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CAPTURING THE IMPACTS OF NORTH AMERICAN FREE TRADE AGREEMENT ON SOUTH DAKOTA'S ECONOMY

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I. Introduction

In August 1992, representatives of Canada, Mexico, and the United States concluded their negotiations of the North American Free Trade Agreement (NAFTA). The treaty has been subsequently signed and ratified by all three countries. As of January 1, 1994, NAFTA created the largest free trade area in the world, with more than 360 million people and a combined gross domestic product of roughly $6.5 trillion (in U.S. dollars). A comparison of NAFTA with the European Union (EU) is provided in appendix A. NAFTA essentially lifts trade barriers between Mexico, Canada, and the United States.

At the time of signing of the NAFTA, Canada and United States had eliminated tariffs on most of their bilateral trade as a result of free trade agreement between these two countries. In 1992, Mexican tariffs on imports from United States averaged about 10 percent whereas U.S. tariffs on imports from Mexico averaged about 4 percent. NAFTA eliminates tariffs on trade among the three countries over the period of 15 years, and substantially reduces nontariff trade barriers (such as import quotas, sanitary regulations, and licensing requirements) over the same period (Kehoe and Kehoe, 1994b, p.21).

NAFTA also addresses the issue of capital mobility. Before NAFTA, the U.S. and Canada had few restrictions on capital flows. Prior to NAFTA, Mexican laws prohibited private ownership, foreign or domestic, in the petroleum industry and parts of the petrochemical industry. Mexican laws also

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restricted foreign investment in the financial and insurance sectors and had institutionalized communal ownership of much agricultural lands. NAFTA immediately ensures the free flow of capital throughout the region (Kehoe and Kehoe, 1994b, p.21). A summary of the important provisions of NAFTA, by sector, can be found in Appendix B.

The main objective of this paper is to identify the economic impacts of NAFTA on the U.S. economy, the South Dakota economy, and the agricultural sector of the South Dakota economy in particular. Following the introduction, a discussion of why nations trade, and the expected impacts of NAFTA are provided in sections II, and III, respectively. We then discuss the economy-wide impacts in section IV and impacts on U.S. agriculture in section V. Impacts on South Dakota's economy are presented in section VI. Finally, section VII is devoted to summary and conclusions.

II. Why do Nations Trade?

The answer to this question is provided by the basic economic principle of comparative advantage. Economists point out that countries differ in technology and resource endowments. Such differences between countries imply that a country will be relatively more efficient in the production of some commodities and less efficient in the production of other commodities relative to another nation. In other words, a nation has a comparative advantage in the production of some commodities and a comparative disadvantage in the production of other commodities. Irrespective of the cause of the differences in efficiency, countries can benefit if each specializes in that group of commodities it is most efficient in producing and then trade its excess production.

An important economic policy implication arrived at from the principle of comparative advantage is that nations will benefit from free trade. Free trade enables a country to expand the quantity of goods and services it consumes. Free trade also allows a pattern of international specialization and exchange to emerge that will maximize world production of all commodities.

With free trade, the resources of the world are allocated more efficiently, generating gains for each and every trading nation. However, any interference with the free flow of trade impedes the efficient allocation of resources worldwide and denies to the world community the opportunity to enjoy the full gains from trade.

Economic Integration: Regional Versus Global

The economic consequences of NAFTA, examined in the light of comparative advantage, indicate that all participating parties will benefit from the formation of a free trade area. However, NAFTA represents a regional trade agreement that will reduce trade impediments between participating countries, without altering the trade barriers of the NAFTA countries toward the rest of the world. Some economists have raised concerns that the implementation of regional trading blocks such as NAFTA will reduce the potential for global trade liberalization through General Agreement on Tariffs and Trade (GATT) negotiations. If regional trade agreements supplant global trade negotiations, then it is possible for these regional trade agreements to have a negative effect on the world trading system. Paul Krugman (1991) discusses three possible unwanted outcomes arising from a regional trade agreement: 1) trade diversion, 2) beggar-thy-neighbor effects, and 3) trade warfare.

Trade diversion generated by a regional trade agreement refers to an increase in trade between member countries coming at the expense of trade between member and non-member countries. Trade diversion need not effect terms of trade. The consequence of trade diversion is a decline in world production efficiency.

Beggar-thy-neighbor effects refers to a regional trade agreement incorporating a preferential tariff scheme between signatories for generating an improvement in the terms of trade against the rest of the world without an overt increase in protection by member countries. The consequence of beggar-thy-neighbor effects is a decline in world production efficiency.

Trade warfare refers to possibility of regional trading blocks, being larger than their individual members, engaging in more aggressive trade polices due to the block's increased market power. Increased market power will enable the trading block to implement an optimal tariff scheme. This type of action will damage global trade and may leave all countries worse off, due to a *prisoner's dilemma* effect.

The economic consequences of NAFTA are dependent upon the success of global trade negotiations. The economic gains realized by NAFTA members from NAFTA will be reduced if global trade negotiations are successful in reducing global trade barriers, because the relative price differential between NAFTA countries and the ROW will be reduced. However, the economic gain to NAFTA members from increased world trade due to progress made in reducing global trade barriers through GATT will be greater than the reduction in economic gain associated with the NAFTA agreement for NAFTA countries. The concern among some economists is that, in some nations, regional trade agreements, like NAFTA and EU, may be viewed as substitutes for world trade liberalization under GATT.

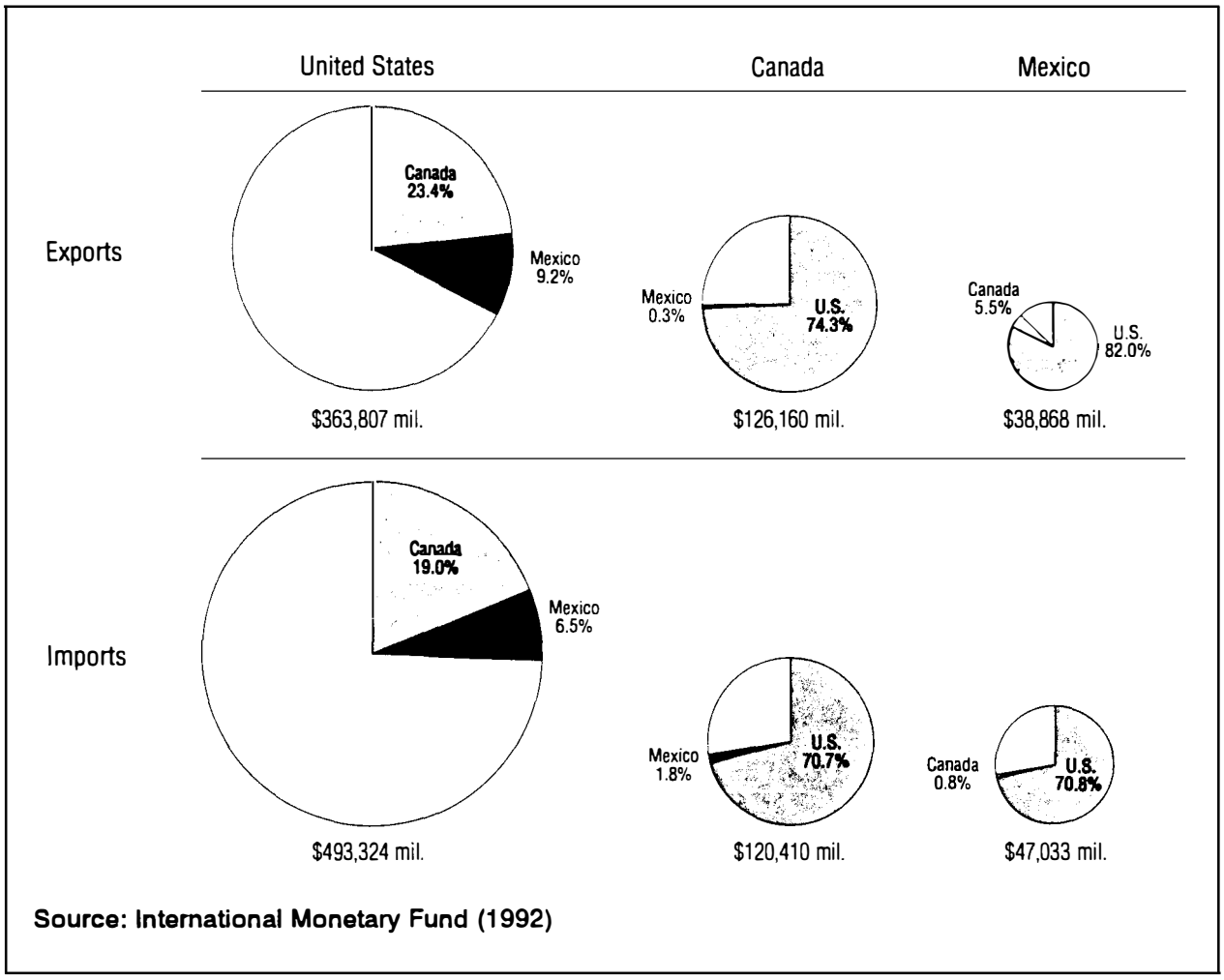
III. The Expected Impacts of NAFTA

Patterns of Trade in North America

The flow of trade among the U.S., Canada and Mexico is displayed in figure 1. Canada is the largest trading partner of the U.S. with Japan and Mexico second and third largest, respectively. The U.S. conducts about only one-quarter of its total trade with Canada and Mexico. In contrast, more than two-thirds of the foreign trade of Canada and Mexico is conducted with the United States. However, direct trade between Canada and Mexico is minor. The sector wise details of U.S. trade data for year 1991 are shown in table 1.

In general, it can be stated that Mexico and Canada have a comparative advantage over the U.S. in natural resource based products. For example, Canadians export a significant amount of wood, paper products, petroleum products, and non-ferrous metals to the U.S., and Mexico exports a large

Figure 1. Foreign Trade in North America, in 1991



Source: International Monetary Fund (1992)

Table 1. U.S. merchandise trade by commodity in 1991

Selected Commodities 1/	U.S. Exports to			U.S. Imports from		
	World	Canada	Mexico	World	Canada	Mexico
	..... in million of U.S. $			..... in million of U.S. $		
0 Food and Live Animals	29555	4204	2086	23924	4023	2666
03 Fish, Related Products	3056	329	17	5951	1248	297
04 Cereals	10916	362	686	1092	423	40
05 Vegetables and Fruit	5329	1727	153	6244	287	1509
1 Beverages and Tobacco	6750	141	44	5132	746	267
2 Crude Materials Except Fuels	25462	2748	1626	14317	6888	782
22 Oil Seeds	4324	97	391	150	83	27
24 Cork and Wood	5103	665	227	3342	2970	145
25 Pulp and Waste Paper	3604	227	285	2301	1983	2
28 Metal Ores and Scrap	3989	929	178	3881	994	213
3 Mineral Fuels, Related Products	12033	1240	865	58557	10992	4876
33 Petroleum, Related Products	6586	644	706	54150	7308	4751
4 Animal and Vegetable Fats, Oils	1147	64	143	927	138	31
5 Chemicals, Related Products	42965	6554	2624	25289	4603	748
51 Organic Chemicals	10928	1088	705	8450	797	257
52 Inorganic Chemicals	4102	489	259	3533	1078	193
6 Manufactudng, by Materal	35566	10266	4419	60362	15762	2364
64 Paper, Related Products	5961	1536	775	8435	6352	124
65 Textiles, Related Products	5457	1350	541	7339	506	330
67 Iron and Steel	4365	1393	873	10073	1579	314
68 Nonterrous Metals	5713	1210	425	8621	3687	356
7 Machinery, Transportation Equipment	187360	42289	15059	215950	41030	15040
71 Power Generating Machinery	16968	4097	1070	14487	2344	1140
72 Specialized Machinery	16565	2658	1222	11244	1122	142
74 General Industrial Machinery	17107	4654	1548	14891	1812	837
75 Office Machines, Computers	25954	3680	1002	30703	2324	729
76 Telecommunications	9966	1486	1506	23915	1013	2965
77 Electrical Machinery	29935	6175	4211	35822	3686	4875
78 Road Vehicles and Parts	31805	17396	3590	72732	25945	4312
79 Other Transportation Equipment	36355	1739	671	8414	2550	33
8 Miscellaneous Manufacturing	43162	8122	3694	87375	3689	3658
82 Furniture	2113	895	638	5286	1081	751
84 Apparel, Clothing	3212	244	533	27699	319	921
87 Scientific Instruments	13488	1883	999	6908	585	648
9 Not Classified Elsewhere	13447	2654	1612	15423	4635	1401
Total 2/	397448	78282	32172	507255	92505	31834

1/ The commodities are coded by Statdard International Trade Classification (revision3) one-digit and three-digit codes.

2/ Since all the data have been rounded somewhat, the subtotals do not necessarily sum to the tptals. Also, the totals on this table may not match exports/imports totals elsewhere in the article because these data are from different sources.

Source: Kehoe & Kehoe, 1994, p 32, adapted from OECD data.

amount of petroleum related products, fruits, and vegetables to the United States.

Intra-industry trade also plays a large role in the trade pattern between the U.S. and Mexico and the U.S. and Canada. The largest category of Canadian exports to U.S. is road vehicles and parts; this is also the largest category of exports from U.S. to Canada. The largest two categories of American exports to Mexico are electrical machinery, road vehicles and parts. On the other hand, Mexican exports of machinery and vehicles to the U.S., rank second and fourth, respectively.

Global Versus Regional Consequences of NAFTA

Trade between NAFTA signatories in the past has been limited by the existence of trade restrictions on imports and exports. Often, protection takes the form of import barriers erected to protect domestic producers by keeping the foreign competition out or at a competitive disadvantage. Import restrictions can be in the form of tariffs or non tariff barriers, including but not limited to, import quotas and import license requirements. Non-tariff barriers on imports can also be disguised as sanitary regulations, foreign exchange controls, or establishment of a state corporation with sole authority to import a particular product.

Under NAFTA a number of economic sectors in each country will continue to have a comparative advantage while other sectors will find themselves at a comparative disadvantage. In the short run, the sectors with a comparative advantage will experience sales growth and those sectors with a comparative disadvantage will experience sales decline (or stagnation). In each country, the declining sectors will experience an increase in structural unemployment which may generate a need for government intervention to retrain displaced workers.

However, an overall increase in the total trade volume of among free trade area member countries is expected. One negative consequence of NAFTA's preferential tariff treatment is that it may generate trade diversion. In the

long run, however, the expanding sectors, with comparative advantage, are expected to absorb the displaced resources and workers from the shrinking sectors, which will result in higher productivity, higher economic growth, and more trade in the free trade area. It is also possible that in the long run, with higher economic growth rates in the free trade area, the negative effects of trade diversion may be offset.

The magnitude of the regional and global trade effects generated by NAFTA will depend on a number of factors. Obviously, a free trade agreement will have significant impacts only if prior to the agreement there are significant barriers to trade. The larger the change in a nation's trade barriers (relative to its trading partners) the more dramatic the relative impact of freer trade. Dissimilarities of the participating economies, in terms of natural resource endowment, labor capital ratios, production techniques, and the size of the economy also play an important role in determining the impacts of free trade agreement. The more dissimilar the trading partners, the more unequal the impact. The implication is that all members of NAFTA will benefit, with Mexico benefiting the most.

Difficulties in Separating NAFTA from other Mexican Policy Changes

In considering NAFTA's impact, it is necessary to define and isolate the NAFTA related policy impacts from the effects of general liberalization of Mexican economy in recent years. Prior to 1985, Mexico had tariffs as high as 100%, required licenses for 92 percent of goods imported, and restricted foreign ownership of Mexican companies to 49 percent (Ten Kate, 1992). In 1985, the Mexican government changed course. Mexico became a member of GATT in 1986 and started the process of opening the Mexican economy to foreign trade and investment. Even before Mexico joined NAFTA, the maximum tariff was reduced to 20 percent, most import licensing requirements were eliminated, and foreign investment laws were liberalized, resulting in a tremendous increase in the level of foreign investment, especially with respect to private foreign portfolio investment.

During this period, another important change in Mexican economic policy was a restructuring of Mexican agriculture. The Mexican government removed the constitutional constraints on land tenure and thereby the impediments to investment in agriculture. The government eliminated many of the costly domestic subsidies. Another important government agricultural policy reform evolved around corn, the main product of small-farms and staple in rural and urban food consumption. Until recently, farm policy emphasized high producer prices and lower consumer prices, maintained through the monopoly position of CONASUPA (Comision Popular de Subsistencias Populares, a parastate organization). In recent years, much of the CONASUPA's role in marketing, in crops other than corn and dry beans, has been transferred to the private sector; and consumer subsidies have been greatly reduced and targeted toward lower-income house holds.

According to USDA (1994) in October 1993, Mexico also implemented PROCAMPO (Programa de Apoyos Direcos al Campo), a program to decouple Mexican agricultural support from production of specific commodities by making direct payments to producers on per hectare bases. These payments will be based on the amount of land devoted to eligible commodities in 3 years prior to December 1993. The payment rates per hectare will be held constant for a period of 10 years, and then will be phased out in equal installments from year 11 to year 15. Under PROCAMPO, farmers will make production decisions based on market prices rather than government set prices. PROCAMPO matches the NAFTA and GATT goals of domestic measures that have minimal or no trade-distorting effects.

These policy changes amount to a potential transformation of the Mexican economy to an extent rarely experienced in any country. There is no doubt that the signing of NAFTA helped lock in these unilateral changes in Mexican policies. However, to what extent this internal development is due to a "NAFTA" effect is debatable (Josling, 1992, p.147).

Any attempt to model the type of policy associated with NAFTA without adjusting for the changes that have occurred in Mexico is bound to generate

very tentative conclusions on the economic consequences of NAFTA. These policy changes and their impacts should be separated from impacts of NAFTA and related removal of tariffs and quantitative restrictions on intra-NAFTA trade. After an exhaustive review of the studies relating to NAFTA impacts, Josling (1992, p.147) points out that no one has attempted to quantify, or even describe fully, the true "NAFTA" effect. Instead, most authors combine NAFTA's impact with the unilateral Mexican liberalization effect.

Another issue is the recent completion of the Uruguay round of GATT. GATT is also supposed to lower trade barriers and place limits on domestic subsidies which have trade distorting effects. The implementation of the GATT accord will most certainly effect the intra-NAFTA trade preferences. However, this is a subject for another paper.

IV. Economy-wide Impacts

The Applied General Equilibrium Models.

The Applied General Equilibrium Model (AGE), also referred to as the Computable General Equilibrium Model (CGE) provides an excellent framework to stress economy-wide interaction among different sectors. The AGE models are constructed to encompass complex economy-wide adjustments, and can be easily adapted to include sectors with increasing returns to scale, imperfect competition, and differentiated products. These attributes make these models useful tools for the study of the economic consequences of free trade agreements which will lead to a reallocation of resources across sectors of an economy. AGE models, therefore, provide economist a tool that can identify winning and losing sectors in the economy as a result of a policy change.

AGE models have been used extensively over past 20 years to analyze government policies in both developed and less developed countries (see for example, Shoven and Walley, 1984a, 1984b). AGE models were also the tools of choice for researchers who began studying the potential impacts of NAFTA (Francois and Shields, 1994). In fact, at a U.S. International Trade conference held in February 1992, open to economists studying economy-wide

impacts of NAFTA, 11 out of 12 studies were based on AGE models (Kehoe and Kehoe, 1994b, p.17). Brown (1992) provides an excellent review of sixteen CGE models used to study the economy wide impacts of NAFTA. Most of the existing AGE trade models are static models and employ the comparative static methodology. This procedure involves constructing a model which can capture the essential features of the economy and replicate the observed data. Once the model is able to replicate the observed data, the policy changes are simulated by altering the relevant policy parameters and the new equilibrium is calculated (Kehoe and Kehoe, 1994a, p.3).

A criticism of existing AGE models is that they simplify complex intra and inter commodity relationships within different sectors and fail to treat the dynamic effects of trade liberalization satisfactorily. As Kehoe (1992) has noted, the dynamic effects of trade liberalization, through the induced effects on investment and adoption of new production technology in Mexico, can be expected to dominate the static effects. For example, in recent years trade liberalization and reduction of restriction in the capital market have resulted in a substantial increase in the flow of foreign capital into Mexico. Kehoe (1992) shows that if these flows of capital could lower the real interest rate from 28 percent to about 5 percent, the capital-labor ratio in Mexico would increase by a factor of about 5.5, which would, in turn, increase Mexican output per worker to about $24,300 and close the current gap with the U.S. level of output per worker by about 45 percent. He further points out that such increases in labor productivity would create a more stable political and economic environment in Mexico, and encourage more private investment and even higher wages.

The static AGE models are, nevertheless, quite useful as an analyst's tool of choice to measure the economy-wide impacts of a commercial policy shift such as the signing of NAFTA. However, these models fail to estimate the dynamic impacts of trade liberalization and therefore greatly underestimate the long term effects of trade liberalization.

For example, Brown (1992) reviewed 16 AGE based studies on the economic consequences of NAFTA. Brown noted in her study that all AGE models show that welfare effects of NAFTA are positive for all participating countries. Her comparison indicates that the AGE models employing differentiated products and constant returns to scale show positive but small welfare gains (less than 1 percent of GNP) from NAFTA to all participant countries. "Models that assume products to be homogenous across producers, incorporate increasing returns to scale, or both, show welfare gains for Mexico of 2 to 4 percent. The addition of international capital flows suggests still larger welfare gains for Mexico of 4 to 7 percent. Finally, endogenizing productivity growth generates larger welfare effects, possibly in the range of 10 percent of Mexican GNP" (Brown, 1992, p.57). She also notes that nearly all the models confirm that understanding the behavior of capital is central to evaluating the effects of NAFTA for Mexico, and that all the models, to some degree, handle capital formation in an ad hoc fashion (Brown, 1992, p.57).

Projected Economy-wide Impacts of NAFTA.

Out of the AGE model based studies reported in the literature, the Stern, Deardorff, and Brown (SDB) (1992), seems to be the most complete and relevant for the purpose of this study. The SDB model, essentially a version of the Michigan University World Trade Model, is a static representation with each of the NAFTA members (Canada, Mexico, and the United Sates) modeled individually. A group of 31 other major trading countries are combined to create a fourth country, and the remaining countries of the world are included as a residual rest of the world economy. SDB contains 23 tradable goods based on one and three-digit International Standard Industrial Classification (ISIC) product categories and 6 nontradable goods based on one-digit ISIC product categories. All of the tradable good sectors except agriculture in SDB are modeled as producing products differentiated by firm. The firms in these sectors employ increasing returns production technologies and are monopolistic competitors as defined by Dixit and Stiglitz (1977). Agriculture and the

nontradable goods are homogenous within countries and are produced under constant returns, and firms in these sectors are perfect competitors. Agricultural goods in different countries are assumed less-than-perfect substitutes and are modeled after Armington's (1969) specification. As a result of this assumption, the model can generate bilateral trade flows in the solution.

The aggregate level of employment is held constant in each country as the overall rate of employment is determined by macroeconomic forces and policies. The focus in the model is on the composition of employment across sectors, occupations, and locations as determined by the microeconomic interactions of supply and demand with the sectoral trade policies that NAFTA will alter. The analysis also assumes that trade remains balanced for each country, or any initial trade imbalance remains constant. The reference year for the data base of SDB was 1989.

Since the SDB study was conducted prior to completion of NAFTA, this study provided solutions for a number of alternative scenarios. We feel that scenario D in SDB (1992) is a reasonable approximation of the NAFTA provisions. Accordingly, we will discuss the SDB results from this perspective. In this scenario, it was assumed that all tariffs on trade between the NAFTA member countries are removed, and the impact of reduced investment barriers are assumed to increase foreign direct investment in Mexico, resulting in 10 percent increase in Mexican capital stock. As was pointed out, under NAFTA, tariffs and nontariff barriers are scheduled to be removed over 15 years. Since SDB is a static model, and cannot analyze the gradual reduction of barriers, the full reduction was assumed to take effect at once.

As expected, the impact on Mexico, in relation to the size of its economy, is much larger than the impact on Canada or the United States. According to SDB estimates, NAFTA is expected to result in a 4.6 percent increase in Mexican Gross Domestic Product (GDP) and 0.7 percent and 0.1 percent increases in Canadian and U.S. GDP, respectively. These results are

partly due to the fact that the U.S. is already a large and fairly open economy and therefore is not able to realize large gains by exploiting increasing returns in production due to NAFTA. The gains from NAFTA to Canada listed in table 2 are inclusive of the U.S.-Canada Free Trade Agreement (FTA). Alternative simulations (scenarios) by Stern, Deardorff, and Brown (1992) show that NAFTA has very little impact on Canada above and beyond that generated by the U.S.-Canada FTA. Table 2 summarizes the economy wide results of BDS.

The employment level in SDB is assumed to be fixed at country level, and cross-border labor movement is not allowed. Consequently, any adjustment in the labor market as a result of NAFTA can only take place in the form of movement from one sector to another within the country and a change in the wages. SDB predicts that, as a result of greater sectoral specialization and realization of economies of scale under NAFTA, the wage rates in U.S. and Mexico will be higher. Specifically, wages in U.S. are estimated to be slightly higher (0.2 percent). However, wages in Mexico are estimated to increase by 7.1 percent and therefore the gap between U.S. and Mexican wages is projected to narrow.

Another interesting result of the SDB model is that despite a 10 percent increase in the Mexican capital stock, the rate of return on capital in Mexico is expected to be 2.7 percent higher and the return on capital in U.S. is expected to be slightly higher (0.2 percent). One would expect that the sectoral specialization as a result of NAFTA would draw respective returns to capital closer, rising in the U.S. and falling in Mexico. The increase in the gap in rate of return on capital is possible only if the potential gains in the rate of return due to economies of scale outweigh the potential losses in the rates of return due to intersector specialization in Mexico (Stern, Deardorff, and Brown, 1992, pp.5-6).

An alternative simulation by SDB, without any foreign direct investment in Mexico, indicates that the real rate of return to capital rises most in Mexico relative to the group of 31 other major trading countries. This suggests that the primary inflow of capital into Mexico may come from the

Table 2. Economy wide impacts of NAFTA, by country

Country	Predicted change in each country's Welfare (GDP)	Exports	Imports	Welfare (GDP)	Wage Rate	Rental Rate	Terms of Trade
	..... in $ Billion			..... in Percent			
Canada	3.8	5.9	5.0	0.7	0.6	0.7	-0.7
Mexico	5.8	11.5	0.8	4.6	7.1	2.7	-4.6
United States	6.1	9.1	9.7	0.1	0.2	0.2	0.1
Others	0.1	-4.4	6.8	0.0	0.0	0.2	0.2

Note. Based on trilateral removal of all tariffs on trade among NAFTA countries and increased Foreign Direct Investment in Mexico resulting in a 10% increase in Mexican capital stock.

Source: Stern, Deardorff, and Brown 1992, Table 1.

outside NAFTA, and that the fear that U.S. firms will relocate to Mexico may be exaggerated (Stern, Deardorff, and Brown, 1992, p.20).

According to SDB, as a result of NAFTA, the terms of trade are expected to improve, slightly, for the U.S. and the group of 31 other major trading countries, and to deteriorate for both Canada and Mexico. As is expected, the countries which enjoy such an improvement in the terms of trade also tend to increase imports relative to exports. This is a result of the fact that an increase in the price of export goods raises the volume of import goods that can be purchased while keeping the trade balance in the model. Large increases in Mexican exports as well as imports by the group of 31 countries are projected as the result of the assumed capital flows. The other 31 countries are assumed to invest large amount of capital in Mexico, generating interest payments from Mexico. The remittance of interest payments from Mexico must be offset by a trade surplus if the current balance is to remain at the level prevailing in the base period (Stern, Deardorff, and Brown, 1992, p.16).

Sectoral effects on Employment in U.S.

The SDB model also provides the employment effects of NAFTA. Stern, Deardorff, and Brown report that in comparison to Mexico and Canada, the U.S. employment effects are more diffused. The sectoral employment effects of NAFTA for the U.S., both as absolute and percentage employment change, are shown in the table 3. The study by SDB predicts that only a slight expansion of U.S. employment due to NAFTA can be expected. For example: nonelectric machinery (+16,435 or 0.75 percent); Agriculture, Forestry, and Fishing (+13,524 or 0.50 percent); miscellaneous manufacturers (+8,686 or 0.39 percent); wearing apparel (+7,077 or 0.60 percent); textiles (11,851 or 0.9 percent); and chemicals (+6,411 or 0.41 percent). The negative employment effects are concentrated in: electric machinery (-33,027 or -1.47 percent); transportation equipment (-13,583 or -0.35 percent); nonferrous metals (-13,206 or -2.1 percent); and mining and quarry (-5,642 or -1.35 percent).

Table 3. NAFTA impacts on employment in U. S. and South Dakota, by sector

ISCI	Sector	Employment Distribution 1/ U.S. (%)	Employment Distribution 1/ S.D. (%)	Estimated Employment Change As a Result of NAFTA 2/ U.S. (No. of Workers)	Estimated Employment Change As a Result of NAFTA 2/ S.D. (No. of Workers)	Estimated Employment Change As a Result of NAFTA 2/ U.S. (%)	Estimated Employment Change As a Result of NAFTA 2/ S.D. (%)
	TRADABLES:						
1	Agr., For., & Fish.	2.32	10.41	13524	180	0.50	0.50
2	Min. & Quarry.	0.36	0.29	-5642	-14	-1.35	-1.40
310	Food, Bev., and Tab.	2.06	3.01	1725	7	0.07	0.07
321	Textiles	1.13	0.22	11851	7	0.90	0.92
322	Wearing Apparel	1.01	0.61	7077	13	0.60	0.62
323	Leather prod.	0.72	0.25	198	0	0.02	0.00
331	Footware	0.19	0.04	374	0	0.17	0.00
331	Wood Prod.	0.34	0.32	1063	3	0.27	0.27
332	Furn. & Fixt.	0.51	0.36	918	2	0.15	0.16
341	Paper & Paper Prod.	0.63	0.11	1907	1	0.26	0.26
342	Print & Publ.	1.78	0.72	903	1	0.04	0.04
35A	Chemicals	1.36	0.18	6411	3	0.41	0.48
35B	Petrol. & Rel. Prod.	0.44	0.00	-110	0	-0.02	0.00
355	Rubber prod.	0.81	0.54	1826	4	0.19	0.22
36A	Nonmetal Min. Prod.	0.33	0.22	534	1	0.14	0.13
362	Glass & Glass Prod.	0.26	0.04	-1924	-1	-0.64	-0.73
371	Iron & Steel	0.51	0.00	-510	0	-0.09	0.00
372	Nonferrous Metals	0.54	0.00	-13206	-1	-2.10	0.00
381	Metal Prod.	2.87	1.11	1818	2	0.05	0.05
382	Nonelec. Mach.	1.88	1.47	16435	38	0.75	0.75
383	Elec. Mach.	1.94	0.68	-33027	-34	-1.47	-1.45
384	Transp. Equip.	3.37	1.08	-13583	-13	-0.35	-0.35
38A	Misc. Manuf.	1.90	1.18	8686	16	0.39	0.39
	NONTRADABLES:						
4	Elec., Gas & Water	1.02	1.04	-516	-2	-0.04	-0.06
5	Construction	6.27	7.00	1374	5	0.02	0.02
6	Whole. & Ret. Trade	20.73	22.57	-2309	-7	-0.01	-0.01
7	Transp., Stor., & Comm.	5.43	8.04	-53	0	-0.00	0.00
8	Fin., Ins., & Real Est.	9.42	7.07	-2724	-6	-0.02	-0.02
9	Comm., Soc., & Pers. Serv.	29.89	31.36	-3018	-9	-0.01	-0.01
	Total	100.00	100.00	0	196	0.00	0.06

1/ Employment distribution is estimated base on "National Matrix Tape," proportions applied to 1989 employment data (i.e 116.182 million for the United States and 344 thousand workers for South Dakota).

2/ Trilateral removal of all tariffs on trade among NAFTA countries and increased foreign direct investment in Mexico resulting a 10% increase in capital stock.

Source: Stern, Deardorff, and Brown 1992, Tables A-23, A-24, A-31.

The employment results for textiles and wearing apparel reflect the different tariff rates applied to these sectors in the three countries. For most part, U.S. has lower tariffs than the other two countries in these sectors and thus has more to gain from tariff removal. At the same time, the U.S. nontariff barriers are substantial against Mexico in the textile and wearing apparel sectors. These nontariff barriers will protect the U.S. textile and wearing apparel sectors as tariff rates decline. These employment effects are based on the assumption that the Canadian and Mexican nontariff barriers in these sectors will remain nonexistent (Stern, Deardorff, and Brown, 1992, p.29).

V. Impacts on U.S. Agriculture

General Equilibrium Estimates.

Exploring NAFTA's impacts on agriculture with AGE models poses a dilemma. The importance of significant cross-sectional implications of NAFTA suggests the use of AGE models. However, the complexity of individual commodity programs and the disparate nature of the agricultural sector make the use of aggregated models problematic (Josling, 1992, p.151). Despite these difficulties, a number of AGE studies with varying degrees of desegregation in the agriculture sector have been published. The AGE study which comes close to capturing both the details of the agricultural sector and the general equilibrium intersector effect is based on the AGE model developed by Sherman Robinson in conjunction with other economists at the Economics Research Service of USDA. This is basically a U.S. model modified to include Mexico. There are several versions of this model, and the results are reported in various places and forms (Josling, 1992, p.152).

The results discussed in this paper are from the Burfisher, Robinson, and Thierfelder (BRT) (1992). The BRT model has twenty-eight sectors, of which ten are agricultural and ten are food-processing sectors. Food grain and feed corn are modeled separately, as is the forestry and fisheries sector. Farm programs are modeled as a combination of fixed and endogenous price

wedges (gaps between traded prices and domestic prices) and income transfers. Deficiency payments (in the U.S.) are endogenous, as are the domestic prices of goods subject to import quotas and the levels of domestic subsidy to Mexican agriculture. The dominant income transfer program is the tortilla subsidy to low-income Mexican households.

The BRT model estimates that full trade liberalization (industrial liberalization plus removal of tariff and nontariff barriers in agriculture) results in an increase in real GDP by 0.2 percent in U.S. as well as in Mexico. The BRT projections of Mexican GDP increases are relatively low because the study did not assume any increased foreign capital investment in Mexico.

In addition to full trade liberalization (scenario 3), the BRT study also offers solutions for several other scenarios as a way to resolve the difficulties of separating the impacts of NAFTA from other related domestic policy changes in Mexico. We feel that two of these scenarios are relevant. Scenario 4 assumes the elimination of Mexican agricultural support prices in addition to trade liberalization. Scenario 5 assumes trade liberalization and removal of input subsidies but not price supports to processors. The specific sector results from the BRT study are shown in table 4.

These results are in line with a priori expectations: U.S. cereal exports to Mexico, such as wheat, food, and feed grain, increase significantly. The Unites States exports of fruits and vegetables and oilseeds also increase. Smaller increases (though not shown in the table 4) are indicated for livestock products and various processed foodstuffs. The overall effect on the agricultural sector in U.S. is positive. Mexican agriculture, on the other hand, is less fortunate. NAFTA results in a significant drop in production of corn, oilseeds and other crops. Adding domestic liberalization to the trade liberalization could further reduce the Mexican grain and crop production. Mexican fruit and vegetable output and exports increase by 10 percent and about 25 percent, respectively.

Table 4. Sectoral results of alternative NAFTA scenarios

Item	Scenario a/ 3	4	5
		..... Percent change from base	
United States:			
Food grain production	0.7	1.5	1.2
Food grain exports	80.8	130.6	140.7
Food corn production	7.5	8.8	9.1
Food corn exports	192.9	209.3	222.8
Feed grain production	0.9	1.6	1.5
Feed grain exports	52.1	71.4	74.1
Oilseed production	1.3	2.7	2.5
Oilseed exports	8.0	16.4	18.3
Fruits & vegetable production	0.3	1.1	0.9
Fruits & vegetable exports	14.8	14.7	15.0
Mexico:			
Food grain production	-6.5	-16.4	-14.1
Food corn production	-15.2	-21.7	-20.2
Feed grain production	-3.2	-5.6	-5.0
Oilseed production	-4.7	-45.6	-46.5
Fruits & vegetable production	10.3	10.1	9.6
Fruits & vegetable exports	25.8	25.6	25.3

Source: Burfisher, Robinson, and Thierfelder (1992), Pp. 34-35, 48-49.

a/ 3 = Trade liberalization.
4 = Trade liberalization and eliminate all Mexican agricultural support policies.
5 = Trade liberalization and eliminate Mexican input subsidies but not processor subsidies.

Partial Equilibrium Estimates.

The "Partial Equilibrium Multimarket" framework allows economists to model selected sectors in the economy in greater detail. The most versatile partial equilibrium model used to evaluate different policy impacts on the U.S. agricultural sector was developed at USDA/ERS. This model is commonly known as the Static World Policy Simulation (SWOPSIM) model and was originally developed by Roningen (1986) and later extended by Roningen, Sullivan and Dixit (1991).

This model, in different variations, has formed the basis for a number of studies by the ERS staff on trade related issues. The SWOPSIM models are multicountry partial equilibrium models with individual supply and demand relationships and world market closure. This type of model does not include increasing returns to scale nor other dynamic gains. Welfare calculations and market balances in these models are generated by manipulating policy parameters, such as price wedges. The SWOPSIM trade models utilize the Armington (1969) specifications, implying less-than-perfect substitution among different sources of import supply.

The NAFTA study discussed here is based on SWOPSIM version reported by Krissoff, Neff, and Sharples (1992). This version (KNS) has three regions, the U.S., Mexico, and the Rest-of-World (ROW). The KNS model is parameterized to reproduce the 1988 set of prices and trade flows for the U.S., Mexico, and ROW.

Krissoff, Neff, and Sharples (1992) present solutions for three different scenarios. Their scenario 1 assumes bilateral elimination of all tariffs and nontariff trade barriers; scenario 2 assumes that Mexico unilaterally removes all trade barriers on imports from all countries; and scenario 3 combines these two assumptions. We feel that of these three alternatives, scenario 1 best reflects the actual NAFTA treaty. Accordingly, we focus our discussion on the KNS estimates generated under scenario 1.

According to KNS predictions, the removal of all bilateral trade barriers will result in an increase in the two way agricultural trade by $650

million (a 15 percent increase from the $4 billion in 1988). The KNS model predicts that the removal of bilateral trade barriers results in a 20 percent increase in U.S. agricultural exports to Mexico, mostly in grains, oilseeds, livestock, and meats. U.S. coarse grain exports to Mexico are also predicted to rise by 60 percent under the KNS scenario 1. Specifically, the KNS model projected that the U.S. will "increase corn and [other] coarse grain exports by 186 million dollars and 100 million dollars, respectively (KNS 1992, p.22)." Their model also projects that U.S. exports of oil seeds and products, and wheat will increase by 84 million dollars and 4 million dollars, respectively (KNS 1992, p.22)

The KNS model predicts that the bilateral trade liberalization increases Mexican agricultural exports by 10 percent, mostly in feeder cattle and fruits and vegetables. Mexican exports of feeder cattle, frozen orange juice, and fresh tomatoes to the U.S. also increase by about 20 percent, 50 percent, and 10 percent, respectively. Even with increased exports to the U.S., the Mexican share of the U.S. fruits and vegetable market remains quite small; for example a 4 percent in case of frozen orange juice.

The removal of bilateral trade barriers results in less than a 1 percent contraction in U.S. and Mexican agricultural imports from other countries. The KNS simulation shows that net producer income in the U.S. increases by about 1 percent. Most of the gains in the U.S. accrue to grain and oilseeds producers (table 5 & 6). Savings are also realized by the U.S. government through a reduction of spending on agriculture (mainly in domestic price support). Production of corn and other coarse grains in the U.S. increase by 0.3 and 1.7 percent, respectively. Prices of corn, and other coarse grains in U.S. increase by 1.1 and 2.3 percent, respectively. Cattle prices in U.S. are estimated to decrease by 0.2 percent.

The KNS model also predicts that the removal of border protection results in significant decrease in prices of farm products in Mexico. Mexican consumers and users of feed grain realize welfare gains equivalent to over 5 percent of value of Mexican farm production. Mexican fruit and vegetable

Table 5. Welfare impacts of U.S.-Mexico bilateral trade liberalization

Item	U.S.	Mexico	ROW
		..... in million dollars	
Producer income:			
Grain and oilseeds	338	-392	425
Livestock, meats, & dairy	-88	1472	7
Horticulture	-31	32	-6
Consumer benefits:			
Grain and oilseeds	-260	835	-615
Livestock, meats, & dairy	72	-1345	-79
Horticulture	72	-12	0
Government savings:			
Grain and oilseeds	279	-27	0
Livestock, meats, & dairy	-17	-87	0
Horticulture	-52	0	0
Quota rents:			
Grain and oilseeds	0	-389	0
Livestock, meats, & dairy	0	0	0
Horticulture	0	0	0
Net welfare:			
Grain and oilseeds	357	28	-190
Livestock, meats, and dairy	-35	40	-72
Horticulture	-12	19	-7

Source: Krissoff, Neff, & Sharples (1992), Tables 7, 8, & 11.

Table 6. U.S.-Mexico bilateral trade liberalization impacts on selected commodity producers' income

Producer's income	U.S.	Mexico	ROW
		..... in million dollars	
Grains and oilseeds:			
Wheat	2	-12	91
Corn	156	-204	153
Other coarse grain	55	-84	100
Soybeans	27	-3	28
Soymeal	19	-27	17
Soyoil	10	-13	5
Other oil seeds	62	-32	17
Other meal	1	-4	6
Other oil	7	-13	8
Total	338	-392	425
Livestock, meat, & poultry:			
Cattle	-144	1532	-77
Beef & Veal	13	-21	18
Pork	12	-12	29
Poultry meat	19	-12	9
Eggs	5	-6	11
Milk	4	0	19
Butter	1	-4	-1
Cheese	2	-4	0
Milk powder	0	0	0
Total	-88	1472	7
Horticulture:			
Melons	-4	3	-1
Frozen orange juice	-6	-12	-6
Cucumbers	-3	2	0
Onions	-6	5	-1
Green pepers	-3	3	-1
Tometoes	-9	7	2
Total	-31	32	-6

Source: Krissoff, Neff, & Sharples (1992), Tables 7,8, & 11.

farmers realize small gains, approximately 2 percent of farm production value. According to KNS estimates, Mexican corn and other coarse grains prices decrease by 15.9 and 10.9 percent, respectively. Consequently, Mexican production of corn and other coarse grains drop by 7.3, and 10.9 percent, respectively. On the other hand, the KNS model predicts a 25 percent increase (from the 1988 base of nearly 850 thousand heads) in Mexican feeder cattle, and significant gain to Mexican cattle producers. This gain is mainly attributed to the fact that the Mexican cattle producers will no longer face an export tax. According to KNS model, cattle prices in Mexico increase by 15.7 percent. Overall, Mexican corn and other course grain producers incur net income losses, and producers of cattle and horticultural products gain significantly higher net income (tables 5 & 6).

Commodity-Specific Studies

Due to the difficulties in incorporating complex commodity particulars in general and partial equilibrium models, agricultural economists often resort to commodity-specific-studies. In these studies, analysts can combine a more detailed policy and institutional structure (in which a particular agricultural commodity is produced) with quantitative models. A collection of a number of such studies by different agricultural economists were included in a five volume report from the American Farm Bureau Federation (1992). This report includes studies which examine general economic issues, labor issues, as well as NAFTA impacts on row crops, livestock, and fruits and vegetables. A brief discussion of few of these studies follows.

Peterson (1991) investigated the impacts of NAFTA on cereals and oilseeds in Mexico. His model assumes that Mexican yields are not influenced by price levels. Mexican production of each commodity depends on acreage planted, which in turn depends on price levels as well as direct and cross-price elasticities. Unlike the KNS model, Peterson (1992) assumes that a commodity produced in the United States is a perfect substitute for a similar commodity produced in Mexico. He also assumes a five year transition period,

1991 to 1995, and estimates yearly levels of production, consumption, and imports for main grains. Under his scenario "NAFTA I", he assumes that over five years, there is a complete liberalization of the Mexican grain and oil seeds markets, implying that the real price received by Mexican producers and paid by Mexican consumers gradually becomes equal to the real U.S. border price.

Peterson's baseline Mexican production projections for 1995 were 10.1 million metric tons (mt) of corn, 4.0 million mt of wheat. 4.0 million mt of sorghum, and 0.7 million mt of soybeans. His baseline Mexican import projections for 1995 were 5.5 million mt of corn, 0.8 million mt of wheat, 2.0 million mt of sorghum, and 1.8 million mt of soybeans.

Peterson estimated that as a result of complete liberalization in Mexican grain and oil seeds markets, Mexican production will drop significantly from the baseline levels, and Mexican imports are expected to be much higher compared to baseline levels. Specifically, he projects a Mexican production drop of 21 percent for corn, 13 percent for wheat, 26 percent for sorghum, and 19 percent for soybeans from the base line projections for 1995. Accordingly, Peterson also projects a Mexican import increase of 71 percent for corn, 72 percent for wheat, 83 percent for sorghum, and 23 percent for soybeans from baseline estimates for 1995.

Peterson's study did not investigate the impact of increased Mexican imports on U.S. exports of these commodities to the rest of the world. Assuming there is an one to one relationship between these two, Peterson's projections imply that U.S. production has to increase about 2 percent for corn as well as wheat, about 11 percent for sorghum, and about 1 percent for soybeans. Peterson's study also did not estimate to what extent increased Mexican demand for U.S. grain would impact U.S. (and world) grain prices.

Rosson et al. (1991) analyzed the impacts of NAFTA on livestock markets. they neither employed a formal model nor provided any quantitative estimates on the effect of NAFTA. Based on their review of historical data, knowledge of the structure of livestock sectors and qualitative analysis, Rosson et al.

(1992) concluded that, in the near term, Mexican feeder cattle exports to United States would most likely be stable to moderately higher. However, in the long run, Mexican cattle exports will depend upon new investment in Mexico and would fall as the domestic beef market expands (Rosson et al., 1991, p.89). Their conclusions are in direct conflict with KNS projections.

McClain and Harris (MH) (1991), projected dairy exports to Mexico under varying assumptions of growth rates for both domestic production and consumption. MH projected Mexican imports of dairy products to remain around 2.7 million metric tons under low (5 percent) growth, and will rise to about 3.15 million metric tons under high (8 percent) growth rate assumptions. MH did not provide any projections on import levels. However, they felt that with successful conclusion of a free trade agreement, continued privatization, and increased availability of cheaper feed, a high growth outcome is more likely. In the absence of any more detailed dairy models, one should probably conclude that dairy imports from United States might continue at the current level and increase if investment is not attracted to Mexican dairy production and processing (Josling, 1992, p.162).

Overall Impacts on U.S. Agriculture

The quantitative studies reviewed in this section show that grain and oilseed producers in the United States will moderately benefit from NAFTA. The BRT model projected that the United States will export about 80 percent more food grain, 193 percent more food corn, 52 percent more feed corn, and 8 percent more oilseeds to Mexico. The KNS model estimated that U.S. coarse grain exports to Mexico are expected to increase by 60 percent, and the shipment of U.S. corn to Mexico by 65 percent. The KNS model also projected that the United States will export more oilseeds and oilseed products ($84 million), and wheat ($4 Million) to Mexico. The KNS model estimates that the U.S. production of corn and other coarse grains will increase by 0.3, and 1.7 percent; and their prices in U.S. will rise by 1.2 and 2.3 percent, respectively.

Peterson (1991) estimated that the Mexican imports of U.S. corn and sorghum will jump by 71 and 83 percent, respectively. These increases are approximately equivalent to 2 percent of corn, and 11 percent of sorghum, production in the United States. Similarly, Peterson also estimated that the Mexican imports of wheat and soybeans from the U.S. will increase by 72 and 23 percent, respectively. These increases are approximately 2 percent of wheat, and 1 percent of soybean, production in the United States. Given the differences in model structures and assumptions as well as in the base years, these projections are surprisingly close and credible.

The large increase in Mexican feeder cattle exports to U.S. projected by KNS is, not supported by others. The general conclusions from the qualitative analysis by Rosson et al. (1991) are in direct conflict with KNS projections. It seems that the increase in Mexican feeder cattle exports to U.S. is substantially overestimated by the KNS model. The KNS model, probably, does not fully take into account the fact that trade liberalization will substantially lower feed cost in Mexico. The Mexican supply elasticity for beef based on historic data, probably, drastically underestimates the potential expansion of cattle feeding operations after joining NAFTA. In fact, one would expect that the cattle feeding expansion trend will be further strengthen as Mexican small grain farmers start looking for alternative enterprises, and increased income levels translate into increased beef demand in Mexico. Despite our reservations regarding the KNS projections for feeder cattle export levels, KNS projections for other sectors are more or less in the middle range.

VI. Impacts on South Dakota's Economy

Stern, Deardorff, and Brown (1992) estimated the sectoral employment impacts in United States, which are reported in table 3. Table 3 also gives the estimates of sectoral employment for South Dakota. As discussed earlier, the SDB model predicts only slight expansion of U.S. employment in some sectors and slight contraction of employment in others. The model, by

assumption, keeps the total United States employment level unchanged. However, it does allow each sector and region in the United States to emerge as net gainer or net loser. According to SDB projections, the four sectors which lose the most jobs in United States are electric machinery, transportation equipment, nonferrous metals, and mining and quarry. South Dakota has very limited employment in these industries (Table 3). On the other hand, 10.4 percent of South Dakota employment is in its agriculture sector. According to the SDB model projections, agriculture is one of the two sectors in the United States which gain employment. According to their projections, as a result of NAFTA, the agriculture sector employment in South Dakota expands by 180 persons. It may be pointed out, that these projections merely indicate that there would be 180 more persons working in agriculture as compared to the situation without NAFTA. Therefore, with the continuation of consolidation, the agriculture sector may still lose some farmers, but the loss will be smaller as a result of NAFTA.

Since agriculture plays a key role in South Dakota's economy, another way to look at the impact of NAFTA is to take the impacts of NAFTA on U.S. agriculture and translate these for South Dakota. For example the KNS model projected that NAFTA will result in an increased sales of grains and oilseeds to Mexico, and will increase corn and coarse grain prices by 1.1 percent, and 2.3 percent, respectively. The higher prices in turn will increase the production of corn, and coarse grain by 0.3 percent, and 1.7 percent, respectively. This will obviously lead to *approximately* similar increases in the South Dakota.

The KNS provides the estimates of NAFTA's impacts on different commodity and livestock producers as well as changes in consumer benefits in the United States. The impacts on producers and consumers in South Dakota are estimated by a proportional allocation of these impacts for the United States, and are shown in table 7. For example, NAFTA is expected to increase the U.S. wheat producers' net income by $2.0 million. Since South Dakota harvests about 5 percent of U.S. wheat, South Dakota wheat producers can expect a rise in their

Table 7. Estimated impacts of NAFTA on South Dakota's agriculture

Item	U.S. Impact in $ million	General Allocation Factor	S.D. Allocation Factor	S.D. Impact in $ million
Grain & Oilseed Producers:				
Wheat production	2.0	1.00	0.050 e/	0.10
Corn production	156.0	1.00	0.029 e/	4.52
Other coarse grain production	55.0	1.00	0.039 e/	2.15
Soybeans production	27.0	1.00	0.028 e/	0.76
Other oilseeds	62.0	1.00	0.028 e/	1.74
Total for Grain & Oilseed Producers				9.3
Cattle/Beef/Pork Producers:				
Cattle production	-144.0	1.00	0.037 e/	-5.33
Beef & veal production	13.0	1.00	0.037 e/	0.48
Pork production	12.0	1.00	0.036 e/	0.43
Corn price increase	-104.0	0.77 a/	0.036 f/	-2.88
Course grain price increase	-36.0	0.74 a/	0.036 f/	-0.96
Soybeans price increase	-26.0	0.64 b/	0.036 f/	-0.60
Other oilseeds price increase	-59.0	0.50 b/	0.036 f/	-1.06
Feeder cattle price increase	173.0	1.00	0.036 f/	6.23
Total for Cattle/Beef/Pork Producers				-3.69
Consumers:				
Wheat price increase	-5.0	1.00	0.0028 g/	-0.01
Corn price increase	-104.0	0.23 c/	0.0028 g/	-0.07
Course grain prices increase	-36.0	0.26 c/	0.0028 g/	-0.03
Soybeans price increase	-26.0	0.36 d/	0.0028 g/	-0.03
Other oilseeds price increase	-59.0	0.50 d/	0.0028 g/	-0.08
Beef & veal price increase	-23.0	1.00	0.0028 g/	-0.06
Pork price increase	-33.0	1.00	0.0028 g/	-0.09
Total for Consumers				-0.37

Notes. a/ The proportion of feed use to domestic disappearence.
b/ The meal value/oilseed value. Assumed 0.5 for other oilseeds.
c/ The proportion of non-feed use to domestic disappearence.
d/ The oil value/ oilseed value. Assumed 0.5 for other oilseeds.
e/ The proportion of South Dakota/U.S. production value.
f/ The proportion of cattle, beef, & pork production in S.D.
g/ The proportion S.D. population to U.S. population.

Source: Based on Impacts on U.S. producer income and consumer benefit estimates from Krissoff, Neff, & Sharples (1992), Tables 7, 8, & 11.

net income by $0.10 million (5 percent of $2.00 million). According to these estimates, NAFTA is expected to add about $9.3 million annually to the net income of South Dakota grain and oilseed producers. The producers of cattle, beef, and hogs in the state are expected to lose $3.69 million annually. Consumers in South Dakota are estimated to pay an additional $0.37 million annually due to higher prices. On the whole, annual net gains from NAFTA to South Dakota producers and consumers amount to a modest sum of $5.24 millions.

VII. Summary and Conclusions

In this paper we discuss why nations trade and the expected economic impacts of NAFTA. Difficulties in unraveling NAFTA's impacts from effects of other policies aimed at liberalizing the Mexican economy are discussed. It is argued that since changes in trade policies involve economy-wide repercussions, the applied general equilibrium models provide an excellent framework to identify winning and losing sectors in the economy. Most large general equilibrium models are static in nature and therefore fail to capture the dynamics of Mexican trade liberalization. Understanding the behavior of capital is central to evaluating the economy-wide impacts of NAFTA for Mexico, and yet all large models handle capital formation in an ad hoc fashion. As a result of these difficulties, the AGE models generally tend to underestimate the impacts of NAFTA.

Prior to joining NAFTA, among the NAFTA countries, the Mexican economy had higher levels of protection than in Canada and United States. Therefore, NAFTA's impact on Mexico's economy is expected to be the most dramatic. On the other hand, the United States had relatively low trade barriers so NAFTA's economic impact is expected to be modest.

With the AGE model, Stern, Deardorff, and Brown estimated that NAFTA will increase the U.S. GDP by about $6 Billion (0.1 percent higher than the level without NAFTA), and would increase both the rates of return on capital and wages by about 0.2 percent. They estimate that the sectoral employment impacts of NAFTA in the United States would be small and dispersed. They

report that the highest percentage of workers displaced in any sector is projected to be 2.1 percent (the electric machinery sector). The highest percentage of jobs gained in any sector is projected to be 0.90 percent (the textile sector). They estimated that as a result of NAFTA, U.S. agricultural employment will higher by about 0.5 percent.

Due to the complexities of the agriculture sector, it is difficult to assess the detailed NAFTA impacts on agriculture with most aggregate AGE models. For this reason, a number of analysts have analyzed the potential impacts of NAFTA on U.S. and Mexican agriculture with partial equilibrium models as well as commodity-specific studies. Most of these studies project that as a result of NAFTA, U.S. exports of grain and oilseeds to Mexico will increase by 60 to 65 percent. Most studies agree that as a result of NAFTA, there will be a moderate increase in Mexican exports of fruits and vegetables. Analysts agree that NAFTA will result in increased shipments of Mexican feeder cattle to the United States in the near terms. There is much less agreement, though, with regards to the magnitude of this increase. Most analysts project only modest increases in Mexican feeder cattle exports into the United States.

South Dakota does not have significant employment in sectors which are projected to experience losses in employment. On the whole, the study by Stern, Deardorff, and Brown projects a net gain of 196 jobs (180 of these in the agriculture sector) in South Dakota. It is estimated that, through higher export and price levels, NAFTA will translate into an increased yearly net income of about $9.3 million to grain and oilseeds producers in South Dakota. The higher grain and oilseed prices and lower feeder cattle prices will, however, translate into a decrease in yearly net income by about $3.7 million to the state cattle, beef, and pork producers. It is estimated that consumers in the state will pay about $0.37 million per year more for their food. Net benefits to South Dakota from NAFTA are estimated to be about $5 million a year.

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APPENDIX A

Comparison of NAFTA with the European Union

In comparison with European Union, NAFTA area is larger in terms of both population and production, and has fewer countries. Since purchasing power varies across countries, for a meaningful comparison of economic size, standard of living, and labor productivity across countries, the output has to be adjusted for purchasing power parity. Summers and Heston (1993) argue that cross country comparisons are more meaningful when the output from different countries are valued at a common set of international prices rather than simply using the exchange rate to convert domestic measures of output. Summers and Heston (1993) also constructed such measures for different countries for 1992. These measures for European Union and NAFTA countries are reproduced in the following table.

Area	Country	Population (Million)	Output (Bil. US$)	Output (US $1,000) Per person	Per Worker
NAFTA	Canada	26.5	548.8	20.7	41.4
	Mexico	86.2	544.4	6.3	18.4
	Unites States	250.0	5392.2	21.6	43.9
	Total (NAFTA)	**362.7**	**6485.4**	**17.9**	**39.2**
European Union	Belgium	10.0	166.6	16.7	40.1
	Denmark	5.1	85.7	16.7	29.9
	France	56.4	941.5	16.7	36.4
	Germany(FRG)	62.1	1125.2	18.7	37.3
	Greece	10.1	79.4	7.9	20.7
	Ireland	3.5	38.1	10.9	28.2
	Italy	57.7	868.5	15.1	37.1
	Luxembourg	0.4	7.3	19.2	44.7
	Netherlands	14.9	232.3	15.5	37.3
	Portugal	10.4	80.7	7.8	17.3
	Spain	39.0	454.0	11.7	32.1
	U.K.	57.4	882.4	15.4	31.1
	Total (EU)	**327.0**	**4961.7**	**15.4**	**33.9**

In comparison with European Union, NAFTA area has higher output per person as well as output per worker. The output per person is about one-third of output per worker in Mexico, but about one-half in the United States, and Canada. In part, this difference is due to the fact that Mexico has a much larger proportion of population which is very young and not in labor force.

NAFTA and the agreements that bind the members of European Union are different in a number of ways. Like European Union agreements, NAFTA does eliminate trade tariffs over 15 years, substantially reduces trade barriers, and ensures free capital flows throughout the region. Unlike the European Union agreements, NAFTA does not erect trade barriers against the rest of the world, promote the flow of labor through out the region, and include plans for significant direct redistribution to poor regions within its area. Since there are no common trade barriers against the rest of the world, the NAFTA relies on its rules of origin to determine whether a product has enough North American contents to qualify for preferential treatment. Although NAFTA does establish dispute resolution mechanisms, NAFTA does not include plans for a central North American government like European Parliament. NAFTA also does not include any plan about establishing a common currency system for North America, as has been proposed for Europe. Both Canadian and Mexican monetary authorities, however, try to manage their currencies exchange rates against the U.S. dollar.

Source: Kehoe and Kehoe, 1994b, Pp. 22-23.

Appendix B

Main Provisions of NAFTA

NAFTA lifts trade barriers primarily between Mexico and North American neighbors. In 1992, Mexican tariffs on imports from the United States averaged about 10 percent when weighted by the value of imported; at the same time, United States tariffs on imports from Mexico averaged about 4 percent. Canada and United States had no tariffs on most of their trade; they had a separate free trade agreement, which took effect in January 1989. NAFTA substantially reduces nontariff trade barriers, such as import quotas, sanitary regulations, and licensing requirements, although these are not eliminated. Recently North American Countries have had few restrictions on Capital flows. The obvious exceptions are in Mexico and are laws prohibiting private ownership, foreign and domestic, in petroleum industry and parts of petrochemical industry, laws restricting foreign investment in the financial and insurance sectors, and laws institutionalizing commercial ownership of much agricultural lands, the ejido system.

NAFTA eliminates tariffs on trade among the three countries over a period of 15 years, it substantially reduces non-tariff barriers over the same period, and it immediately ensures the free flow of capital throughout the region.

Here are some specifics by sector:

Automobiles. NAFTA immediately decreases Mexico's tariffs on automobiles from 20% to 10% and over the next 10 years decreases them to zero. It decreases tariffs on most auto parts to zero with in 5 years. To qualify for this preferential tariff treatment, a vehicle must contain 62.5 percent North American content. NAFTA eliminates over 10 years requirements that auto makers supplying the Mexican market produce the cars in Mexico and buy Mexican parts. It eliminates mandatory export quotas on foreign-owned auto manufacturing facilities in Mexico, and with in 5 years it eliminates Mexico's restrictions on imports of buses and trucks.

Energy and Petrochemicals. NAFTA immediately lifts trade and investment restrictions on most petrochemicals. It allows foreign private ownership of electric power plants and allows foreigners to sell to state-owned Mexican energy companies under competitive bidding rules.

Financial Services. NAFTA eliminates over six years Mexican restrictions on Canadian and U.S. ownership and provision of commercial banking, insurance, securities trading, and other financial services. Under NAFTA the Canadian and U.S. financial firms are allowed to establish wholly owned subsidiaries in Mexico and engage in range of activities like similar Mexican firms.

Textile and Apparel. NAFTA immediately eliminates barriers to trade on over 20 percent of trade in textiles and apparel between Mexico and the United States. Over six years it eliminates barriers on another 60 percent. However, to qualify for NAFTA tariff preferences, apparel must be manufactured in North America from yarn-spinning stage forward.

Agriculture. NAFTA immediately reduces tariffs from current 10 and 20 percent to zero for one-half of the U.S. agricultural exports to Mexico. NAFTA changes the licenses and quotas to tariffs and tariff-rate quota (TRQ) on the other half of the U.S. agricultural exports to Mexico which will be phased out over the period ranging from 10 to 15 years. It immediately eliminates Mexico's licensing requirements for grain, dairy, and poultry imports. As a part of agricultural reform program, Mexico is also eliminating most of the restrictions on buying and selling agricultural land.

The United States corn exports will enter duty free for up to an initial 2.5 million mt in the first year. The corn exports above 2.5 million mt would

be assessed an ad valorem duty of 215 percent. This over-quota duty will decline 24 percent over first six years with the remaining duty phased out over the nine years as the quota grows at 3 percent compounded annually over the full 15-year period. United States exports of grain sorghum will enter Mexico duty free immediately after the agreement goes into effect. Wheat exports will be assessed 15 percent duty, which will be phased out over 10 year period. The United States soybean complex will face duties ranging from zero percent to 20 percent to be eliminated over 10 years.

Mexican imports of all U.S. cattle and beef except edible offal, will be duty free immediately. Edible offal, will be assessed a 20 percent duty, to be phased out over 10 years. United States hog exports for breeding will enter Mexico duty free immediately. United States slaughter hogs and pork will face duties up to 20 percent with certain pork products subject to 68,600 mt quota and a 20-percent duty to phased out over 10 years. Mexico will be exempt from the United States Meat Inspection Law. Most meat products and livestock will have immediate duty free access to the United States market.

The United States imports of many Mexican horticultural products will be subjected to seasonal, declining duties and seasonal, increasing quotas. The seasonal quotas on horticultural products will increased at 3 percent compounded annually and the tariffs will be phased out over 10 years.

Sources:
1) Kehoe and Kehoe, 1994, P. 21.
2) Rosson and Williams, 1992, Pp.14-15.