The World's Largest Open Access Agricultural & Applied Economics Digital Library

This document is discoverable and free to researchers across the globe due to the work of AgEcon Search.

Help ensure our sustainability.

Give to AgEcon Search

AgEcon Search
http://ageconsearch.umn.edu
aesearch@umn.edu

*Papers downloaded from **AgEcon Search** may be used for non-commercial purposes and personal study only. No other use, including posting to another Internet site, is permitted without permission from the copyright owner (not AgEcon Search), or as allowed under the provisions of Fair Use, U.S. Copyright Act, Title 17 U.S.C.*

No endorsement of AgEcon Search or its fundraising activities by the author(s) of the following work or their employer(s) is intended or implied.

Agribusiness & Applied Economics Report No. 478 **February 2002**

U.S. Agricultural Trade with Western Hemisphere Countries and the Effect of the Free Trade Area of the Americas

Jeremy W. Mattson
Won W. Koo

Center for Agricultural Policy and Trade Studies
Department of Agribusiness and Applied Economics
North Dakota State University
Fargo, North Dakota 58105-5636

Acknowledgments

The authors extend appreciation to Drs. Cheryl Wachenheim, Edwin Sun, and Gue Dae Cho for their constructive comments and suggestions. Special thanks go to Ms. Beth Ambrosio, who helped to prepare the manuscript.

The research was conducted under the U.S.-Mexico and Western Hemisphere agricultural trade research program funded by the U.S. Department of the Treasury/U.S. Customs Service (Grant No. TC-00-002G, ND1301).

We would be happy to provide a single copy of this publication free of charge. You can address your inquiry to: Beth Ambrosio, Center for Agricultural Policy and Trade Studies, Department of Agribusiness & Applied Economics, North Dakota State University, P.O. Box 5636, Fargo, ND, 58105-5636, Ph. 701-231-7334, Fax 701-231-7400, e-mail beth.ambrosio@ndsu.nodak.edu. This publication is also available electronically at this web site: http://agecon.lib.umn.edu/.

NDSU is an equal opportunity institution.

NOTICE:

The analyses and views reported in this paper are those of the author(s). They are not necessarily endorsed by the Department of Agribusiness and Applied Economics or by North Dakota State University.

North Dakota State University is committed to the policy that all persons shall have equal access to its programs, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

Information on other titles in this series may be obtained from: Department of Agribusiness and Applied Economics, North Dakota State University, P.O. Box 5636, Fargo, ND 58105. Telephone: 701-231-7441, Fax: 701-231-7400, or e-mail: cjensen@ndsuext.nodak.edu.

Copyright © 2002 by Jeremy W. Mattson and Won W. Koo. All rights reserved. Readers may make verbatim copies of this document for non-commercial purposes by any means, provided that this copyright notice appears on all such copies.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

Abstract

Negotiations to create the largest single market in the world, the Free Trade Area of the Americas (FTAA), are in progress**.** Such an agreement could have significant effects on U.S. agriculture; it could create an opportunity to increase U.S. exports of agricultural commodities and products, and could also lead to an increase in imports**.** The objective of this study is to analyze U.S. agricultural trade with Western Hemisphere countries and to determine the effects of hemisphere-wide trade liberalization. The Western Hemisphere contains important sources for U.S. agricultural imports and important markets for U.S. agricultural exports, though the hemisphere has been more important as a source for imports than as a market for exports.

Results suggest that U.S. agricultural exports within the hemisphere are positively influenced by real GDP in the importing country and negatively influenced by the strength of the U.S. dollar and tariffs in importing countries. U.S. agricultural imports are positively affected by the strength of the U.S. dollar and negatively affected by U.S. tariffs. A reduction in tariffs under the FTAA would have a greater effect on U.S. agricultural exports than it would on U.S. agricultural imports because tariffs are generally larger in other countries and food consumption is more price sensitive in other countries.

Key words: Free Trade Area of the Americas, trade liberalization, Western Hemisphere, agricultural trade.

Highlights

Agricultural trade with Canada and Mexico has increased significantly since free trade agreements have been signed, while trade with other Western Hemisphere countries has increased at slower rates or remained flat. Canada and Mexico are the United States' two major trading partners in the Western Hemisphere, but the United States also imports a significant amount of agricultural products from South America. The United States has an agricultural trade deficit with South America that has averaged $2.5 billion during the 1989-2000 period. The United States also has an agricultural trade deficit with Central America and a growing trade deficit with Canada, but has agricultural trade surpluses with Mexico and the Caribbean.

Although the United States exports considerable quantities of agricultural products to Western Hemisphere countries, the hemisphere is a greater source of U.S. imports than it is a destination for U.S. exports. In recent years, 54 percent of U.S. agricultural imports have been from the Western Hemisphere, while about 35 percent of U.S. agricultural exports have been sent to Western Hemisphere countries. Western Hemisphere countries not including Canada and Mexico have been the source of about 20 percent of U.S. agricultural imports and the destination for about 9 percent of U.S. agricultural exports.

The types of products imported from Latin America are mostly horticultural products or tropical products such as coffee, while exports to Latin America largely consist of grains and oilseeds. The FTAA may be beneficial to producers of grains and oilseeds; only minimal amounts of these crops are imported from Latin America. The FTAA may be harmful, however, to sugar producers. The United States does import sugar from Latin American countries and could expand imports under the FTAA.

An econometric model is developed to estimate the effects of macroeconomic factors on the flow of agricultural trade with Western Hemisphere countries. Results indicate that U.S. agricultural exports within the hemisphere are positively influenced by real GDP in the importing country and negatively influenced by the strength of the U.S. dollar and tariffs in importing countries. U.S. agricultural imports are positively affected by the strength of the U.S. dollar and negatively affected by U.S. tariffs. Results indicate that tariffs have a greater effect on U.S. exports than they do on imports.

The estimated model is used to project agricultural trade with select Latin American countries. The projections indicate that both U.S. agricultural exports and imports would increase if tariffs are reduced or eliminated, but the increase in exports would be greater. The effect on U.S. exports is greater because tariffs are higher in Latin American countries than they are in the United States, and the estimated elasticities are higher for exports than they are for imports, which indicates that food consumption is more price-sensitive in other countries. The increase in exports could likely include wheat, corn, soybeans, and possibly meat, which would benefit producers in the Northern Plains. The increase in imports would likely include sugar, which could be harmful for U.S. sugar producers.

U.S. Agricultural Trade with Western Hemisphere Countries and the Effect of the Free Trade Area of the Americas

Jeremy W. Mattson and Won W. Koo*

Introduction

Negotiations to create the largest single market in the world, the Free Trade Area of the Americas (FTAA), are in progress. While the United States has free trade agreements with Canada and Mexico, the goal of the FTAA is to progressively eliminate trade and investment barriers within the Western Hemisphere. Negotiations for the FTAA involve 34 democratic nations from the Western Hemisphere. Such an agreement could have significant effects on U.S. agriculture; it could create an opportunity to increase U.S. exports of agricultural commodities and products. It could also increase U.S. imports of agricultural commodities produced in other Western Hemisphere countries.

Agricultural trade with Canada and Mexico has increased significantly since free trade agreements have been signed with those countries, while trade with other Western Hemisphere countries has increased at slower rates or remained flat. Canada and Mexico are the United States' two major trading partners in the Western Hemisphere, but the United States also imports a significant amount of agricultural products from South America. The United States, in fact, has an agricultural trade deficit with South America that has averaged $2.5 billion during the 1989-2000 period. The United States also has an agricultural trade deficit with Central America and a growing trade deficit with Canada, but has agricultural trade surpluses with Mexico and the Caribbean.

The types of products imported from Latin America are mostly horticultural products or tropical products such as coffee, while exports to Latin America largely consist of grains and feeds and oilseeds. The FTAA could increase the existing trade flows of agricultural commodities and products. U.S. exports of grain, feed, oilseeds, and meats could increase, while the United States could import more horticultural products and sugar and tropical products. One concern is the impact of the FTAA on the U.S. sugar industry. Latin America is a major sugar-producing region. The FTAA could substantially increase U.S. sugar imports from these countries.

The general objective of this study is to analyze U.S. agricultural trade with Western Hemisphere countries and to determine the effects of hemisphere-wide trade liberalization. Specific objectives are to 1) analyze specific U.S. trade data with Western Hemisphere countries to evaluate trade patterns of agricultural goods in the region, 2) examine factors influencing U.S. agricultural trade with these countries, and 3) determine the effect of tariff removals on agricultural trade with these countries.

---

*Research Assistant and Professor and Director in the Center for Agricultural Policy and Trade Studies, North Dakota State University, Fargo.

U.S. Agricultural Trade with Western Hemisphere Countries

The Western Hemisphere contains key markets for U.S. agricultural exports and significant suppliers of agricultural products imported by the United States. Although the United States exports significant quantities of agricultural products to Western Hemisphere countries, the hemisphere is a greater source of U.S. imports than it is a destination for U.S. exports. In recent years, 54 percent of U.S. agricultural imports have been from the Western Hemisphere, while about 35 percent of U.S. agricultural exports have been sent to Western Hemisphere countries. Latin America has been the source of about 33 percent of U.S. agricultural imports and the destination for about 20 percent of U.S. agricultural exports in recent years. Western Hemisphere countries not including Canada and Mexico have been the source of about 20 percent of U.S. agricultural imports and the destination for about 9 percent of U.S. agricultural exports.

U.S. Agricultural Trading Partners in the Western Hemisphere

Figure 1 shows U.S. agricultural imports from Western Hemisphere countries/regions from 1989-2000, in dollar terms, and Figure 2 shows U.S. agricultural exports. Canada and Mexico are the United States' two major trading partners in the hemisphere, but the United States also imports a significant quantity of agricultural products from South America. The United States, in fact, has an agricultural trade deficit with South America that has averaged $2.5 billion during the 1989-2000 period. The United States also has an agricultural trade deficit with Central America and a growing trade deficit with Canada, but has agricultural trade surpluses with Mexico and the Caribbean.

Excluding Canada and Mexico, the Western Hemisphere countries that the Unites States imports the most agricultural products from are Brazil, Colombia, Chile, Costa Rica, and Guatemala. A substantial percentage of the imports from these countries is made up of products that are not produced in the United States - mostly coffee and bananas. The countries that the United States exports the most agricultural products to, besides Canada and Mexico, are Venezuela, the Dominican Republic, Colombia, and Brazil. Figure 3 shows the top Western Hemisphere countries that the United States imports agricultural products from, and Figure 4 shows countries to which the United States exports agricultural products.

Figure 1. U.S. Agricultural Imports from the Western Hemisphere

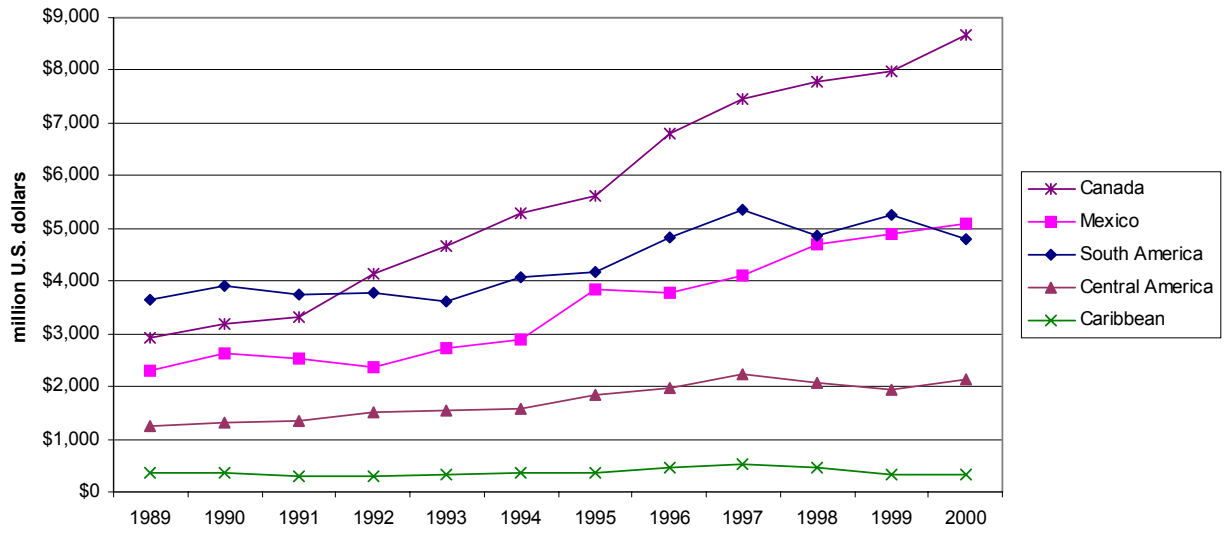


Figure 2. U.S. Agricultural Exports to the Western Hemisphere

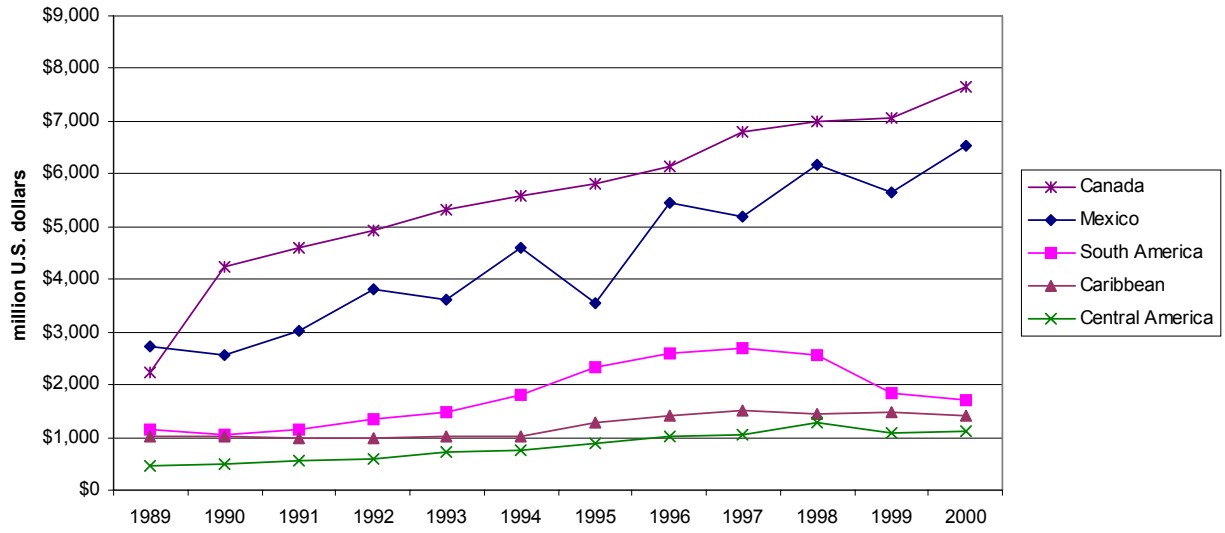


Figure 3. U.S. Agricultural Imports from the Western Hemisphere by Country, 1989-2000

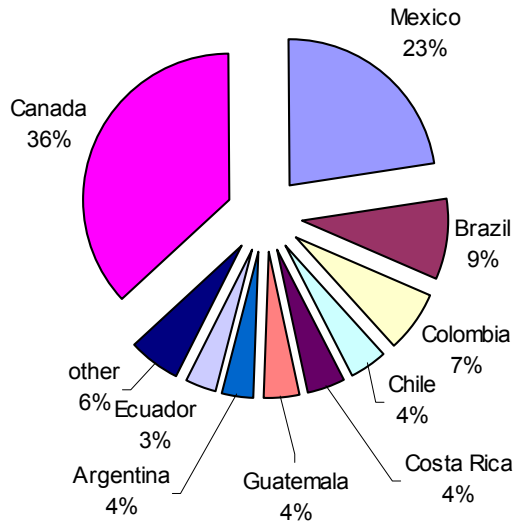
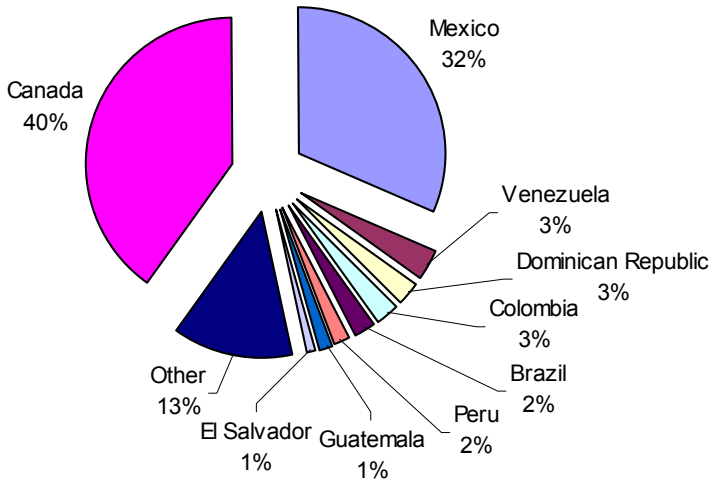


Figure 4. U.S. Agricultural Exports to the Western Hemisphere by Country, 1989-2000



Types of Agricultural Products Traded

The United States already has a free trade agreement with Canada and Mexico. The FTAA will create a free trade area throughout the hemisphere, and thus it is interesting to examine the types of agricultural products traded with the other Western Hemisphere countries. Figure 5 shows the types of agriculture products the United States imports from Latin American countries (excluding Mexico) for the 1991-2000 period. Most of the imports fall into either the horticultural products category or the sugar and tropical products category. The horticultural products category includes mostly fruits and vegetables, and the sugar and tropical products category includes coffee, cocoa, sugar, tea, spices, honey, and a few other products. Sixty-three percent of the imports classified as sugar and tropical products from these countries during the 1991-2000 period were coffee and coffee products. The remainder was mostly sugar and sugar related products or cocoa and cocoa products. Figure 6 shows the types of agricultural products the United States has exported to Latin American countries (excluding Mexico). Forty percent of these exports are grains and feeds, and the next largest groups are oilseeds and oilseed products and horticultural products.

Figure 5. U.S. Agricultural Imports from Latin American Countries (excluding Mexico), Types of Products Imported, 1991-2000

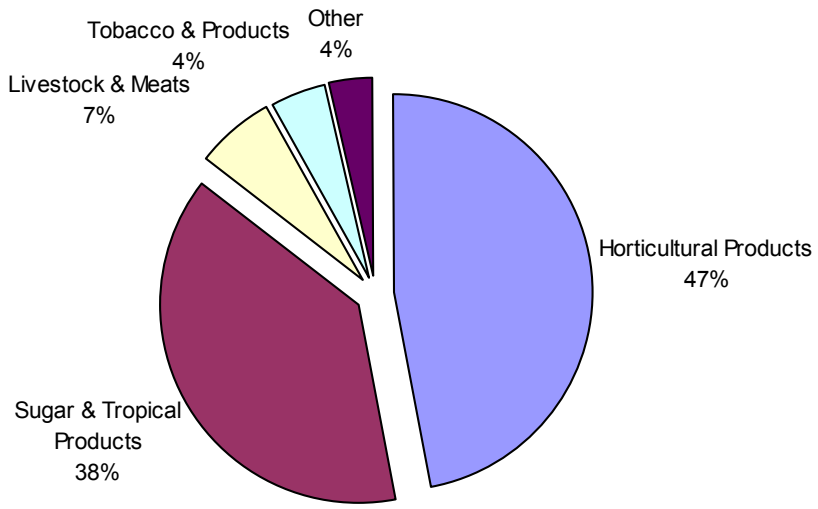
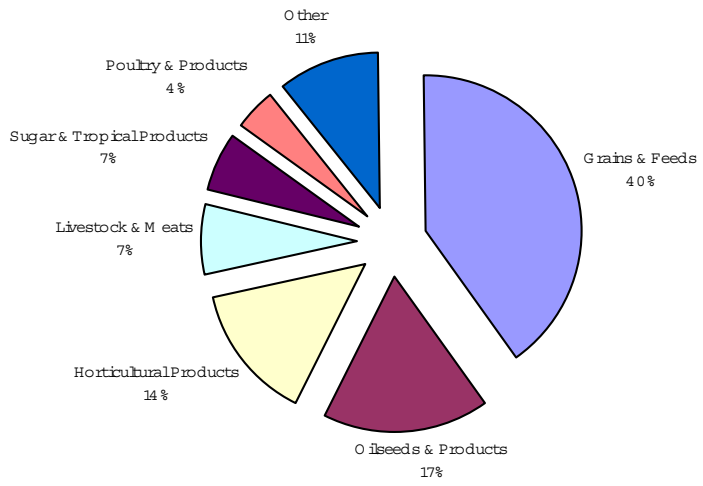


Figure 6. U.S. Agricultural Exports to Latin America (excluding Mexico), Types of Products Exported, 1991-2000



The types of crops grown in the Northern Plains - grains and feeds and oilseeds - are the major agricultural products that the United States exports to Latin America countries, while only minimal amounts of these products are imported from these countries. The FTAA may be beneficial to producers of these crops. An exception is sugar. The United States does import sugar from Latin American countries and could expand imports under an FTAA.

Table 1 provides more detail of the types of products exported to Western Hemisphere regions. The table shows the agricultural products most exported to Canada, Mexico, the Caribbean, Central America, and South America classified under the Harmonized System (HS) during the 1991-2000 period. The Harmonized System of trade codes is an international standard for classifying products for world trade. The United States uses a ten-digit system, where each successive digit provides more detailed information. The information in Table 1 is at the four-digit level. This table shows that the United States exports a number of products to Canada, such as animal feed products, beef, food preparations, bakery products, and fruit and vegetable products. The top exports to Canada are mostly processed food products, whereas the top exports to Latin American regions are mostly bulk commodities. Soybeans, corn, and sorghum are the top exports to Mexico; corn, rice, and wheat are the top exports to the Caribbean; and wheat and corn are the top exports to both Central America and South America.

Table 1. U.S. Agricultural Products Exported to Western Hemisphere Countries/Regions

Destination/Product Exported	HS Code	Average Exports, 1991-2000 (thousand dollars)
Canada		
Animal Feed Preparations	2309	292,814
Beef, fresh or chilled	0201	274,809
Misc. Food Preparations	2106	256,951
Baked Bread, Pastry	1905	250,840
Fruit & Vegetable Juices	2009	209,512
Misc. Vegetables, fresh or chilled	0709	174,467
Soybean Meal	2304	161,298
Citrus Fruit, fresh or dried	0805	142,997
Grapes	0806	137,448
Chocolate	1806	130,388
Mexico		
Soybeans	1201	610,965
Corn	1005	422,378
Grain Sorghum	1007	377,017
Cotton, Not Carded	5201	272,221
Beef, fresh or chilled	0201	209,429
Poultry Meat	0207	176,663
Wheat	1001	162,279
Raw Hides, Bovine	4101	116,039
Bovine Leather	4104	113,120
Fats, Bovine, Sheep	1502	99,702
Caribbean		
Corn	1005	115,547
Rice	1006	100,945
Wheat	1001	88,846
Misc. Food Preparations	2106	85,515
Tobacco Unmanufactured	2401	84,535
Poultry Meat	0207	81,349
Soybean Meal	2304	64,380
Cigars, Cigarettes	2402	45,856
Bovine Leather	4104	38,306
Animal Feed Preparations	2309	36,316
Central America		
Wheat	1001	127,813
Corn	1005	124,981
Soybean Meal	2304	73,625
Misc. Food Preparations	2106	62,657
Rice	1006	53,238
Fats, Bovine, Sheep	1502	39,581
Soybeans	1201	36,354
Cigars, Cigarettes	2402	31,317
Saf/Sun Flower & Cottonseed Oil	1512	20,621
Animal Feed Preparations	2309	17,565
South America		
Wheat	1001	309,457
Corn	1005	305,004
Soybean Meal	2304	138,993
Cotton, Not Carded	5201	119,073
Soybeans	1201	118,258
Misc. Food Preparations	2106	85,286
Cigars, Cigarettes	2402	79,332
Rice	1006	70,064
Animal Feed Preparations	2309	51,563
Ethyl Alcohol	2207	47,832

Different types of agricultural products are imported. Table 2 shows the top agricultural products imported from Western Hemisphere regions. There are a large number of agricultural products imported from Canada. The most significant imports from Canada are live cattle, beef, and pork. The top imports from Mexico include coffee, fresh tomatoes, miscellaneous vegetables, beer, and live cattle. Cigars and cigarettes and sugar are the top imports from the Caribbean. The United States imports a substantial amount of coffee and bananas from South and Central America. Significant amounts of fruit, sugar, juices, and cut flowers are also imported from these regions.

Products of interest to producers in the Northern Plains include wheat, corn, soybeans, sugar, livestock, and meats. These products are produced in this region, and the effect of an FTAA on trade flows of these products would be of great interest to producers of these commodities. Except for sugar, these are commodities that the United States has trade surpluses for in Latin America.

Wheat, Soybeans, and Corn. Table 3 shows the average annual exports of wheat, soybeans, and corn during the 1991-2000 period to the leading Western Hemisphere destinations. Mexico is an important destination for U.S. wheat. Close to one-fourth of all U.S. wheat exports in the Western Hemisphere during this period were sent to Mexico. However, exports to Mexico are less than 4 percent of all U.S. wheat exports because most U.S. wheat exports are sent to the Eastern Hemisphere. The United States imports a significant amount of wheat from Canada, but very little wheat is imported from other Western Hemisphere countries.

Mexico is a greater destination for U.S. soybean exports. Most U.S. soybean exports in the Western Hemisphere are imported by Mexico, and Mexico imports more than 10 percent of all U.S. soybean exports. The United States imports only minimal amounts of soybeans. U.S. imports of soybeans averaged only 129 thousand metric tons during the 1991-2000 period, and most of these imports came from Canada.

Mexico is also the leading Western Hemisphere importer of U.S. corn, followed by Colombia, Canada, Venezuela, and the Dominican Republic. About 7 percent of all U.S. corn exports during this period were sent to Mexico, and close to 40 percent of U.S. corn exports in the Western Hemisphere were imported by Mexico. The United States imports minimal amounts of corn, and most of these imports are from Canada.

Wheat, corn, and soybeans are the top U.S. agricultural exports in Latin America, and the United States does not import these commodities from Latin American countries. But, exports of these commodities to Latin American countries other than Mexico are small when compared to total U.S. exports of wheat, corn, and soybeans. Reducing trade barriers could possibly create greater markets in Latin America for these commodities.

Table 2. U.S. Agricultural Products Imported from Western Hemisphere Countries/Regions

Origin/Product Imported	HS Code	Average Imports, 1991-2000 (thousand dollars)
Canada		
Live Bovine Animals	0102	841,974
Beef, fresh or chilled	0201	497,248
Pork	0203	348,031
Liqueur, Spirits	2208	336,444
Baked Bread, Pastry	1905	287,939
Chocolate	1806	241,345
Wheat	1001	237,054
Rapeseed, Colza, or Mustard Oil	1514	206,056
Live Swine	0103	180,933
Animal Feed Preparations	2309	178,425
Mexico		
Coffee, Coffee Husks	0901	422,531
Fresh Tomatoes	0702	397,521
Misc. Vegetables, fresh or chilled	0709	369,888
Beer made from malt	2203	354,777
Live Bovine Animals	0102	323,267
Liqueur, Spirits	2208	151,300
Vegetables, frozen	0710	125,107
Onions, shallots	0703	124,959
Melons, Watermelons	0807	119,863
Cucumbers, gherkins	0707	105,141
Caribbean		
Cigars, Cigarettes	2402	121,731
Cane or beet sugar	1701	112,824
Cocoa beans	1801	40,853
Coffee, Coffee Husks	0901	32,190
Tobacco Unmanufactured	2401	24,321
Ethyl Alcohol	2207	22,498
Manioc, Arrowroot	0714	17,581
Liqueur, Spirits	2208	17,120
Beer made from malt	2203	14,199
Dates, figs, pineapples	0804	11,608
Central America		
Bananas	0803	578,248
Coffee, Coffee Husks	0901	517,654
Cane or beet sugar	1701	156,156
Melons, Watermelons	0807	88,781
Dates, figs, pineapples	0804	63,611
Beef, frozen	0202	54,880
Beef, fresh or chilled	0201	38,166
Fruit & Vegetable Juices	2009	31,347
Vegetables, frozen	0710	30,601
Manioc, Arrowroot	0714	30,270
South America		
Coffee, Coffee Husks	0901	1,010,651
Bananas	0803	468,648
Cut Flowers, dried	0603	363,974
Fruit & Vegetable Juices	2009	361,145
Bovine Leather	4104	287,610
Grapes	0806	261,078
Tobacco Unmanufactured	2401	240,163
Prepared Meat	1602	204,043
Cane or beet sugar	1701	184,722
Coconuts, Brazil nuts, cashews	0801	125,539

Table 3. U.S. Wheat, Corn, and Soybean Exports to Leading Western Hemisphere Importers, Average 1991-2000

Wheat		Corn		Soybeans	
Destination	Average annual U.S. exports (metric tons)	Destination	Average annual U.S. exports (metric tons)	Destination	Average annual U.S. exports (metric tons)
Mexico	1,087,149	Mexico	3,302,722	Mexico	2,464,652
Venezuela	578,476	Colombia	955,584	Brazil	254,224
Colombia	434,330	Canada	906,505	Canada	165,418
Peru	364,874	Venezuela	785,126	Venezuela	153,061
Brazil	236,137	Dominican Republic	669,574	Costa Rica	141,590
Ecuador	204,978	Costa Rica	342,614	Trinidad and Tobago	81,845
Dominican Republic	199,090	Peru	330,868	Colombia	73,847
El Salvador	158,433	Chile	323,781	Argentina	51,351
Guatemala	155,579	Guatemala	241,542	El Salvador	33,279
Jamaica	151,382	El Salvador	190,611	Jamaica	26,909

Meat and Live Animals. Most Western Hemisphere trade of meat and live animals for the United States occurs with Canada or Mexico. Tables 4 and 5 show the top Western Hemisphere countries that the United States trades meat products and live animals with, respectively. The United States imports and exports only minimal amounts of meats and live animals with other countries within the hemisphere. There are a few exceptions.

The United States has actually had a trade deficit in beef with Latin America, but exports to Mexico have increased rapidly in recent years and there is now a trade surplus. Most U.S. beef exports to Latin America are imported by Mexico, while the U.S. imports beef from Argentina, Brazil, and a few other South and Central American countries. In recent years, U.S. beef imports from Canada have been more than twice the amount of beef imports from all of Latin America. Most U.S. pork exports to Latin America are sent to Mexico, and U.S. pork imports from Latin America are nearly non-existent. Most U.S. pork imports are from Canada.

A majority of U.S. poultry meat exports to Latin America are imported by Mexico; most of the remainder are sent to the Caribbean. Canada is also a significant importer of U.S. poultry meat. The United States imports only a small quantity of poultry meats, and nearly all of these imports are from Canada.

Live cattle and live swine trade within the Western Hemisphere is almost entirely with Canada and Mexico. Live swine imports are entirely from Canada; exports are much smaller and mostly to Mexico. While Canada and Mexico are also the United States' leading Western Hemisphere trade partners for live poultry, there are some significant live poultry exports to Brazil, the Bahamas, the Dominican Republic, and a few other Latin American countries, though exports to Canada are significantly larger. Nearly all of the U.S. live poultry imports are from Canada.

Table 4. U.S. Exports and Imports of Beef, Pork, and Poultry Meats with Western Hemisphere Countries, Average 1991-2000

Beef

Destination	Average annual U.S. exports (metric tons)	Origin	Average annual U.S. imports (metric tons)
Mexico	91,858	Canada	221,160
Canada	90,905	Argentina	41,441
Bahamas	1,156	Brazil	27,025
Cayman Islands	984	Costa Rica	16,561
Bermuda	925	Uruguay	12,240

Pork

Destination	Average annual U.S. exports (metric tons)	Origin	Average annual U.S. imports (metric tons)
Mexico	44,095	Canada	209,002
Canada	25,877	Mexico	18
Colombia	2,200		
Panama	1,211		
Guatemala	993		

Poultry meats

Destination	Average annual U.S. exports (metric tons)	Origin	Average annual U.S. imports (metric tons)
Mexico	190,863	Canada	6,729
Canada	75,905	Mexico	19
Jamaica	26,121		
Leeward & Windward Islands	18,867		
Netherlands Antilles	14,381		

Table 5. U.S. Exports and Imports of Live Cattle, Hogs, and Poultry with Western Hemisphere Countries, Average 1991-2000

Cattle

Destination	Average annual U.S. exports (animals)	Origin	Average annual U.S. imports (animals)
Mexico	141,974	Canada	1,167,203
Canada	114,414	Mexico	1,006,697
Brazil	883		
Venezuela	443		
Colombia	574		

Live Swine

Destination	Average annual U.S. exports (animals)	Origin	Average annual U.S. imports (animals)
Mexico	100,975	Canada	2,379,650
Canada	2,690		
Chile	498		
Guatemala	349		
Venezuela	340		

Live Poultry

Destination	Average annual U.S. exports (animals)	Origin	Average annual U.S. imports (animals)
Canada	27,487,440	Canada	8,416,228
Mexico	5,866,490	Argentina	3,637
Brazil	2,167,482	Peru	4,773
Bahamas	1,677,107	Uruguay	3,170
Dominican Republic	1,537,796	Guyana	1,647

Sugar. Table 6 shows the leading U.S. trading partners for sugar in the Western Hemisphere. U.S. sugar imports from these countries are greater than exports. The United States exports sugar to Canada, Mexico, Jamaica, Haiti, and Peru, and imports large amounts of sugar from Guatemala, the Dominican Republic, Brazil, and Colombia. Mexico is not listed among the top countries that export sugar to the United States, but sugar imports from Mexico have increased substantially in recent years, making Mexico one of the top sources for U.S. sugar imports. Imports from Mexico are expected to increase further under the North American Free Trade Agreement (NAFTA) due to a reduction in trade barriers.

Table 6. U.S. Sugar Exports and Imports with Western Hemisphere Countries, Average 1991-2000

Destination	Average annual U.S. exports (metric tons)	Origin	Average annual U.S. imports (metric tons)
Canada	59,996	Guatemala	248,356
Mexico	52,801	Dominican Republic	241,553
Jamaica	38,095	Brazil	201,991
Haiti	29,160	Colombia	100,933
Peru	27,099	Costa Rica	74,171
Dominican Republic	10,507	Argentina	74,005
Chile	6,077	El Salvador	68,214
Bahamas	5,810	Nicaragua	67,130
Netherlands Antilles	3,698	Peru	54,350
Barbados	2,426	Canada	52,895

The Free Trade Area of the Americas and Effects on U.S. Agricultural Trade

Negotiations are in progress for the Free Trade Area of the Americas (FTAA). The process, which involves 34 Western Hemisphere nations, began in December 1994 and is expected to conclude no later than 2005. The agreement would eliminate tariffs and create common trade and investment rules among the Western Hemisphere countries. The Economic Research Service remarks that the "U.S. interest in forming an FTAA stems in part from the broad goal of fostering economic and political security in the hemisphere and also from the desire to secure more open and transparent rules for U.S. trade and investment in the rapidly growing markets of Latin America" (ERS, p.11, April 1998).

The countries negotiating the FTAA agree that expanding access to agricultural markets is one of their top trade priorities, but they disagree on certain issues. There is a debate whether domestic support payments to farmers should be addressed. The United States believes that domestic supports can only be addressed at a global level and not in a regional trade agreement (U.S. GAO, 2001). The United States uses domestic support programs to compete in world markets with the European Union (EU). It is believed that eliminating or reducing domestic support programs in the United States, while the EU continues its programs, would be harmful and unfair to U.S. producers. Another issue for debate in the FTAA is how to treat import-sensitive agricultural products in the tariff negotiations.

The FTAA could have significant effects on agricultural trade, since the Western Hemisphere includes key markets for U.S. agricultural products and major suppliers of U.S. agricultural imports. The FTAA may be beneficial for U.S. agriculture because it will expand market opportunities by progressively eliminating tariffs and non-tariff barriers. U.S. agriculture could gain from tariff removal because agricultural tariffs are higher in other Western Hemisphere countries compared to the United States' tariffs. The United States imports a large quantity of products, such as coffee and bananas, with no tariffs on these commodities. Once tariffs are eliminated or reduced, it is expected that products that previously faced higher import barriers would experience faster trade growth. Such a theory would suggest that U.S. agricultural exports would grow faster than imports due to current differences in U.S. and foreign import barriers. Furthermore, tariffs on agricultural products in the Western Hemisphere tend to be higher than tariffs on other products, which would suggest that the FTAA may lead to more substantial increases in U.S. agricultural trade than in other sectors.

The FTAA will consolidate the numerous free trade agreements currently existing in the Western Hemisphere. There are about 30 different regional trade agreements of different types in the Western Hemisphere. These agreements can put non-participating countries at a competitive disadvantage. For example, the MERCOSUR trade agreement includes Argentina, Brazil, Paraguay, and Uruguay. Because of this agreement, U.S. exporters face tariff differentials in the MERCOSUR market that favor member suppliers. The FTAA will help U.S. exporters that are currently outsiders in many of the free trade areas (ERS, 2000).

Free trade agreements can affect trade in three ways: trade creation, trade diversion, and income effects. Trade creation occurs when trade flows increase due to the elimination or reduction of tariffs or other trade barriers. 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 if imports from one country increase at the expense of imports from a country outside of the free trade agreement. For example, a free trade agreement with Canada may increase imports from Canada, but overall trade may not change if imports from Canada are simply replacing imports from other countries. Trade diversion leads to less efficient allocation of resources in the global economy, and directly harms other countries outside of the agreement (ERS, April 1998). A key finding by Burfisher and Jones (1998) is that regional trade agreements have both trade-creating and trade-diverting effects in agriculture, but trade creation dominates in most regional trade agreements.

If tariffs are removed, the snapshot effects on trade can be analyzed by looking at 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). In the long-run, the FTAA would stimulate the growth and efficiency of members' factors of production (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.

Previous Studies

The U.S. Department of Agriculture's (USDA) 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 that includes the United States would cause annual U.S. farm income (in 1992 dollars) to increase by $180 million, and an FTAA that excludes the United States would cause annual U.S. farm income to be $50 million lower. These projected changes to farm income are relatively small. They found that an FTAA including the United States would increase annual U.S. agricultural exports by $580 million (1 percent) and imports by $830 million (3 percent), which is contrary to the theoretical argument that the FTAA would increase exports more than imports. An FTAA excluding the United States was found to decrease annual agricultural exports by $130 million (0.2 percent) and decrease imports by $90 million (0.3 percent). Their results suggest that the potential economic effects of the FTAA, with or without U.S. participation, would be relatively small in the short-run. Although ERS estimated that the FTAA with U.S. membership would increase imports more than exports, they estimated that U.S. farm income under this scenario would increase.

Diao et al. (1998) estimated the effects of an FTAA on U.S. agricultural trade. Their results suggest that U.S. exports would increase more than U.S. imports under this agreement, and that U.S. exports and imports would both increase even if the United States was not involved in the agreement. They found that U.S. exports and imports would increase by 7.9 percent and 6.5 percent, respectively, under an FTAA that included the United States, and U.S. exports and imports would increase by 6 percent and 3.2 percent, respectively, under an FTAA that excluded the United States. The United States can increase exports to Western Hemisphere countries under an FTAA that does not include the United States because the trade agreement could create economic growth and trade opportunities in these countries. Diao et al. found that the growth in U.S. agricultural trade would be greater than the growth in overall U.S. trade, and that the effect of an FTAA on trade flows would be greater than the effect on economy-wide factors such as GDP and total consumption. They found that U.S. GDP, total consumption, and farm income would increase modestly under an FTAA.

Results from the ERS and Diao et al. seem to suggest that an FTAA would have positive but modest effects on U.S. agriculture overall. Diao et al. remarked, however, that the gains in U.S. agricultural exports and farm income in the short- and medium-run may disappear in the long-run due to increased competitiveness from developing Western Hemisphere countries that could compete with the United States in third country export markets. These countries may become competitors for U.S. agricultural products once they catch up with the United States' advanced technology.

Possible Effects of the FTAA on Specific Agricultural Commodities

While the overall effect of the FTAA may be positive for U.S. agriculture, it will have different effects on producers of different products. As with any free trade agreement, there will be winners and losers. To create a trade agreement that benefits every sector may be impossible. The ERS (November 1998) examined how the FTAA would affect specific U.S. agricultural commodities.

The ERS suggests that Argentina would likely lose its wheat market share in Brazil to the United States and Canada, and that North American wheat trade would not change. Nonparticipation by the United States in the FTAA could hurt U.S. wheat exports because Argentina and Canada would have advantages in exporting to Western Hemisphere markets.

Argentina is a major competitor with U.S. corn and is the only serious competitor in the hemisphere. Mexico is a major importer of corn, and Brazil is expected to increase corn imports (ERS, November 1998). The United States has logistical and transportation advantages in shipping to Mexico, and Argentina has these same advantages in shipping to Brazil. It is unlikely that these advantages could be overcome under the FTAA. The key corn markets that would be influenced under the FTAA are Venezuela, Colombia, Ecuador, Peru, the Caribbean, and Central America (ERS, November 1998). The ERS concludes that there would be limited gains for both Argentina and the United States if tariffs are eliminated.

ERS expects that U.S. soybean exports would benefit from the removal of tariffs, and that U.S. imports of soybeans or soybean meal would not likely be affected. Exports of soybean oil and soybean meal could increase to several countries that may decide to import these products instead of crushing soybeans.

The FTAA could change the source of U.S. beef imports, but it would not necessarily change the amount of total U.S. imports. Increased beef imports from Argentina and Uruguay under the FTAA could displace imports from Australia and New Zealand (ERS, November 1998). U.S. beef exports could expand slightly under the FTAA, but gains would likely be limited because the United States tends to export a higher quality grain-fed beef, and most of the non-NAFTA Western Hemisphere imports are lower-cost, grass-fed beef that is widely available elsewhere in the hemisphere (ERS, November 1998). U.S. beef exports may expand more significantly if the FTAA can increase incomes in the hemisphere.

It is unlikely that the FTAA would significantly affect U.S. pork trade, which is greatly influenced by health restrictions. The agreement would not likely significantly affect U.S. pork imports. Exports may increase slightly, but lower-cost products produced elsewhere may be more competitive (ERS, November 1998). The FTAA is also not expected to have much of an impact on U.S. poultry meat trade, which is also greatly influenced by health restrictions (ERS, November 1998). The ERS also doesn't expect U.S. dairy trade to be significantly impacted. U.S. dairy exports could displace some of Argentina's exports to Brazil, but U.S. imports from Argentina could increase.

Wheat, corn, and soybean trade could show modest gains under the FTAA, while changes in meat trade may only be minimal. Some commodities, though, could experience trade losses under the FTAA. The FTAA could have major implications for the U.S. sugar industry. A significant amount of sugar is produced in Latin American countries, and the FTAA would give U.S. consumers access to inexpensive imported sugar from low-cost producers such as Brazil. ERS reports that imports of sugar could increase, and U.S. prices, production, and exports could significantly decline.

Empirical Model

An econometric model is developed to estimate the effects of macroeconomic factors on the flow of U.S. agricultural trade with Western Hemisphere countries. Two models are developed: one for U.S. agricultural exports to Western Hemisphere countries and one for U.S. agricultural imports. Panel data are used in the analysis. Twelve years of annual data (1989-2000) and ten countries are used in each model. The top ten Western Hemisphere countries that imported U.S. agricultural products during the 1989-2000 period were Canada, Mexico, Venezuela, the Dominican Republic, Colombia, Brazil, Peru, Guatemala, El Salvador, and Jamaica. Tariff data for the Dominican Republic, Peru, and Jamaica are not available, so they could not be used in the model. The other seven countries are used in the export model, and Costa Rica, Panama, and Argentina are added. The export model is specified as

$$X_{it} = f(RGDP_{it}, RER_{it}, TAR_{it}, D)$$

where X_{it} = U.S. exports of agricultural products to country i in time t
$RGDP_{it}$ = Real GDP in importing country i in time t
RER_{it} = Real exchange rate between the United States and importing country i in time t
TAR_{it} = Import tariffs on agricultural products in country i in time t
D = Dummy variables for countries and NAFTA.

The top ten Western Hemisphere countries that exported agricultural products to the United States during this period were Canada, Mexico, Brazil, Colombia, Chile, Costa Rica, Guatemala, Argentina, Ecuador, and the Dominican Republic. These ten countries are used in the import model. The import model is specified as

$$M_{it} = f(USRGDP_{it}, RER_{it}, USTAR_{it}, TR_t, D)$$

where M_{it} = U.S. imports of agricultural products from country i in time t
$USRGDP_{it}$ = Real GDP in the United States in time t
RER_{it} = Real exchange rate between the United States and exporting country i in time t
$USTAR_{it}$ = U.S. import tariffs on agricultural products in time t
TR_t = Trend variable
D = Dummy variables for countries.

It is expected that an increase in income in the importing country will result in an increase in that country's imports of agricultural products. An increase in real GDP should increase imports, depending on how sensitive the consumption of those products is to changes in income. It is likely that income changes in Western Hemisphere countries will have a greater impact on U.S. agricultural exports to those countries than would changes in U.S. income on U.S. agricultural imports, because U.S. food consumption should not be as sensitive to changes in income.

Economic theory predicts that U.S. imports will increase when the U.S. dollar strengthens relative to the currency of the exporting country, and vice versa. Further, U.S.

exports should decrease when the U.S. dollar strengthens relative to the currency of the importing country, and vice versa. As the U.S. dollar gains strength, U.S. exports become more expensive in the foreign market, and foreign goods become less expensive in the U.S. market.

Tariffs are a barrier to trade; it is expected that the existence of tariffs will have a negative effect on trade flows. Agricultural tariffs between the United States and Canada were gradually reduced under the Canada - U.S. Free Trade Agreement (CUSTA), starting in 1989, and have now been eliminated. Agricultural tariffs between the United States and Mexico are being gradually reduced under NAFTA, which started in 1994, and should be eliminated by the end of this decade. Agricultural tariffs between the United States and other Western Hemisphere countries still exist, creating a trade barrier. Reduction of these tariffs under the FTAA should result in an increase in trade flows. It is expected that tariffs may have a greater effect on U.S. exports than on imports for two reasons: agricultural tariffs are generally greater in other countries than they are in the United States (some products that the United States does not produce and imports from Latin American countries, such as coffee and bananas, have no tariffs), and U.S. food consumption is not likely to be as price-sensitive as consumption in other countries.

Nine dummy variables for the ten countries are included in the model to determine if there are regional differences in export or import behavior. The dummy variable for Brazil is not included to avoid a multicollinearity problem. A dummy variable for NAFTA is included in the export model, and a trend variable is included in the import model.

Estimation Procedure

The models use panel data with twelve time series observations and ten cross sections, resulting in 120 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. The covariance matrix is estimated by a two-stage procedure leading to the estimation of model regression parameters by generalized least squares (GLS).

Data

Annual data from 1989 to 2000 for ten countries are used in each model. U.S. agricultural exports and imports to and from each country were obtained from the Foreign Agricultural Trade of the United States (FATUS) data set on the USDA's ERS website. These data are originally from the Census Bureau of the U.S. Department of Commerce. The data are measured in U.S. dollars and are converted into real dollars for the analysis using the Consumer Price Index. The dependent variable in these models, therefore, is measured as the value of exports or imports rather than the quantity. Since the dependent variable is the exports or imports of all agricultural products, a quantity measure is difficult to obtain and would not be very meaningful.

Real exchange rate data between the U.S. dollar and each foreign currency were obtained from the ERS. These data are measured as the foreign currency per U.S. dollar, which means that an increase indicates appreciation of the U.S. dollar, and a decrease means depreciation.

The exchange rates were converted to an index. It is necessary to convert the exchange rates to an index because, in the panel data, the exchange rate variable includes exchange rates for ten different countries with different units of measure; this variable needs a consistent unit of measure to be meaningful. The exchange rates are indexed by dividing the exchange rate in each year by the average exchange rate over the 1989-2000 period and then multiplying it by 100, so 100 equals the average exchange rate between the United States and that country, and values above or below 100 indicate the exchange rate is above or below the average.

Real GDP data for each country were obtained from the International Monetary Fund's World Economic Outlook Database. These data are converted to U.S. dollars to maintain a common unit of measure.

Tariff data were obtained from the Agricultural Market Access Database (AMAD). AMAD is a cooperative effort among Agriculture and Agri-Food Canada, EU Commission - Agriculture Directorate-General, Food and Agriculture Organization of the United Nations, Organization for Economic Co-operation and Development, The World Bank, United Nations Conference on Trade and Development, and the USDA's ERS.

One of the limitations of this study is the tariff data: data are not available for every year, and some of the data used in the study are estimates. The AMAD database lists tariffs by HS code for each country used in the study for selected years from 1995-1999. It is assumed in this study that tariffs prior to 1995 are the same as they were in 1995, and data for missing years are the average of surrounding years. These assumptions are reasonable because the data indicate that there has been little change in tariff levels. The database includes tariffs for agricultural goods classified at the HS 8-digit level. There is no aggregate tariff level for all agricultural goods, so one had to be calculated. A trade-weighted tariff level for each country is calculated by determining the average tariff level of the major agricultural products imported or exported by the United States, with weights given to each product based on how much that product is traded. Tariffs with Canada were gradually eliminated under CUSTA, and tariffs with Mexico have been gradually falling under NAFTA.

Results

Results indicate that exchange rates and tariffs affect trade of agricultural products with Western Hemisphere countries, and real GDP in importing countries affects U.S. agricultural exports. The estimated models are presented in Table 7. The R^2s are 0.98 for the export model and 0.82 for the import model, indicating that the models are a good fit.

Every variable, except for real GDP, is significant at the 10 percent level in the import model, and all variables are significant at the 1 percent level in the export model. Results indicate that real GDP in Western Hemisphere countries has a positive effect on U.S. agricultural exports to those countries, but U.S. real GDP does not significantly affect the level of U.S. imports. Results support the theory that U.S. dollar appreciation has a negative effect on exports and a positive effect on imports. The results also show that tariffs have a negative effect on agricultural trade flows.

The trend variable in the import model indicates that imports have been trending upward after accounting for GDP, exchange rates, and tariffs. The NAFTA dummy variable in the export model is positive and significant, indicating that exports to Canada and Mexico have increased under NAFTA even after accounting for the reduction in tariffs. The dummy variables for the countries are all highly significant, and the results of an F-test indicate that jointly they are very significant. This result indicates that there is strong regional differentiation in export and import behavior. Holding all other variables constant, U.S. agricultural trade with Canada is much greater than agricultural trade with the other countries, and agricultural trade with Mexico is greater than that with the other Latin American countries.

Elasticities are reported on the bottom of Table 7. The reported elasticities are the percent change in the value of imports or exports given a 1 percent change increase in real GDP, the real exchange rate, or tariffs. The elasticities indicate that a 1 percent increase in real GDP in an importing country would result in a 0.276 percent increase in U.S. agricultural exports to that country. The results show that U.S. imports are more sensitive than exports to changes in exchange rates, which is somewhat surprising. The elasticities also show that U.S. exports are more sensitive than imports to tariffs. This result is important because it indicates that a reduction or elimination of agricultural tariffs in Western Hemisphere countries would have a greater effect on U.S. exports than it would on U.S. imports. The elasticities indicate that a 100 percent decrease in tariffs under an FTAA would increase agricultural exports by 12.1 percent and imports by 5.2 percent.

Table 7. Estimated Models

	Exports	Imports
	estimated coefficients (p-values in parentheses)	
Intercept	-744,520,000 (0.0001)	859,564,000 (0.0018)
Real GDP	1,452,000 (0.0001)	4,000 (0.879)
Real exchange rate	-306,000 (0.0005)	3,083,000 (0.0001)
Tariffs	-13,515,000 (0.0001)	-7,878,000 (0.0432)
Trend		24,380,000 (0.0004)
D_{NAFTA}	1,083,910,000 (0.0001)	
D_{Canada}	4,177,349,000 (0.0001)	3,724,787,000 (0.001)
D_{Mexico}	3,588,495,000 (0.0001)	1,899,943,000 (0.0393)
$D_{Colombia}$	1,457,790,000 (0.0001)	-423,064,000 (0.0852)
D_{Chile}		-796,862,000 (0.0011)
$D_{Guatemala}$	1,043,884,000 (0.0001)	-700,640,000 (0.0042)
$D_{Venezuela}$	1,328,243,000 (0.0001)	
$D_{El\ Salvador}$	1,019,117,000 (0.0001)	
$D_{Dominican\ Republic}$		-821,396,000 (0.0005)
$D_{Ecuador}$		-1,245,781,000 (0.0001)
D_{Panama}	1,009,511,000 (0.0001)	
$D_{Costa\ Rica}$	999,461,000 (0.0001)	-796,017,000 (0.0011)
$D_{Argentina}$	667,578,000 (0.0001)	-866,845,000 (0.0007)
R^2	0.9832	0.8215
Elasticities		
Real GDP	0.276	0.024
Real exchange rate	-0.030	0.244
Tariffs	-0.121	-0.052

Effect of Tariff Removal on Trade Flows

The estimated model is used to forecast U.S. agricultural exports and imports to and from select countries. The projections are made using forecasted GDP and exchange rates from the Food and Agricultural Policy Research Institute (FAPRI 2001). The purpose of the projections is to estimate the effect of tariff reduction or elimination. Projections are made for three significant importing and exporting countries for which forecasted GDP and exchange rate data are available: projections are made for exports to Venezuela, Colombia, and Brazil, and imports from Brazil, Colombia, and Argentina.

Trade flows are projected for three scenarios: tariffs remain the same, tariffs are gradually reduced, and tariffs are totally eliminated at one time. It is most likely that tariffs would be removed gradually, though the procedure that would be used for tariff reduction is not known. Under the tariff reduction scenario in this study, tariffs are reduced 10 percent each year starting in 2005. Under the tariff elimination scenario, tariffs remain the same until 2005 and are totally removed in 2005. Figures 7-9 show projected exports to Venezuela, Colombia, and Brazil; and Figures 10-12 show projected imports from Brazil, Colombia, and Argentina. The solid line in the figures is the projected exports or imports with tariffs remaining the same, the dashed line on top is the projected exports or imports if tariffs are totally removed in 2005, and the dotted line in the middle is projected exports or imports if tariffs are gradually eliminated starting in 2005. The projections show that U.S. agricultural exports would increase more than imports.

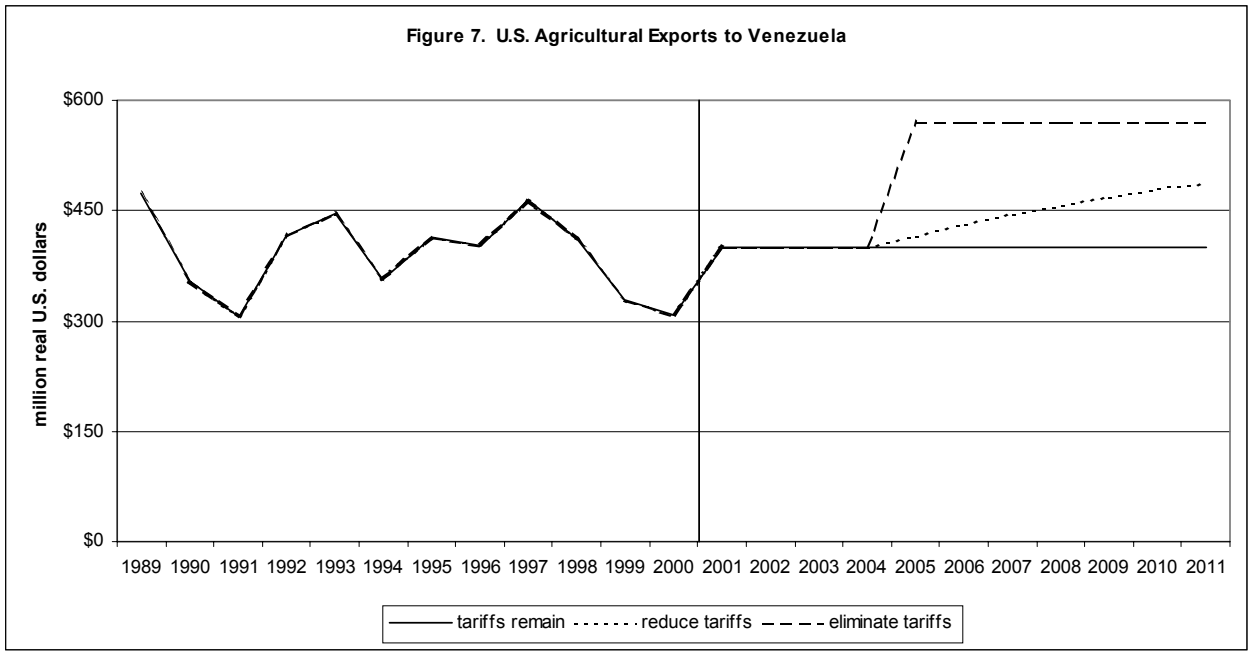


Figure 8. U.S. Agricultural Exports to Colombia

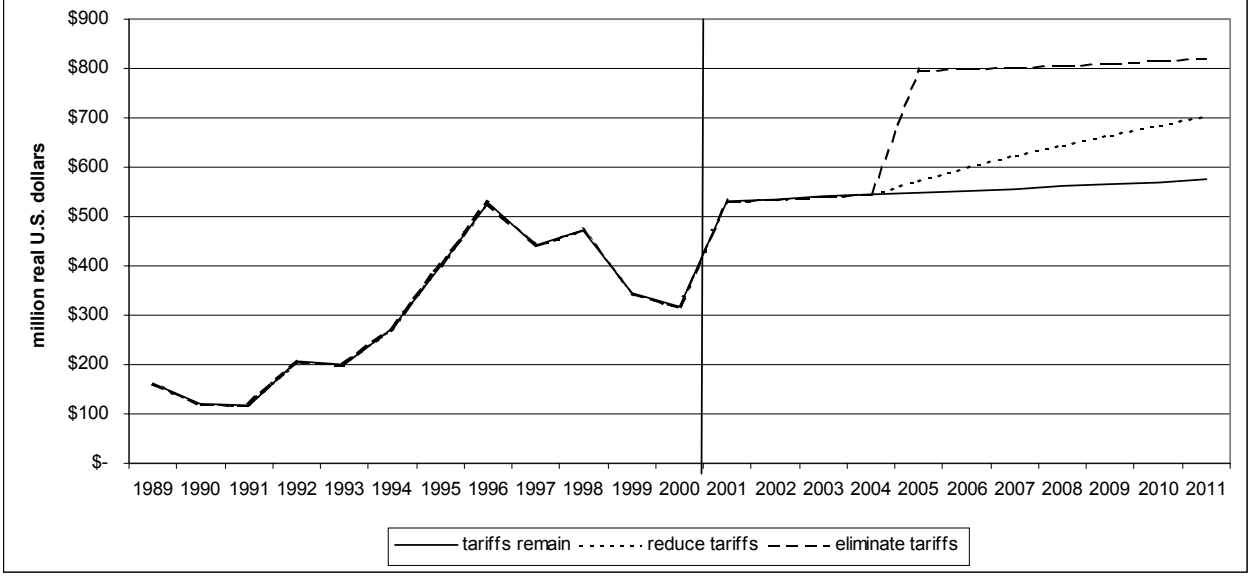


Figure 9. U.S. Agricultural Exports to Brazil

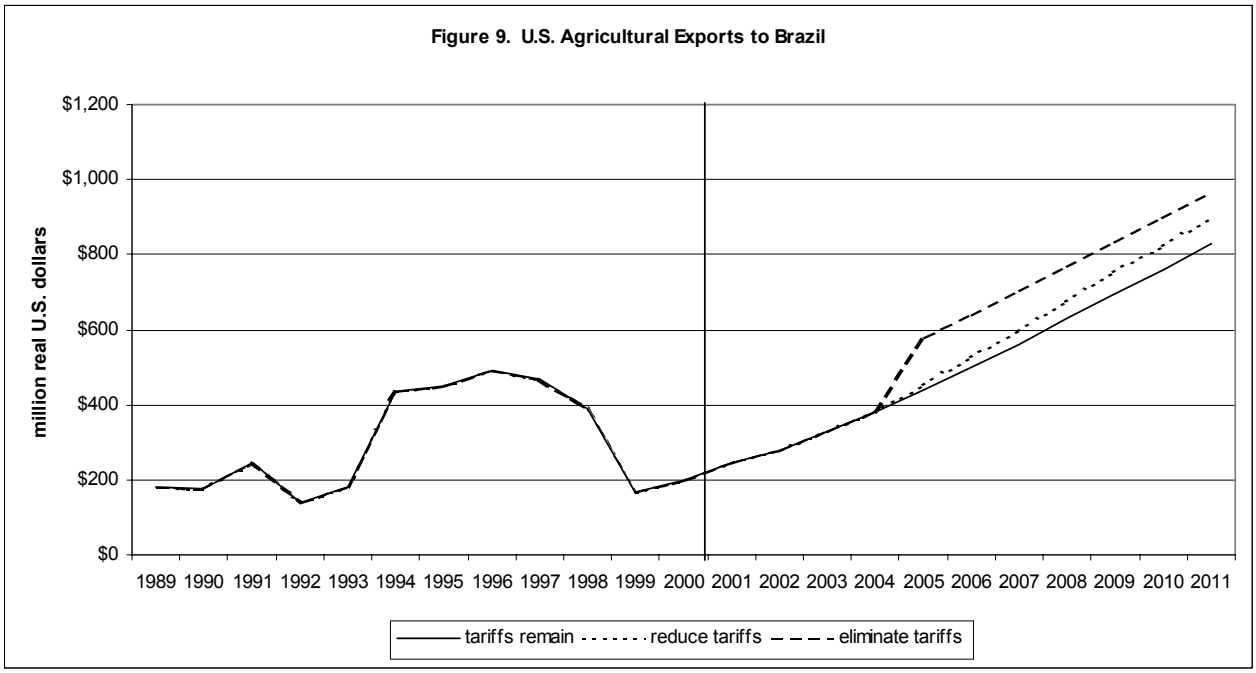


Figure 10. U.S. Agricultural Imports from Brazil

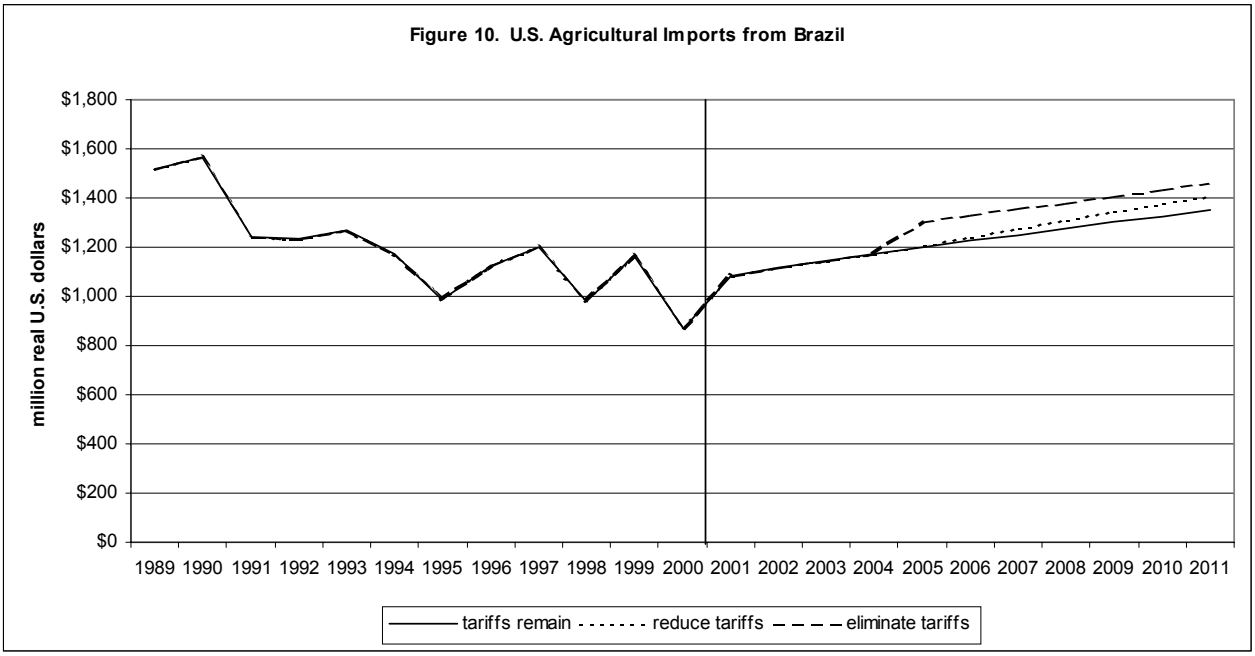
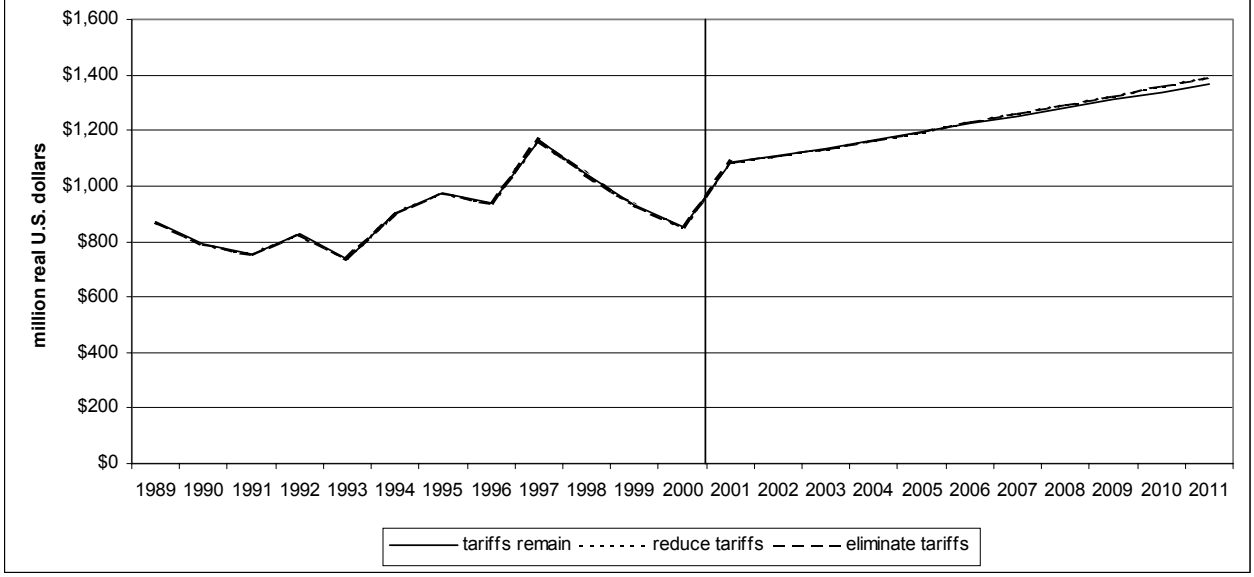
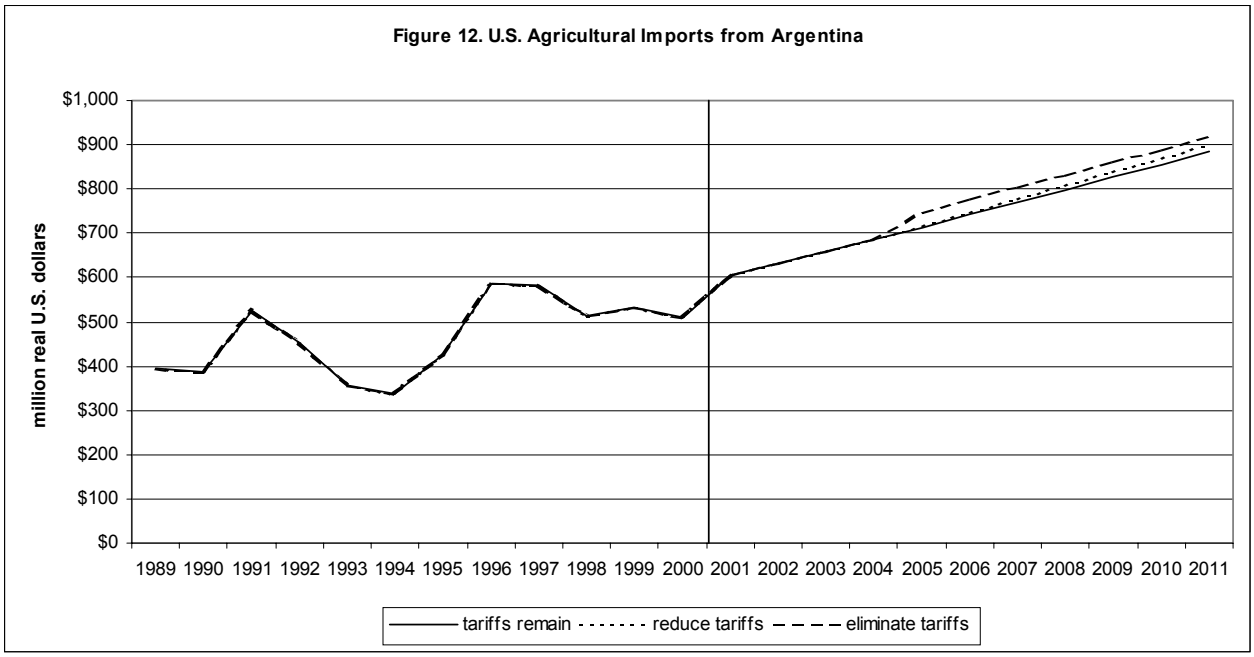


Figure 11. U.S. Agricultural Imports from Colombia





Conclusions

Results from the estimated models suggest that U.S. agricultural exports within the hemisphere are positively influenced by real GDP in the importing country and negatively influenced by the strength of the U.S. dollar and tariffs in importing countries. U.S. agricultural imports are positively affected by the strength of the U.S. dollar and negatively affected by U.S. tariffs. Imports appear to be more sensitive than exports to exchange rate changes, and imports are not affected by changes in U.S. real GDP. Results suggest that tariffs have a greater effect on U.S. exports than they do on imports.

The estimated model is used to project agricultural trade with select Latin American countries. The projections indicate that reduction or elimination of tariffs on agricultural products would increase U.S. exports more than U.S. imports. The effect on exports is greater because tariffs are higher in Latin American countries than they are in the United States, and the estimated elasticities are higher for exports than they are for imports, which indicates that food consumption is more price-sensitive in other countries. The increase in exports could likely include wheat, corn, soybeans, and possibly meat, which would benefit producers in the Northern Plains. The increase in imports would likely include sugar, which could be harmful for U.S. sugar producers.

The export and import projections simply analyze the trade creation effect of removing tariffs. The increase in exports may be greater due to income effects. The projections assume an increase in real GDP, but the FTAA could have a positive effect on income in Latin America countries that causes real GDP to grow faster than currently projected. Such an effect would cause a greater increase in U.S. exports.

References

Agricultural Market Access Database. http://www.amad.org/. Accessed November 2001.

Burfisher, Mary, and Elizabeth Jones, editors. *Regional Trade Agreements and U.S. Agriculture.* Economic Research Service, U.S. Department of Agriculture. Agricultural Economic Report No. 771. November 1998.

Diao, Xinshen, Agapi Somwaru, and Terri Raney. "How Western Hemisphere Integration Affects the U.S. Economy in an Intertemporal Global Model," Selected Paper for the AAEA Meetings, Salt Lake City, 1998.

Economic Research Service, U.S. Department of Agriculture. Foreign Agricultural Trade of the United States Database. http://www.ers.usda.gov/Data/FATUS/. Accessed October 2001.

Economic Research Service, U.S. Department of Agriculture. *Free Trade in the Americas: International Agriculture and Trade*. Report Coordinators: Terri Raney and John Link. November 1998.

Economic Research Service, U.S. Department of Agriculture. "Free Trade Area of the Americas: Potential Advantages For U.S. Agriculture," *Agricultural Outlook*, April 1998.

Economic Research Service, U.S. Department of Agriculture. "Free Trade Area of the Americas: What Are the Benefits For U.S. Agriculture?" *Agricultural Outlook*, April 2000.

FAPRI 2001 U.S. and World Agricultural Outlook. Food and Agricultural Policy Research Institute, Iowa State University, University of Missouri-Columbia. Ames, Iowa. January 2001.

International Monetary Fund. *World Economic Outlook Database*. May 2001. http://www.imf.org/external/pubs/ft/weo/2001/01/data/index.htm

Parks, R.W. "Efficient Estimation of a System of Regression Equations when Disturbances are both Serially and Contemporaneously Correlated," *Journal of American Statistical Association*, Vol. 62, 500-509, 1967.

U.S. General Accounting Office. *Free Trade Area of the Americas: Negotiators Move Toward Agreement That Will Have Benefits, Costs to U.S. Economy*. Report to the Ranking Minority Member, Committee on Finance, U.S. Senate. September 2001.