	392	267	0	267	68%
Guatemala	2,420	1,235	2	1,236	51%
Honduras	2,991	1,810	23	1,833	61%
Jamaica	8	11	0	11	136%
Nicaragua	238	121	0	122	51%
Panama	1,685	2,753	0	2,753	163%
Peru	23	23	0	23	102%
Uruguay	11	5	0	5	43%
Venezuela	81	54	1	55	68%
Total	11,960	9,381	26	9,407	79%

Beef

Export Destination	2001 U.S. Exports (MT)	Trade Creation (MT)	Trade Diversion (MT)	Trade Expansion (MT)	Percent Increase
Argentina	175	113	0	113	64%
Brazil	13	8	0	8	64%
Chile	54	21	0	21	40%
Colombia	45	45	0	45	100%
Costa Rica	901	629	0	629	70%
Dominican Republic	483	602	0	602	125%
Ecuador	6	4	3	6	100%
El Salvador	116	87	0	87	75%
Guatemala	756	565	1	566	75%
Honduras	72	65	0	65	90%
Jamaica	387	755	17	772	200%
Nicaragua	20	15	0	15	75%
Panama	265	331	0	331	125%
Peru	48	72	0	72	150%
Uruguay	88	61	0	61	70%
Venezuela	675	674	0	674	100%
Total	4,102	4,046	22	4,068	99%

Poultry Meat

Export Destination	2001 U.S. Exports (MT)	Trade Creation (MT)	Trade Diversion (MT)	Trade Expansion (MT)	Percent Increase
Argentina	692	205	0	205	30%
Brazil	1,348	367	33	400	30%
Chile	3,624	688	0	688	19%
Colombia	23,451	11,136	0	11,136	47%
Costa Rica	819	194	0	194	24%
Dominican Republic	5,930	3,520	0	3,520	59%
Ecuador	657	312	0	312	47%
El Salvador	78	28	0	28	36%
Guatemala	36,461	12,984	1	12,985	36%
Honduras	1,937	1,610	0	1,610	83%
Jamaica	27,936	26,497	34	26,531	95%
Nicaragua	604	359	0	359	59%
Panama	3,514	1,250	1	1,251	36%
Peru	1,853	1,314	7	1,320	71%
Uruguay	37	11	0	11	30%
Venezuela	1,098	470	51	521	47%
Total	110,040	60,945	127	61,072	55%

Table 8. Trade Creation and Trade Diversion Effects of FTAA on U.S. Imports

Pineapples, Avocados, Mangos

Import Source	2001 U.S. Imports (MT)	Trade Creation (MT)	Trade Diversion (MT)	Trade Expansion (MT)	Percent Increase
Argentina	3	1	0	1	38%
Brazil	26,937	9,894	219	10,112	38%
Chile	49,176	18,062	399	18,461	38%
Colombia	5	0	0	0	0%
Costa Rica	263,225	0	0	0	0%
Dominican Republic	9,571	0	0	0	0%
Ecuador	28,240	0	0	0	0%
El Salvador	0	0	0	0	0%
Guatemala	12,846	0	0	0	0%
Honduras	20,122	0	0	0	0%
Jamaica	8	0	0	0	0%
Nicaragua	1,826	0	0	0	0%
Panama	255	0	0	0	0%
Peru	15,553	0	0	0	0%
Uruguay	0	0	0	0	0%
Venezuela	0	0	0	0	0%
Total	427,765	27,956	618	28,574	7%

Grapes

Import Source	2001 U.S. Imports (MT)	Trade Creation (MT)	Trade Diversion (MT)	Trade Expansion (MT)	Percent Increase
Argentina	7,625	4,641	68	4,710	62%
Brazil	61	37	1	38	62%
Chile	324,107	197,278	2,902	200,179	62%
Colombia	0	0	0	0	0%
Costa Rica	0	0	0	0	0%
Dominican Republic	0	0	0	0	0%
Ecuador	0	0	0	0	0%
El Salvador	0	0	0	0	0%
Guatemala	0	0	0	0	0%
Honduras	0	0	0	0	0%
Jamaica	0	0	0	0	0%
Nicaragua	0	0	0	0	0%
Panama	0	0	0	0	0%
Peru	1,045	0	0	0	0%
Uruguay	0	0	0	0	0%
Venezuela	0	0	0	0	0%
Total	332,838	201,956	2,970	204,927	62%

Fruit & Vegetable Juice

Import Source	2001 U.S. Imports (MT)	Trade Creation (MT)	Trade Diversion (MT)	Trade Expansion (MT)	Percent Increase
Argentina	625,389	1,112,427	370,418	1,482,845	237%
Brazil	618,812	1,100,727	366,522	1,467,248	237%
Chile	285,053	507,045	168,836	675,881	237%
Colombia	2,714	0	0	0	0%
Costa Rica	110,785	0	0	0	0%
Dominican Republic	6,874	0	0	0	0%
Ecuador	7,957	0	0	0	0%
El Salvador	395	0	0	0	0%
Guatemala	503	0	0	0	0%
Honduras	20,001	0	0	0	0%
Jamaica	805	0	0	0	0%
Nicaragua	97	0	0	0	0%
Panama	214	0	0	0	0%
Peru	771	0	0	0	0%
Uruguay	201	358	119	477	237%
Venezuela	259	461	154	615	237%
Total	1,680,829	2,721,017	906,048	3,627,066	216%

Prepared/Preserved Meat

Import Source	2001 U.S. Imports (MT)	Trade Creation (MT)	Trade Diversion (MT)	Trade Expansion (MT)	Percent Increase
Argentina	20,671	153	36	189	1%
Brazil	40,846	303	71	373	1%
Chile	0	0	0	0	0%
Colombia	0	0	0	0	0%
Costa Rica	1	0	0	0	0%
Dominican Republic	0	0	0	0	0%
Ecuador	0	0	0	0	0%
El Salvador	0	0	0	0	0%
Guatemala	0	0	0	0	0%
Honduras	0	0	0	0	0%
Jamaica	0	0	0	0	0%
Nicaragua	0	0	0	0	0%
Panama	0	0	0	0	0%
Peru	0	0	0	0	0%
Uruguay	2,649	20	5	24	1%
Venezuela	0	0	0	0	0%
Total	64,168	475	111	586	1%

For U.S. imports, total trade creation effects are small. There are no trade creation or trade diversion effects on imports of bananas, coffee, fish meat, or crustaceans due to a current lack of tariffs. The United States also refrains from imposing tariffs on other commodities for a number of the Latin American countries, leaving little opportunity for trade creation or trade diversion effects. The trade creation and diversion effects are greatest for juice imports from Argentina, Brazil, and Chile. The trade effects for juice are large because of the size of the tariff elasticity, the size of the tariff, and the high volume of initial imports. Juice imports from these countries could triple under tariff removal.

Tariff removal could also have a significant effect on grape imports from Chile. About two-thirds of all U.S. grape imports come from Chile, which accounts for about one-fourth of the total U.S. grape supply, and the removal of tariffs could increase Chilean grape exports to the United States by 62 percent. Grape imports from Argentina have increased rapidly in recent years and could continue to increase under the FTAA. Avocado imports from Chile and Brazil could also increase significantly under the FTAA.

Overall, the results show that exports to these countries could increase by 99 percent for beef, 79 percent for pork, 55 percent for poultry meat, 42 percent for rice, 38 percent for corn, 15 percent for soybeans, 5 percent for wheat, and 4 percent for soybean meal. U.S. imports could increase 216 percent for fruit and vegetable juice; 62 percent for grapes; 7 percent for pineapples, avocados, and mangos; and 1 percent for prepared or preserved meat.

The ERS analyzed the effects of an FTAA on U.S. agriculture using a computable general equilibrium model (ERS, November 1998). They found that an FTAA including the United States would increase annual U.S. agricultural exports by only 1 percent and imports by 3 percent. Diao et al. (1998) also estimated the effects of an FTAA on U.S. agricultural trade. Their results indicate that U.S. exports and imports would increase by 7.9 and 6.5 percent, respectively, under an FTAA that included the United States. Our findings indicate that the effect on trade could be much greater for some agricultural commodities.

There may be some trade diversion effects for U.S. exports that are not captured by Equation 8. This equation assumes that trade diversion effects are a result of trade being diverted from countries that are not members of the trade agreement, i.e., countries not within the hemisphere. These trade diversion effects result from imports from non-FTAA countries being displaced by imports from FTAA countries due to the reduction in tariffs of the FTAA country relative to the non-FTAA country. There could be additional trade diversion effects, however, within the FTAA countries because of the many existing trade agreements. For example, because of the Mercosur agreement, Brazil does not impose any tariffs on wheat from Argentina, which contributes to Argentina's large market share in Brazil. The FTAA would eliminate this advantage for Argentina, and the United States and Canada could increase their market share in Brazil and other Mercosur countries. Similarly, removal of the regional trade blocs could make U.S. rice and other commodities more competitive in South America.

CONCLUSIONS

The Free Trade Area of the Americas (FTAA) and trade with Latin American countries is an important emerging issue. This study analyzes agricultural trade with these countries and develops a model which estimates factors affecting trade flows of a number of important agricultural commodities. Results from the model show that exports are negatively influenced by tariffs, price, exchange rates, and foreign production, while being positively influenced by foreign real GDP. U.S. imports are negatively influenced by U.S. tariffs and price and positively influenced by the exchange rate. U.S. tariffs on imports of agricultural products from Latin American countries are small or nonexistent in many cases. This would suggest that trade liberalization could have a larger effect on U.S. exports than on imports.

Trade creation and trade diversion effects are calculated. The calculations show the estimated effect on trade of tariff elimination. Trade creation effects are higher for U.S. exports to these countries than they are for U.S. imports because foreign tariffs are generally higher than U.S. tariffs and the tariff elasticities are slightly higher for exports than for imports. The trade diversion effects, especially for exports, are small because most agricultural imports in the hemisphere are from other countries within the hemisphere, indicating that the FTAA will not significantly affect trade of agricultural commodities with third party non-member countries.

Trade creation effects are largest for U.S. exports of corn, beef, pork, and rice, while being small but significant for wheat, soybeans, and soybean meal. Trade creation effects for imports are small or nonexistent because of low or nonexistent tariffs, with a few exceptions. There could be a significant increase in imports of fruit and vegetable juice from Argentina, Brazil, and Chile; grape imports from Chile and Argentina; avocado imports from Chile; and mango imports from Brazil.

An important factor to consider is the trend variable in the import models. While tariff removal could have a significant positive effect on juice imports from Brazil, these imports have been trending downward after accounting for the other variables. This downward trend could negate some of the trade creation effect. Imports of coffee and prepared meats have also been trending downward. On the other hand, imports of bananas; pineapples, avocados, and mangos; grapes; fish meat; and crustaceans have been trending upward. Imports of these commodities could continue to rise even without reductions in any applicable tariffs.

Trade creation effects for sugar imports are not calculated in this study, but it is important to consider the possible increase in sugar imports under an FTAA if quotas are removed. Sugar is a major commodity in a number of Latin American countries, and if producers in countries such as Brazil, Guatemala, or the Dominican Republic can produce sugar at a lower cost, U.S. imports of sugar could increase substantially under trade liberalization.

There are some limitations to this study and areas for future research. Income effects of an FTAA are not estimated in this study. If the FTAA is able to increase GDP in Latin American countries, there could be further increases in U.S. exports. The export models show that foreign GDP has a significant and positive effect on U.S. agricultural exports to these countries. The income effect would not likely affect U.S. imports significantly.

There may be some additional trade effects for U.S. exports that are not captured in this analysis. There are currently a number of free trade agreements of different types existing in the Western Hemisphere. For example, the Mercosur agreement includes Brazil, Argentina, Paraguay, and Uruguay. U.S. exports face tariffs in these countries that member countries do not face; e.g., Argentina has an advantage in exporting wheat and other commodities to Brazil. Eliminating Mercosur and the numerous other trade agreements and replacing them with the hemisphere-wide FTAA will remove these tariff differentials. U.S. exporters that are currently outsiders in many of the free trade agreements will benefit.

A few other areas require further consideration. Future production levels in Latin American countries will affect U.S. exports to these countries. Production of corn and soybeans in Argentina and Brazil has increased substantially during the last decade, with production more than doubling in the case of soybeans. Wheat production in Argentina has also increased during this time period. If Argentina and Brazil continue to increase production as well as exports, it may be more difficult for the United States to increase market share in Latin American countries. Further, this study does not examine U.S. soybean imports since the United States has not imported significant quantities of soybeans. However, it is possible that the FTAA could increase U.S. soybean imports from Brazil, similar to the example of increased U.S. wheat imports from Canada under the U.S. - Canada free trade agreement.

Trade liberalization may affect trade in other ways not considered by this study. For example, removal of agricultural subsidies, sanitary and phytosanitary restrictions, and other non-tariff barriers could further affect trade flows.

Overall, the FTAA will likely have mixed effects on U.S. agriculture. U.S. exports of corn, wheat, rice, and meats may increase, while imports of fruit, juice, and sugar could also increase. Certain industries and regions will benefit, while others may be harmed.

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