FREE TRADE IMPACTS ON U.S. AND SOUTHERN AGRICULTURE

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In June 1991, the United States and Mexico agreed to work toward the formation of a free trade area (FTA), in which trade barriers between the two countries will be gradually reduced and eliminated. An FTA is expected to deepen a trade relationship that has always been important to the two countries, and which has been expanded by the unilateral trade liberalization initiated by Mexico in 1983. A U.S.-Mexico FTA will be an important development for U.S. agriculture. In 1990, Mexico ranked among the top four markets for U.S. agricultural exports and imports. Mexico's share of U.S. agricultural trade has increased since the mid-1980s, and could expand further if trade barriers are removed.

Some characteristics of the agricultural sectors in the United States and Mexico will likely complicate negotiations. Trade barriers of both countries in agriculture are high relative to barriers in other sectors, signaling the sensitivity of the farm sector to import competition. Nontariff barriers in agriculture, including quotas and phytosanitary regulations, impede U.S.-Mexican agricultural trade. Nontariff barriers are difficult to measure, and their exclusion from the U.S.-Canadian FTA indicates how hard they are to remove.[1]

Both countries have extensive policy intervention in their farm sectors. Their domestic farm programs, designed to support farm prices and income, distort trade and rely on trade barriers to be effective. Mexico has already undertaken significant, unilateral policy changes, including reduction of agricultural input subsidies, elimination of price controls for some commodities, and a reduction of government's role in agricultural marketing and trade. But the link between Mexico's remaining agricultural import quotas and its domestic farm programs will create a need for further domestic farm policy changes under an FTA. Whether and how Mexico restructures its domestic farm programs to accommodate changes in its trade policies will have a significant impact on prospects for U.S. agricultural export growth.

Relatively high protection, the prevalence of nontariff barriers, and the links between trade and domestic farm programs are special characteristics of the agricultural sector that make the comprehensiveness of its treatment under an FTA difficult to predict. In this paper, we do not attempt to identify specific points that may or may not be included in any negotiated agreement, but rather assume that a U.S.-Mexico FTA will lead to removal of tariffs and quotas, and we analyze the effects of such an FTA on U.S. and southern agriculture.

The next section of this paper describes U.S.-Mexico agricultural trade and bilateral trade barriers in agriculture. The third section reviews analyses of the FTA from economywide models and the USDA Static World Policy Simulation model (SWOPSIM). We attempt to find a consensus from this research on the effects of an FTA on U.S. agriculture, and we discuss the factors determining the effects of an FTA, including labor migration, domestic farm program reforms, and income growth. The fourth section incorporates the findings of selected studies for U.S. agriculture at the national level into a regional U.S. model to determine the implications of an FTA for southern U.S. grains, oilseeds, and livestock. The effect of an FTA on southern fruits and vegetables is discussed in the fifth section.

Our four main conclusions are presented in the final section. First, an FTA will eliminate Mexican barriers, already unilaterally and substantially reduced since 1986, to U.S. agricultural exports. Since 1988, transitional adjustments in Mexico's border policies have tended to "tariffy" its remaining trade barriers, with a further reduction of quota protection accompanied by a slight increase in tariff rates. Second, given the already low U.S. and Mexican trade barriers and the small share of exports to Mexico in U.S. agricultural output, effects of an FTA on U.S. agricultural production and trade are likely to be small, except in a few commodities such as U.S. corn, for which Mexico has maintained quotas, and

[1] For example, Goodloe and Link (1991) found that most nontariff barriers and domestic programs in place under the U.S. - Canadian free trade agreement.

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U.S. horticultural products, for which U.S. tariffs are high. Third, some of the important effects of an FTA on U.S. agriculture could stem from Mexican labor migration, Mexican domestic farm program changes, and the potential for long-term economic growth in Mexico.

Fourth, the effects of an FTA on combined net farm revenues of southern U.S. producers of grains, oilseeds, and livestock are estimated to range between modest net gains or losses. Southern U.S. grain and oilseed producers will benefit from expansion of bilateral exports, although absolute gains will be small since they are not major producers of these crops. The effects on net farm revenues of livestock producers depend on whether the FTA is assumed to reduce or increase U.S. net cattle imports from Mexico. In some southern regions, producer revenue will be higher if U.S. cattle imports fall, but lower in all southern regions if U.S. cattle imports rise. Increased U.S. grain exports raise U.S. feed prices and southern livestock producers would be hurt more than the rest of the country becuase of their higher feed costs per unit of output. The fruit and vegetable sector will register both gains and losses, as export opportunities for both countries expand under an FTA.

TRENDS IN THE U.S.-MEXICO AGRICULTURAL TRADE

The Composition of U.S.-Mexico Agricultural Trade

In 1990, Mexico was our fourth largest agricultural export market, following Japan, Canada, and South Korea, and it was our second largest import supplier after Canada. Mexico has been a dynamic market for U.S. agriculture. In 1990, the United States exported $2.5 billion of agricultural products to Mexico, a 14-percent increase from 1988. U.S. agricultural imports from Mexico, worth $2.6 billion in 1990, represented a 43-percent increase from 1988. By comparison, U.S. agricultural exports to and imports from the world market increased 6 percent and 9 percent, respectively, during the same period.

U.S.-Mexican agricultural trade is mostly complementary. Grains and feeds accounted for almost two-fifths of U.S. agricultural exports to Mexico in 1990, with corn and sorghum accounting for over 75 percent of that category. Oilseeds, of which 62 percent was soybeans, accounted for 13 percent of U.S. agricultural exports to Mexico. Other important U.S. farm exports to Mexico are meat products, vegetables, sugar products, seeds, fats and oils, poultry, dairy, and hides and skins (Fig. 1).

U.S. agricultural imports from Mexico include horticultural products, live animals, coffee, and beer. Mexico is our major supplier of fresh tomatoes (14 percent of Mexico's agricultural exports to the United States) and other fresh vegetables such as peppers, squash, cucumbers, asparagus, onions, cauliflower, broccoli, and eggplants. Many of these vegetables are shipped to the United States during the winter months when U.S. supplies are low. Mexico also exports frozen vegetables such as cauliflower and broccoli to the U.S. market. Live feeder cattle account for over 16 percent of Mexican agricultural exports to the United States (Fig. 2).

Trade Barriers In U.S.-Mexico Agricultural Trade

The structure of agricultural trade barriers differs between the two countries. U.S. agricultural import barriers on Mexican products are mainly tariffs, but Mexico additionally applies import quotas to a significant share of its agricultural imports from the United States. In 1990, the trade-weighted average U.S. tariff on agricultural imports from Mexico was 5.7 percent (Tables 1-3).[2] This average tariff rate takes into account the duty-free treatment of many products exported by Mexico to the United States under the Generalized System of Preferences (GSP). The GSP permits preferential tariff treatment to selected developing countries. A developing country can be graduated out of GSP treatment when it becomes "competitive" with U.S. producers; this generally occurs when the country provides over 50 percent of total U.S. imports of a commodity. Mexico is thus no longer eligible for GSP treatment on winter tomatoes, cauliflower, brussels sprouts, guavas, mangoes, and melons.

U.S. tariff rates vary among commodities. U.S. import tariffs on Mexican horticultural products average 13 percent, and reach 37-percent *ad valorem* equivalent on some items. The United States also employs seasonal tariffs on some commodities, including tomatoes, cucumbers and eggplants. The United States maintains quotas on sugar, dairy, some meats, and a few other farm commodities. These quotas have not handicapped Mexican exports. Mexico tends to be a net importer of products that fall under U.S. agricultural quotas under Section 22, including nonfat dry milk. While the United States limits meat imports under the Meat Import Law, which applies to fresh, chilled, and frozen beef, veal,

[2] Average tariff rates are calculated using 1989 trade weights.

Table 1. Mexican Tarifs and Nontariff Barriers on Selected Agricultural Imports from the United States

	1988 ad valorem tariffs	1991 ad valorem tariffs	1988 import licenses	1991 import licenses	1989 value of imports from U.S. ($1,000)
Corn	0	0	yes	yes	403,515
Soybeans[a]	0	0	no	no	273,012
Sorghum[b]	0	0	no	no	267,237
Pork, hams	0	0.2	no	no	48,411
NFD milk	0	0	yes	yes	68,811
Wheat	0	0	yes	yes	61,233
Rice, long grains	0.1	0.2	no	no	55,789
Beans, pinto	0.1	0.1	no	no	55,046
Poultry	0	0.1	yes	yes	49,911
Tallow, inedible	0	0.1	yes	no	44,099
Tallow, edible	0	0.1	yes	no	21,635
Offal, edible	0	0.2	no	no	22,844
Barley, malting	0	0.05	yes	yes	21,125
Fruits	0.2	0.2	no[c]	no[c]	29,375
Apples	0.2	0.2	yes	yes	4,755
Malt	0.1	0.1	no	yes	23,900
Dorum wheat	0.1	0.1	yes	yes	2,100
Horse meat, fresh	0	0.1	no	no	10,692
Tongues / livers, bovines	0	0.2	no	no	13,188
Bones and horn	0.05	0.1	no	no	11,447
Fresh vegetables	0.1	0.1	no	no	6,183
Sugar, cane or beet	0	Variable levy changing monthly, 55% in May	no	no	56,784
Hide, cattle, whole	0	0	no	no	62,886

[a]A 10-percent seasonal tariff applied during October to December.
[b]A 15-percent seasonal tariff applied during May 1 to December 15.
[c]Except fresh table grapes, apples, and peaches.

mutton and goat meat, Mexico has not exported these meats to the United States since 1983. Other U.S. quotas that could affect Mexican exports to the United States, including quotas on beer, have either been set high enough to be nonbinding or have not been put into effect.

Mexico has already liberalized its trade policies since the mid-1980s as part of an economic restructuring following the debt crisis. Mexico also became a contracting party to the GATT in 1986, reducing maximum tariff rates from 100 percent to 20 percent. Fewer commodities are subject to import licensing, and the role of CONASUPO, the state marketing agency, has been reduced. Although import license requirements were removed for most agricultural commodities, many are still subject to sanitary and phytosanitary regulations.

In agriculture, Mexico has continued to readjust its trade policies. Changes in import policies between December 1988 and June 1991 (June 1991 is the date at which tariff rates are fixed for purposes of the negotiations) have raised tariffs but reduced the number of commodities requiring import licenses. The trade-weighted average agricultural import tariff by Mexico against the United States increased from 3.3 percent in 1988 to 5.7 percent in 1991. During the same period, quota restrictions were lifted for grain sorghum, soybeans and other oilseeds, vegetable oils, and sugar.

As of January 1991, licenses were required for a small number of commodities: corn for food use, wheat, poultry, eggs, nonfat dry milk, some cheeses, day-old chicks, potatoes, grapes, apples, peaches, coffee, barley, malt, lard, flue-cured tobacco, and cigars. Among the commodities remaining under

Table 2. U.S. Ad Valorem Tariffs and Nontariff Barriers on Selected Agricultural Imports from Mexico[a]

Items	1991 tariffs	1991 quotas	1989 agr. imports ($1,000)
Coffee	0.0		400,985
Bovines, live, 90kg to 320 kg	2.2 cents/kg or 1.7%	yes	281,963
Beer, glass	1.6 cents/hl	yes	128,605
Fresh tomatoes, 3/1-7/14, 9/1-11/1	4.6 cents/kg or 8.3%		112,205
Fresh tomatoes, 11/15-end of Feb.	3.3 cents/kg or 5.1%		100,443
Peppers & other fresh chilli	5.5 cents/kg or 9%		62,236
Onions and shallots	3.9 cents/kg or 9.7%		57,817
Cucumbers, 12/1-end of Feb.	4.9 cents/kg or 11.3%		56,769
Cucumbers, 3/1-4/30	6.6 cents/kg or 15.6		18,511
Cucumbers, 5/1-6/30, 9/1-11/30	6.6 cents/kg or 13.8		8,381
Frozen broccoli and cauliflower	17.5%		82,074
Frozen orange juice	9.25 cents/hl or 27.9%		45,345
Asparagus, fresh 11/6-9/14	25%		14,203
Guavas, mangoes, fresh 10/1-5/3	8.6%		13,303

[a]Based on 1989 trade weights.

license restrictions, corn and wheat are major U.S. exports to Mexico. Tariff equivalents of the import licenses for corn and wheat were estimated to be 73 percent and 50 percent respectively in 1990. Although some commodities important to U.S. farm exports continue to require import licenses, the sustained move by Mexico to relax its agricultural quotas has reduced the share of U.S. farm exports to Mexico under quota from 57 percent in 1988 to 26 percent in 1991.

The path to a more market-oriented economy has not been without difficulty for Mexico. Sorghum and sugar are two examples of recent Mexican policy adjustments in which trade barriers were initially lowered but then raised because of the ensuing market disruptions. For sorghum, removal of the import quota in 1989, coupled with a lower domestic producer price, resulted in increased U.S. sorghum exports to Mexico and a temporary surplus of sorghum. In 1990, the Mexican Government responded by imposing a seasonal *ad valorem* tariff of 15 percent on sorghum entering between May 1 and December 15.

Privatization of the Mexican sugar market resulted in a temporary shortage of sugar in Mexico. As a result, Mexico overbought sugar in the world market and entered the 1990-1991 marketing year with stocks of 1.3 million tons. Mexican sugar support prices exceed the world price, and without import licenses, Mexico has had to increase tariffs on imported sugar in order to support domestic producers. The variable tariffs effective February 1991 are set every month, adjusting for changes in exchange rates between the United States and Mexico. In May 1991, the tariff rate was 55 percent.

Table 3. Bilateral Aggregates Ad Valorem Tariffs[a]

	-- United States --		-- Mexico --	
	1988	1991	1988	1991
Average tariffs	4.5	4.5	10	13
Weighted average tariffs	5.7	5.7	3.3	5.7
Share of trade subject to quota	0.8	0.8	56.7	26
Agricultural imports, 1989, $mil	2,280		2,721	

[a]Based on 1989 trade weights

Since 1988, Mexican tariffs have increased on other U.S. exports, including vegetable oil, from 15 percent in 1988 and 1990 to 20 percent in 1991, and rice, from 10 percent to 20 percent during the same period. Mexico has also adopted seasonal tariffs on soybeans and safflower, in addition to sorghum.

EFFECTS OF AN FTA ON U.S. AGRICULTURE: A SURVEY OF RESEARCH

Is there a consensus on the effects of an FTA on U.S. agriculture? The prospects for a U.S.-Mexico

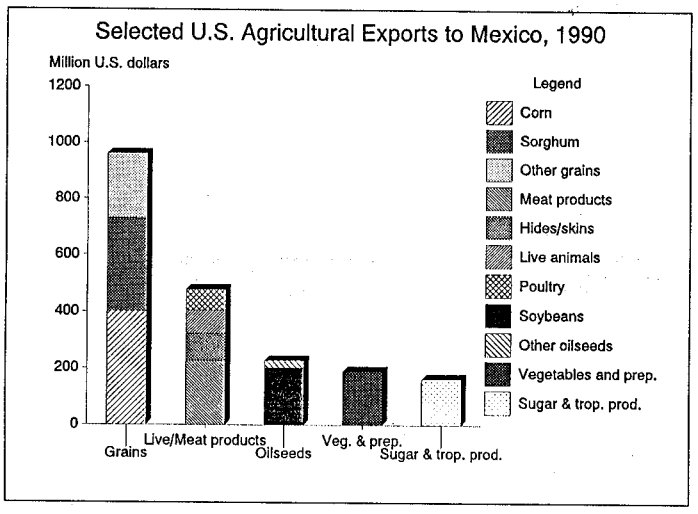

Figure 1. Selected U.S. Agricultural Exports to Mexico, 1990

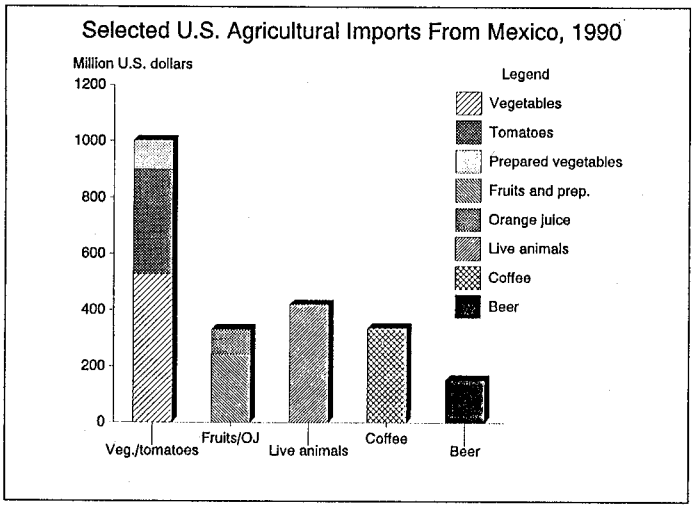

Figure 2. Selected U.S. Agricultural Imports From Mexico, 1990

FTA have stimulated a body of research on the likely impacts of the agreement. We reviewed nine analyses of the FTA (Tables 4 and 5), including partial and general equilibrium and multisector macroeconomic analyses, and compared their findings for a scenario of bilateral tariff and quota removal in all sectors.[3]

The studies differed in model structure, sectoral composition, assumptions about trade barriers and elasticities, and the variables that were reported in results. These dissimilarities resulted in substantial differences among them in the their estimated impacts of the FTA on agriculture. However, among

[3]The Levy and van Wijnbergen study is not included in Table 5, because the authors do not report their findings on trade.

Table 4. Basic Features of Models of U.S.-Mexico Free Trade

	Brown, Deardorff, Stern (1991)	Cox, Harris (1991)	Hinojosa, Robinson (1991)	Interindustry (1990)	ITC (1991)
Base year	1989	1981 with 1989 trade	1987, 1988	1988	
Model type	Multi-country CGE	CGE	Multi-country CGE	Linked macro models	Partial equil.
Countries	U.S., Mexico, Canada, 31 other	Canada	U.S., Mexico, rest	U.S., Mexico	U.S., Mexico
Scenario[a]	Tariff removal, U.S. increases Mex. quotas 25%		Tariff / quota removal and migration	Tariff and quota removal	Tariff and quota removal
Model features	Imperfect competition and economies of scale		Labor migration, AIDS import demands		
Number of sectors					
Total	29	19	7	74(MX), 78 (US)	
Agricultural	1		1	4 (MX), 1 (US)	
Processed Agric.	1		1	12 (MX), 1(US)	
Income change[b]					
U.S. (%)			0.0	0.1	
U.S. ($bil)	3.8				
Mexico (%)			0.3	0.0	
Mexico ($bil)	0.8				
Total trade (% change)					
U.S. imports		6.7	-0.3	0.2	
U.S. exports			-2.1	1.1	
Mexico imports			4.7	20.4	
Mexico exports			6.0	4.8	
Bilateral exports (% change)					
U.S. to Mexico				27.1	
Mexico to U.S.				6.5	
Migration (1,000 persons)					
Mexican rural outmigration			11	282	
Mexico to U.S. migration			-16		

agriculture-focused models, some conclusions about the effects of an FTA on U.S. agriculture are fairly robust. First, those studies with sectoral detail on agriculture conclude that U.S. agricultural exports to Mexico would expand significantly from a base year under an FTA, especially in the grains sectors in which Mexico now employs quotas. However, the effects of an FTA on U.S. agricultural output are relatively small, reflecting the small share of exports to Mexico in total U.S. farm output. Most studies conclude that growth in U.S. agricultural exports to Mexico would exceed growth in our farm imports from Mexico. Horticultural imports would increase significantly in both directions. Finally, the general equilibrium, agriculture-focused analyses show the importance of factors in addition to relative price changes in determining the net effects of an FTA on U.S. agriculture, including labor migration, Mexican domestic farm policy reform, and long-term investment and productivity growth.

Trade and Production Effects

Central to all the analyses is the response of import demand to trade liberalization, and the resulting

Table 4. Basic Features of Models of U.S.-Mexico Free Trade (continued)

	KPMG Peat Marwick (1991)	Krissoff, Neff (1992)	Levy, van Wijnbergen (June 1991)	Robinson, Burfisher, Hinojosa, Thierfelder (1991)	Yunez (1991)
Base year	1988 with 1990 tariffs	1988	1989	US1987, Mexico 1988	1985 with 1989 tariffs
Model type	Multi-country CGE	Partial equil.	Single country CGE	Multi-country CGE	Single country CGE
Countries	U.S., Mexico, rest	U.S., Mexico, rest	Mexico	U.S., Mexico, rest	Mexico
Scenario[a]	Tariff / quota removal; 7% capital growth	Tariff quota removal	Tariff quota removal	Removal of tariffs, quotas, Mexican farm subsidies, EEP	Tariff and quota removal
Model features			Migration, income distribution, land types	Farm programs, labor migration	Irrigated/ nonirrig. land types
Number of sectors					
Total	44	29	7	28	30
Agricultural	4	18	5	10	12
Processed Agric.	4	11	0	10	10
Income change[b]					
U.S. (%)	.04			0.2	
U.S. ($bil)		0.4			
Mexico (%)	4.6			0.3	
Mexico ($bil)		0.1	1.0		
Total trade (% change)					
U.S. imports					
U.S. exports					
Mexico imports					
Mexico exports					
Bilateral exports (% change)					
U.S. to Mexico				10.6	
Mexico to U.S.	12.9			5.7	
Migration (1,000 persons)					
Mexican rural outmigration			492	839	
Mexico to U.S. migration			-	610	

[a]Scenario reported here, if study compares alternatives scenarios.
[b]Income changes measured as percent changes from the base year.

impact on trade and production. The removal of tariffs and quotas stimulates a shift in demand from domestic goods to imports in response to the fall in the relative price of imports. Declining demand for the domestic good draws down its price, and contracts domestic output. Differences among the analyses in their assumptions about the relative heights of initial trade barriers and the elasticities of demand and supply help to explain differences in their empirical results on the impacts of an FTA.

The studies share a common ground in using 1988-1990 tariff rates and, except for the Interindustry study, quotas are included as tariff equivalents of quotas.[4] Most studies assume that Mexican tariffs

[4]The interindustry study simulates quota removal using an "add factor." Estimates were made of the direct quantitative impact of removing nontariff barriers and these wedges are added to the import functions.

Table 5. Sectoral Results of Models of a U.S.-Mexico FTA

	Brown, Deardorff, Stern (1991)			Hinojosa and Robinson (1991)	
	U.S. exports	U.S. imports	U.S. employment	U.S. bilateral exports	Mexican bilateral exports
	Percent			Percent	
Agriculture	5.70	18.3	-0.4	19.0	11.0
Field crops					
Food grains					
Feed grains					
Program crops[d]					
Corn					
Wheat					
Sorghum					
Beans					
Soybeans					
Fruits/vegs.					
Live cattle					
Other agriculture					
Food	33.8	16.1			
Meat and Dairy					
Meats					
Dairy					
Prep. frts/vegs.					
Corn milling					
Sugar					
Animal products					
Alcoholic bevs.					
Tobacco					

are higher than U.S. tariffs at the outset, and this contributes to a greater import demand response by Mexico than the United States (Hinojosa and Robinson; Krissoff and Neff[5]; KPMG Peat Marwick; Robinson et al.). For agriculture, Brown and others assume the opposite tariff structure, and find that U.S. bilateral agricultural import growth exceeds export growth under an FTA.

Estimated U.S. agricultural export (or Mexican import) growth under an FTA is not always positive in studies that aggregate the agricultural sector. Growth in agricultural trade is estimated to be much higher in the disaggregated studies, which isolate the highly protected agricultural commodities. Studies that include corn as a separate commodity estimate substantial U.S. bilateral export growth, since the Mexican quota has a high 1988 tariff equivalent (45-55 percent). The value of corn imports by Mexico from the U.S. are estimated to increase between 67 percent (Krissoff and Neff) and 185 percent (Robinson et al.). Most studies find that Mexico's agricultural exports will expand under an FTA. Mexican global agricultural exports are estimated to increase 18 percent by Brown and others, and their bilateral exports could increase between zero and 11 percent. Much of Mexico's projected export growth would stem from an expansion in its fruit and vegetable exports to the United States.

Mexican food processing industries are more labor intensive than those of the United States. With Mexico's relatively inexpensive labor and higher U.S. trade barriers for some processed versus raw horti-

[5]The Krissoff and Neff study has been updated in Krissoff, Neff, and Sharples (1992).

Table 5. Sectoral Results of Models of a U.S.-Mexico FTA (continued)

	Interindustry, 1990							ITC (1991)	
	U.S. employ-ment	U.S. bilateral exports	U.S. bilateral imports	Mexican output	Mexican world import	Mexican world export	Mexican employ-ment	U.S. bilateral exports	U.S. bilateral imports
	----------Percent----------							----Percent---	
Agriculture	10.6	64.0	0						
Field crops				0	56.3	1.9	-4.25		
Food grains									
Feed grains									
Program crops[d]									
Corn									
Wheat									
Sorghum									
Beans									
Soybeans								signif.	negl.
Fruits/vegs.								mod.	signif
Live cattle				0	67.1	0.9	-0.2	mod.	mod.
Other agriculture									
Food		9.5	7.2						
Meat and Dairy				0	3.4	2.7	0		
Meats									
Dairy									
Prep. frts/vegs.				0	8.7	9.12	0		
Corn milling				0		0	0		
Sugar				0	0	1.7	0		
Animal products									
Alcoholic bevs.					3.6	0	0	signif.	negl.
Tobacco					0	33.0	0		

cultural items, Mexican food processing industries would likely expand under an FTA. Krissoff and Neff estimate that Mexican meat exports to the U.S. would increase by $73 million, and prepared fruit and vegetable exports will increase by $42 million. Robinson and others estimate a 7 percent increase in Mexican processed food exports to the U.S. Yunez estimates a 39 percent increase in world exports of prepared fruits and vegetables by Mexico.

Krissoff and Neff, Robinson and others, and Yunez find that Mexican processed food export growth would exceed U.S. export growth to Mexico. However, Brown and others, and the Interindustry study conclude the opposite. One reason for their contradictory findings may be their treatment of sugar. U.S. trade data registers large sugar exports by Mexico to the United States, which refines and re-exports the sugar to Mexico. The high U.S. tariff equivalent of the U.S. sugar quota, and the large share of re-export sugar in the processed food flows to the United States, would result in an overestimate of Mexican food export growth under quota removal.

The studies reach no consensus as to the effects of an FTA on agricultural output in the United States and Mexico, although agriculture-focused models agree that U.S. farm output would increase slightly (Krissoff and Neff, and Robinson et al.) to meet increased Mexican demand. The Interindustry study estimates an 11 percent increase in U.S. farm employment, suggesting that U.S. agricultural output could expand significantly. The KPMG study estimates a negligible decline in U.S. farm output under an FTA. The Interindustry study estimates no change in Mexican agricultural output under an FTA. Robinson and others, and Yunez both estimate a significant decline in production of grains and oilseeds, with an expansion of fruit and vegetable production. In contrast, The KPMG study estimates an expansion in total Mexican agricultural output ranging from 6 to 11 percent.

Table 5. Sectoral Results of Models of a U.S.-Mexico FTA (continued)

	KPMG Peat Marwick (1991)				Krissoff and Neff (1992)[b]		
	U.S. Output	U.S. employment	Mexican output	Mexican employment	U.S. bilateral exports	U.S. bilateral imports	U.S. output
	Percent				$ Million		
Agriculture							
Field crops	-0.1	-0.1	10.5	10.4			
Food grains							
Feed grains							
Program crops[d]							
Corn					255		small rise
Wheat					1		small rise
Sorghum					175		small rise
Beans							
Soybeans					75		small rise
Fruits/vegs.	-0.1	-0.8	6.1	6.1		48	increases
Live cattle					90[c]		
Other agriculture	-0.1	-0.1	6.1	6.1			
Food	-0.1	0.0	5.3	5.3			
Meat and Dairy							
Meats					50	73	
Dairy							
Prep. frts/vegs.						42	
Corn milling							
Sugar							
Animal products	-3.9	-2.4	32.1	32.1			
Alcoholic bevs.	0.0	0.0	5.7	5.7			
Tobacco	-0.1	0.0	4.5	4.5	2	4	

Labor Migration

Corn production in Mexico accounts for a third of the Mexican rural labor force and, in 1988, was protected by a 45- to 55-percent tariff equivalent of a quota. Liberalization of agricultural trade including corn quotas, and the resulting contraction in Mexican farm output, is found to prompt a migration from rural areas ranging from 11,000 (Hinojosa and Robinson) to 835,000 workers (Robinson et al.). Studies concur that rural workers employed in sectors formerly protected by high tariffs and quotas, corn in particular, would be only partially absorbed by the expected expansion in Mexican fruits and vegetables (Levy and van Wijnbergen; Robinson et al.).

Labor migration affects U.S. agriculture directly through the labor supply to U.S. rural areas, and indirectly through the effects of changes in factor endowments on income growth in each country. Robinson and others estimate that the flow of migrant Mexican labor to U.S. rural areas would increase by 57,000 workers under an FTA, an expansion in the U.S. rural labor supply that reduces rural wages by 5 percent. Most Mexican migrant labor enters the U.S. urban labor market, where the effect on wages is less significant.

Changes in factor endowments affect national income. The increase in the U.S. labor force and decline in Mexican labor supply contributes to a greater increase in U.S. GNP (0.6 percent) under an FTA compared to that of Mexico (zero) (Robinson et al.). This indirect income effect, although very small, can be expected to support an increase in U.S. demand for imports from Mexico, but reduce Mexican demand for U.S. imports.

Domestic Farm Programs

Institutional change in Mexican agriculture will be very important in determining the effects of an FTA on U.S. agriculture, and institutional change is likely. Because of the importance of tariffs and quotas in Mexico's farm support programs, any continued

Table 5. Sectoral Results of Models of a U.S.-Mexico FTA (continued)

	Robinson, Burfisher, Thierfelder, Hinojosa (1991)				Yunez (1991)			
	Mexican output	Mexico bilateral exports	U.S. Output	U.S. bilateral exports	Mexico Output	Mexico employ-ment	Mexico Exports[a]	Mexico imports[a]
	----------Percent----------				----------Percent----------			
Agriculture					0.2	0.1		
Field crops					-1.9	-1.0		
Food grains								
Feed grains								
Program crops[d]	-21.1		1.7	88.2				
Corn	-19.4		5.1	185.4	-13.3	-9.9	17.3	114.9
Wheat					3.5	4.3	17.5	-14.5
Sorghum					1.8	1.7	-17.1	12.3
Beans					-8.8	-8.6		-22.4
Soybeans					-4.8	-4.1		46.9
Fruits/vegs.	3.1	17.6	0.7	13.6	1.4	2.2	27.4	-9.9
Live cattle					2.3	2.8	17.2	-36.8
Other agriculture					3.4	4.2	19.6	-5.0
Food	-2.0	7.1	0.7	5.7				
Meat and Dairy					-0.7	-0.2	16.9	-40.6
Meats								
Dairy								
Prep. frts/vegs.					6.6	7.0	39.2	-4.3
Corn milling					-0.31	0.3		
Sugar								
Animal products								
Alcoholic bevs.								
Tobacco								

[a]Mexican trade with U.S. and Canada combined.
[b]Changes reported in millions of dollars.
[c]Includes both live cattle and poultry.
[d]Includes wheat, rice, feed corn, soybeans, and cotton.

commitment by Mexico to support its farm sector under an FTA will necessarily entail a restructuring of its domestic farm programs.

How Mexico decides to buffer its farmers will have significant implications for U.S. agricultural exports. Robinson and others find that if Mexico adopts a deficiency payments program similar to that of the United States, then U.S. agricultural export growth to Mexico is likely to be unaffected by Mexico's continued support to Mexican farmers. If, however, Mexico decides to protect its farmers through only a partial lowering of its trade barriers, then U.S. agricultural export growth would be significantly reduced. The U.S. has an interest in whether Mexican farmers are protected by policies that only distort production, through domestically financed support programs, or through trade barriers that distort consumer demand for U.S. products.

Income Effects

A unanimous conclusion of the studies is that income growth due to an FTA will be negligible. Estimated growth in GNP under the comparative static analyses is very low, always under 1 percent for the United States, and reaching 5 percent for Mexico in the KPMG study, which assumes a capital stock increase of 7 percent.

Small income gains follow from several features of the models, and of the U.S. and Mexican economies. The models are all comparative static analyses (except the Interindustry study) so that income growth is limited to efficiency gains along a stationary production possibility frontier. All analyses as-

sume relatively low tariffs at the outset and, for the United States, bilateral trade accounts for a small share of total GNP. (In Mexico, bilateral exports are about 10 percent of GNP and bilateral imports are 6 percent of GNP).

Although these studies suggest that the income effects of an FTA will be small, nevertheless, Mexican economic growth under an FTA could be a key element in determining the impact of an FTA on U.S. agriculture. By increasing domestic competitiveness and efficiency, and improving domestic and foreign investor confidence, the FTA is expected to generate gains for the Mexican economy through investment flows and productivity growth. Robinson and others explore the implications of investment growth in Mexico for U.S. agriculture by analyzing the trade effects of an FTA that is accompanied by a $25 billion (7 percent) increase in the Mexican capital stock. Consistent with the KPMG scenario of capital stock growth, income in Mexico could grow by up to 5 percent, if the FTA is accompanied by investment flows. Furthermore, Robinson and others conclude that Mexican capital growth is crucial in enabling Mexico to grow out of the structural (that is, rural employment) problems associated with an FTA. Investment enables nonagricultural sectors to absorb most of Mexico's rural outmigration. It permits Mexico to maintain some protection for its corn sector during a period of transition, yet allows U.S. farm exports comparable to a complete removal of trade protection and domestic support for Mexican corn producers.

IMPLICATIONS FOR SOUTHERN U.S. AGRICULTURE

Three studies contained agricultural commodity detail sufficient to investigate the U.S. regional implications of their results (Krissoff and Neff, Robinson et al., and Yunez). The United States Mathematic Programming model (USMP), regional agricultural model of the U.S. (House), was applied in order to disaggregate the studies' estimated changes in bilateral U.S. agricultural trade to the level of U.S. farm production regions. The USMP analytical framework covers major U.S. field crop and livestock enterprises. Fruit and vegetable product effects we evaluate separately.

USMP Regional Model

The USMP regional model is a comparative static, spatial equilibrium model that represents U.S. crop and livestock production at the level of 10 farm production regions. Four of these regions are southern: Appalachia, Southeast, Delta States, and South Plains. USMP models production of 10 crops: corn, sorghum, barley, oats, wheat, cotton, rice, soybeans, hay, and silage. No fruit or vegetable products are included in USMP. Some 16 primary livestock enterprises include dairy, poultry, swine, and beef cattle. Several dozen processed or retail products are modeled, the principal being dairy products, pork, fed and nonfed beef, soy meal and oil, livestock feeds, and corn milling products. Additionally, the model incorporates domestic use, export/import, and stock product markets. Finally, USMP includes government commodity income support and acreage programs. The regional analysis uses 1991 as a base year.

Each of the three studies' findings on changes in bilateral agricultural trade are recalculated to determine the implied effects of an FTA on total U.S. exports of each commodity (Table 6). We use these total U.S. trade changes to shift export demand or import supply in the USMP regional model. After adjusting to the trade changes, the USMP model provides acreage, production, and income and expense impacts for crops and livestock at the level of U.S. farm production regions.

To simplify the comparison of FTA effects, we look at only five of the commodities most important in bilateral trade: corn, sorghum, wheat, soybeans, and live cattle. To further simplify the spectrum of possible FTA outcomes for the United States, we evaluate only two alternative scenarios: a "most net exports" and a "least net exports" scenario. The **most** net exports scenario selects for each commodity the trade change among the studies that most increases U.S. net exports. The **least** net exports scenario selects for each commodity the trade change among the studies that most decreases U.S. net exports. In the **most** net exports scenario, crop exports rise from 1.8 to 26 percent—depending on the crop—and live cattle net imports fall 2.4 million hundredweight. In the **least** net exports scenario, changes in crop net exports range between -2.9 to 4.9 percent—depending on the crop—and live cattle net imports rise 5.3 million hundredweight.

Note that these two alternatives are not necessarily best or worst for U.S. agriculture as greater exports of crops tend to affect livestock negatively and vice versa. Neither scenario reflects exactly what any of the three studies project for shifts in U.S. trade under an FTA. The alternatives were selected simply to represent a wide range of FTA outcomes for U.S. agriculture.

Crop Acreage Planted

Both FTA scenarios estimate gains in overall U.S. crop exports from the 1991 base year, which lead to small price increases and thus attract more acreage

Table 6. Effects of an FTA on total U.S. exports

U.S. exports or net trade	Robinson, et al.	Krissoff & Neff	Yunez
	percent change		
Corn	13.9[a]	4.9[b]	8.6
Sorghum	17.6	26.0[a]	-2.9[b]
Wheat	1.8[a]	0.0[b]	NA
Soybeans	6.5[a]	1.4[b]	3.5
	change, million hundredweight		
Live cattle	.38	2.4[a]	-5.3[a]

NA: not available

[a] Most net exports projections for U.S.

[b] Least net exports projections for U.S.

into production. Acreage planted to 8 crops (corn, sorghum, barley, oats, wheat, cotton, rice, and soybeans) rises 1.6 percent with the most exports scenario and 0.4 percent with the least exports scenario (Table 7, Fig. 3). Acreage planted in the Appalachian, Southeast, Delta States, and South Plains regions rises 1.9, 0.4, 0.9, and 1.1 percent, respectively, under the **most** scenario and rises only 0.2- to 0.4-percent under the **least** scenario. This suggests that southern U.S. crop producers can benefit as much as other regions that concentrate more in the FTA-enhanced crops.

Cattle Production

The 2 FTA scenarios for live cattle estimate a decline in U.S. net imports of 2.4 million and a rise in net imports of 5.3 million hundredweight. For beef feeder yearlings, this translates to impacts ranging from a 1.1-percent rise to a 3.1-percent decline in total U.S. production (Table 8, Fig. 4). Cattle imports go mainly into U.S. feedlots. They are an input to finished beef or slaughter, not a substitute for feeder cattle produced domestically. In the scenarios, the Appalachian, Southeast, and Delta States regions are less affected than major beef producing

Table 7. Total Acres Planted by Crop and Region

	North east	Lake States	Corn Belt	North Plains	Appa-lachia	South-east	Delta States	South Plains	Moun-tain	Pacific	U.S. total
	Percent change in acres										
CORN											
Most exports	2.1	2.6	2.2	2.7	2.5	2.2	2.4	3.0	2.1	2.4	2.4
Least exports	0.6	0.7	0.6	0.7	0.7	0.6	0.7	0.7	0.5	0.6	0.6
SORGHUM											
Most exports	0.0	0.0	2.3	4.1	3.6	2.3	2.8	3.7	1.9	2.5	3.6
Least exports	0.0	0.0	0.6	1.0	0.9	0.7	0.7	1.0	0.5	0.6	0.9
WHEAT											
Most exports	1.1	1.1	-0.5	1.4	1.0	1.2	1.9	1.0	1.4	1.5	1.2
Least exports	0.3	0.3	0.0	0.4	0.3	0.3	0.5	0.3	0.4	0.4	0.3
SOYBEANS											
Most exports	1.3	1.7	1.3	1.9	1.7	1.5	0.9	1.8	0.0	0.0	1.4
Least exports	0.2	0.3	0.2	0.3	0.2	0.2	0.1	0.3	0.0	0.0	0.2
8 CROPS											
Most exports	1.8	2.0	1.5	2.0	1.9	1.4	0.9	1.1	1.4	1.0	1.6
Least exports	0.4	0.5	0..4	0.5	0.4	0.3	0.2	0.3	0.4	0.3	0.4

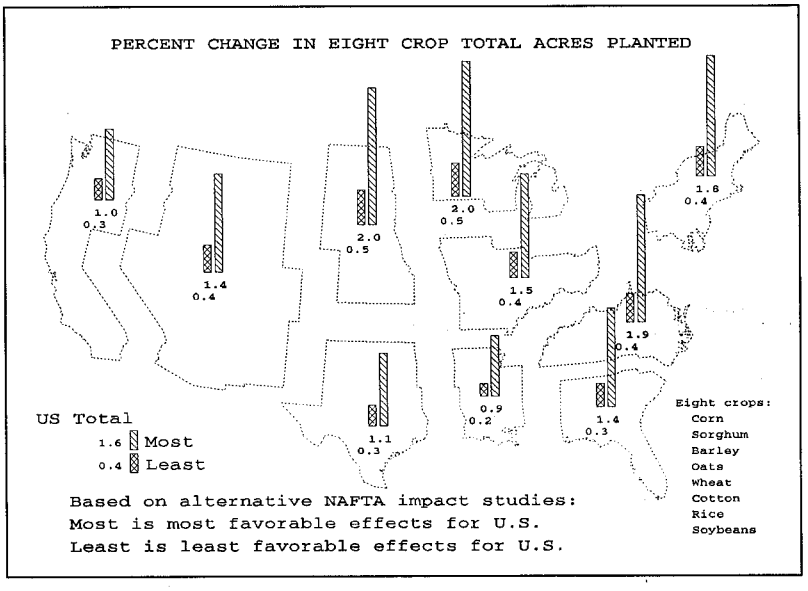

Figure 3. Percent Change in Eight Crop Total Acres Planted

regions. The South Plains, a larger beef producer than the other southern regions, is affected somewhat more, proportionally, than other large beef-producing regions.

Income and Expense

Income and expense summaries from the USMP model give a comprehensive indication of how the FTA might affect major U.S. field crop and livestock enterprises (Table 9, Fig. 5).

The value of production of major crops rises $3.0 billion under the **most** exports scenario and $560 million under the **least** exports scenario. Deficiency payments fall $848 million and $187 million because both scenarios boost program crop prices. Increased production in both scenarios raises variable costs $432 million and $57 million. These changes increase U.S. net crop revenues $1.7 billion and $317 million.

Of the four southern regions, the Appalachian and Delta States regions benefit most from an FTA, with crop income gains ranging from $66-$69 million in the **most** exports scenario. Gains for these regions are only $12 million each under the **least** exports scenario. The Southern Plains and Southeast regions participate less in these scenarios' crop income gains.

The livestock income changes follow from both the change in beef cattle net imports and from the feedgrain price changes in the scenarios. With reduced net imports, the value of livestock produced rises, but feed costs also increase. In the most exports scenario (a decline in U.S. cattle imports), the value of livestock production rises $669 million, and feed costs rise $988 million, reducing net returns $319 million lower. Under the alternative scenario (an increase in net U.S. imports), the value of U.S. production falls $941 million, and feed costs decline

Table 8. Cattle Production Indicators by Region

	North east	Lake States	Corn Belt	North Plains	Appa-lachia	South-east	Delta States	South Plains	Moun-tain	Pacific	U.S. total
	Percent change in quantity										
Feeder cattle											
Most exports	0.7	1.2	0.5	0.6	0.3	1.131	0.9	3.1	0.2	0.8	1.1
Least exports	-4.6	-4.1	-1.6	-3.4	-1.3	-1.8	-1.5	-8.2	-0.8	-1.8	-3.1
Fed slaughter cattle											
Most exports	0.0	-0.9	-0.4	-0.2	0.0	0.0	0.0	-0.2	-0.4	-1.0	-0.4
Least exports	0.0	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.1	-0.1	0.1

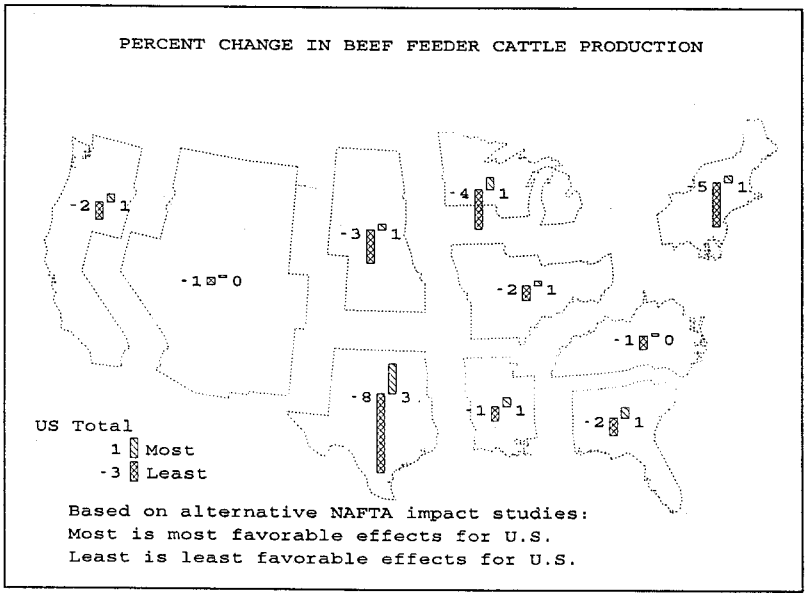

Figure 4. Percent Change in Beef Feeder Cattle Production

$598 million, leaving net returns $343 million lower. Each scenario leaves livestock net returns several hundred million dollars lower, or just less than 0.4 percent of value of livestock production. These scenarios suggest that livestock enterprises might be affected negatively by the FTA through rising feed costs, but that the level of the revenue decline might well be negligible.

On a regional level, the Southern Plains region is in a good position to benefit more than most from reduced cattle imports—or to lose more than most from an increase in imports of cattle. The value of production (as well as production costs) of beef, dairy, and swine animals in the USMP model falls somewhat in the Appalachian, Southeast, and Delta States regions with the **most** exports scenario and in all the southern regions with the **least** exports scenario. This follows from the higher feed-costs-per-unit output (relative to other regions) of some dairy and swine enterprises in these regions. Having only fixed-coefficient production functions, the USMP model suggests reduced output due to higher feed costs. It could be expected that rising feed costs may pressure livestock producers in these regions, inducing them to adjust enterprises, feeding practices, or some other facet of their operations in order to maintain incomes. For total U.S. agriculture, net crop gains outweigh the decline in net livestock losses by $1.4 billion in the **most** exports scenario (Fig. 5). The Appalachian, Delta States, and South Plains regions follow this pattern with income gains from $41 million to $75 million, while the Southeast shows an overall loss of $19 million. Nationally, the **least** exports scenario results in a $27 million income decline. The Southern Plains region loses somewhat more than other regions because so much of this scenario involves increased net cattle imports.

GAINS AND LOSSES FOR SOUTHERN U.S. FRUIT AND VEGETABLE PRODUCERS

U.S. imports of Mexican fruits and vegetables could increase significantly under an FTA. However, the U.S. fruit and vegetable industry is already competing with increased Mexican imports even without the elimination of tariffs. Mexican exports of fruits and vegetables to the United States increased 55 percent between 1980 and 1988, representing an increase in market share from 3.5 percent to 18.5 percent. The traditional winter vegetable industry in Sinaloa competes primarily with Florida. Cool season vegetables such as broccoli, cauliflower, brussels sprouts, and asparagus have expanded in the Baja peninsula and Sonora during the 1980s and now compete with U.S. growers in southern California and Arizona.

Crops marketed during the same time period and with the highest U.S. tariffs should expect the greatest increases in U.S. imports under an FTA (such as fresh broccoli, cauliflower, asparagus, and cantaloupe). Much of the processed frozen broccoli and cauliflower production has already shifted to Mexico. An FTA would little affect crops for which U.S. tariffs are low, such as green onions with an *ad valorem* tariff equivalent of about 2 percent. Crops that do not compete for the same seasonal marketing window would not be hurt in the short run.

Table 9. Income Accounts by Region

	North east	Lake States	Corn Belt	North Plains	Appa-lachia	South-east	Delta States	South Plains	Moun-tain	Pacific	U.S. total
	Change in million dollars										
CROPS											
Value of production											
Most exports	78.4	361.2	1267.1	597.4	114.8	40.1	97.0	161.8	159.6	89.0	2966.4
Least exports	13.3	69.7	249.4	114.6	21.7	6.9	16.3	27.5	26.2	14.2	560.0
Deficiency payments											
Most exports	-13.3	-106.2	-298.5	-217.5	-25.4	-14.5	-13.9	-64.9	-60.7	-32.9	-847.8
Least exports	-3.0	-24.2	-68.6	-47.4	-5.8	-3.1	-2.6	-13.2	-12.7	-6.6	-187.1
Gross value of production											
Most exports	65.1	225.0	968.6	379.9	89.5	25.7	83.1	96.9	98.8	56.1	2118.7
Least exports	10.3	45.5	180.9	67.3	16.0	3.8	13.7	14.4	13.5	7.7	372.9
Total variable costs											
Most exports	14.5	47.8	135.4	73.7	20.1	10.9	16.7	51.5	46.8	14.1	431.6
Least exports	1.3	7.7	23.8	4.8	4.0	1.7	2.0	7.1	3.1	0.9	56.5
Gross value of product less variable costs											
Most exports	50.6	207.2	833.2	306.2	69.3	14.8	66.4	45.4	52.0	41.9	1687.0
Least exports	8.9	37.8	157.1	62.5	12.0	2.1	11.7	7.3	10.4	6.7	316.5
LIVESTOCK											
Gross value of production											
Most exports	116.0	109.5	203.9	121.9	-64.2	-52.5	-49.5	173.2	6.8	103.6	668.9
Least exports	1.8	32.1	-2.4	-106.6	-40.4	-35.8	-26.2	-519.6	-156.0	-88.3	-941.4
Total variable costs											
Most exports	153.8	145.4	252.1	218.7	-70.1	-18.9	-24.5	168.4	29.2	133.9	988.1
Least exports	13.1	40.8	16.4	-81.6	-21.3	-14.6	-9.0	-358.8	-129.2	-54.0	-598.1
Gross value of product less variable costs											
Most exports	-37.8	-35.9	-48.2	-96.8	5.9	-33.7	-25.0	4.8	-22.4	-30.2	-319.2
Least exports	-11.2	-8.7	-18.8	-25.0	-19.1	-21.2	-17.2	-160.8	-26.9	-34.3	-343.3
CROPS AND LIVESTOCK											
Gross value of production											
Most exports	181.1	364.5	1172.4	501.9	25.3	-26.9	33.6	270.2	105.7	159.7	2787.5
Least exports	12.1	77.6	178.4	-39.3	-24.4	-32.0	-12.5	-505.3	-142.5	-80.6	-568.5
Total variable costs											
Most exports	168.3	193.2	387.5	292.4	-49.9	-8.0	-7.7	220.0	76.0	148.0	1419.7
Least exports	14.4	48.6	40.2	-76.8	-17.3	-12.9	-7.0	-351.7	-126.0	-53.1	-541.6
Gross value of product less variable costs											
Most exports	12.9	171.3	785.0	209.4	75.2	-18.9	41.4	50.2	29.6	11.7	1367.8
Least exports	-2.3	29.0	138.3	37.5	-7.2	-19.1	-5.5	-153.5	-16.4	-27.6	-26.8

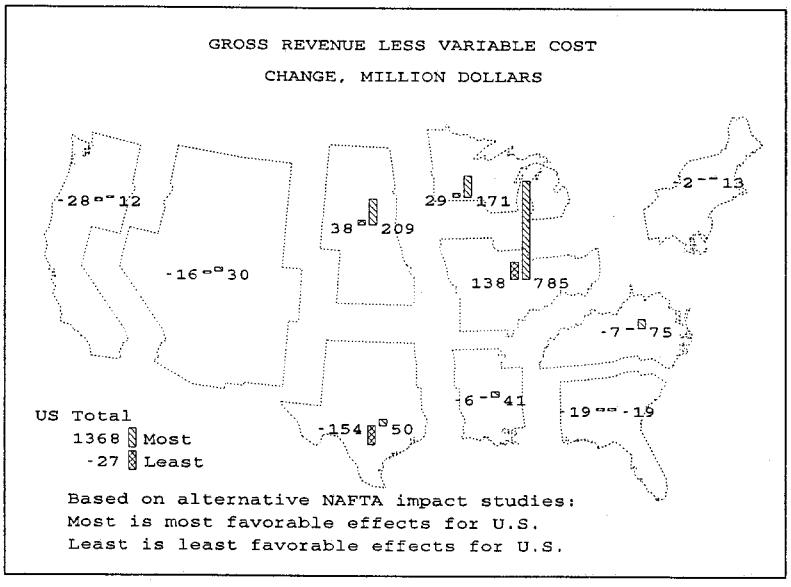

Figure 5. Gross Revenue Less Variable Cost Change, Million Dollars

Because of their warmer climates, California, Texas, and Florida have production areas similar to Mexico's, and more potential for competing fruits and vegetables. Florida producers are particularly concerned about their competitiveness in production of fresh winter vegetables. Mexico and Florida compete directly in green beans, carrots, cucumbers, eggplant, lettuce, green peppers, squash, tomatoes, fresh citrus, mangoes, melons, and strawberries. Between 1981 and 1990, Florida lost market share for squash, beans, and bell peppers, gained market share in cucumbers and eggplant, and has retained an almost constant share of tomatoes.

Mexico has shown the capability to increase shipments into the U.S. market. But the potential for significant, further expansion of Mexican horticultural export supply under an FTA is uncertain. Mexico lacks water infrastructure especially in Sonora and Baja. It is also difficult to determine how many Mexican producers will shift between crops; for example, grain farmers shifting to production of tomatoes. Mexican horticulture has a comparative advantage relative to the U.S. in its lower labor and land costs. The U.S. sector has the advantage of lower-priced irrigation water, lower cost capital, highly developed transportation, and superior technology.

Some U.S fruit and vegetable producers would increase their exports to Mexico with the removal of import license requirements. U.S. grape growers plan to sell grapes in Mexico due to divergent seasons. Other fruit and vegetable producers may find markets for their high quality products in the upper-income, urban groups, a market that should expand under an FTA. U.S. exports to Mexico of fresh oranges, apples, pears, nectarines, peaches, almonds, and pistachios are also expected to increase under an FTA.

CONCLUSIONS

A U.S.-Mexico FTA will further the substantial, unilateral trade liberalization undertaken by Mexico since 1983. In agriculture, Mexican and U.S. tariffs are now approximately equal, but Mexico still maintains quota protection for some important U.S. farm exports, especially corn. U.S. agriculture would benefit from an FTA that succeeded in removing both tariffs and quotas. U.S. grain exports to Mexico (especially corn) would expand most under free trade relative to other farm sectors. U.S. horticultural imports from Mexico are likely to increase significantly, reflecting the relatively high U.S. trade barriers in this sector prior to an FTA, but U.S. horticultural exports to Mexico should also expand.

To analyze the implications of an FTA for southern agriculture, we incorporated the findings of three, agriculture-focused analyses of the U.S.-Mexico FTA (Krissoff and Neff, Robinson et al., and Yunez) into a U.S. regional model of grains, oilseeds, and livestock. Our findings suggest the likelihood of modest benefits for southern agriculture from a U.S.-Mexico Free Trade Agreement. Southern agriculture will benefit if increased U.S. grain and oilseed exports are realized, although not so much as other regions with more acreage and more comparative advantage in production of these crops. Analyses of

the FTA differ as to whether the livestock trade balance might shift toward increased or decreased net imports of animals into the U.S. Reduced net cattle imports would benefit U.S. livestock producers, and the Southern Plains area more than other Southern regions. Increased net imports would have an opposite effect. Any gain in crop demand that boosts grain prices bodes well for grain producers but signals higher feed costs for livestock producers, particularly in the southern region, where the feed costs per unit of output are relatively high. U.S.-Mexico horticultural trade is expected to expand in both directions under an FTA, with offsetting gains and losses for southern states.

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