

A U.S.–Mexico–Canada Free Trade Agreement: Sectoral Employment Effects and Regional/Occupational Employment Realignments in the United States

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1. Introduction

The purpose of this study is to estimate the changes in employment that will be required across sectors, occupations, and locations within the U.S. economy as a result of a North American Free Trade Agreement (NAFTA). Such changes will undoubtedly occur as reduced trade barriers among the members of a NAFTA—the United States, Canada, and Mexico—cause expanded trade among them and the need for certain industries to expand and for others to contract. These changes could also prove quite costly to the workers involved, to the extent that they find it difficult to transfer from declining to expanding sectors. Since it may fall to the U.S. government to assist workers in this process of adjustment, it is important to estimate not only where that adjustment will be needed, but also what the attendant costs will be. This study, therefore, provides such estimates and examines the feasibility of meeting these needs within the existing programs of labor adjustment assistance in the United States.

Negotiations for a U.S.-Mexico-Canada Free Trade Agreement were initiated following the Congressional approval of "fast track" negotiating authority in late May 1991. These negotiations were completed in August 1992. The prospective NAFTA is an historic moment because it provides an opportunity to enhance the aggregate economic welfare of the three nations involved. The gains in welfare will come from a variety of sources that will be mutually reinforcing: (1) improved allocation of resources and lower prices to consumers and business firms; (2) realization of economies of large scale production in manufacturing; (3) reductions in transactions costs and in the uncertainty of government policies; and (4) dynamic changes resulting from improvements in the business environment, added investments in physical and human capital, and technological progress. There will also be significant noneconomic benefits from a NAFTA as the three nations are drawn more closely together politically and are thus better able to pursue common interests among themselves as well as globally.

Although there currently exist other free trade areas (FTAS) elsewhere, an agreement between the United States and Canada on the one hand and Mexico on the other hand presents some unique challenges due to the great disparities between Mexico and the other two countries in income levels, resource endowments, and environmental, health, safety, and labor laws and standards. Special fears in the United States and Canada concerning a NAFTA include a possible fall in wages, welfare losses from significant reallocation of labor from labor-intensive to capital-intensive occupations, and capital relocation to Mexico due to lower Mexican wages and ostensibly more lax labor standards. Concern has also been expressed that a NAFTA might result in environmental degradation due to the

inadequate enforcement of environmental regulations in Mexico and to the possible shift of investment to Mexico to avoid the more stringent and costly regulations in the United States and Canada. In light of the foregoing considerations, it is useful to evaluate the overall impact of a NAFTA, identify those groups of workers, industries, and geographic regions that may experience difficulties in adjusting to the changes brought about by a NAFTA, and devise policies that will help to ease the transition.

The purpose of this study is to provide some estimates of the sectoral employment effects and the regional/occupational employment realignments that may occur in the United States as a consequence of a NAFTA. The various U.S. policy options for worker adjustment assistance that may be pertinent to the implementation of a NAFTA are also assessed. The study concentrates in particular on the effects of the elimination or reduction of trilateral NAFTA tariffs, nontariff barriers (NTBs), investment restrictions among the United States, Mexico, and Canada, and changes in cross-border migration. There are several additional issues, though, that may be quite important in the NAFTA negotiations but that lie outside the scope of the study. These include: (1) new and possibly more liberal and transparent rules and procedures involving trilateral trade and investment in automobiles and parts; (2) access to energy products; (3) different types of services (e.g., banking, financial services, trucking, etc.); (4) arrangements for the settlement of disputes that might arise in trilateral trade and investment relations; and (5) the effects of differences in labor standards and environmental regulations and enforcement in Mexico as compared to the United States and Canada.¹⁾

1) This tendency for shifting resources based on factor intensity will not hold, however, for every individual sector. Sectoral changes will depend on the particular trade

It must be emphasized that the study is an analysis only, of the effects of the NAFTA *itself*. Many other changes are already underway in the economies involved, especially in Mexico, that are also causing changes in patterns of employment across the United States. In particular, the liberalization of the economic environment within Mexico is already causing that economy to grow and to restructure itself in a variety of ways that are changing its volume and pattern of trade with the United States. These changes and their implications for employment are not included in the present analysis, for they are already occurring and presumably will continue with or without the NAFTA. The analysis therefore, if it leads to results that sometimes appear to be surprisingly small, does so because the NAFTA itself may be of only relatively minor importance compared to the many other changes that are occurring independently.

In this context it must be understood that the results to be reported below, especially for changes in employment, are not forecasts of the employment changes that will actually occur over the future. Many such changes will occur for reasons other than the NAFTA, and these could well be much larger than the ones reported here. The changes presented in this study, as due to the NAFTA should be rinderstood accordingly as being relative to what would happen otherwise if the NAFTA were not put in place.

barriers that are in place and the extent to which they are removed in a NAFTA. Thus, for example, while one would expect most labor-intensive sectors in Mexico to expand, particular labor-intensive sectors that happen to face low protection abroad, or high protection that is not removed, may not share in this expansion.

II. Analyzing the Economic Impact of a NAFTA

Before proceeding with the analysis, it is useful to identify the qualitative implications of a NAFTA for the United States, Mexico, and Canada. Mexico is, of course, labor abundant relative to the United States and Canada. Therefore it is to be expected that trade liberalization will stimulate production of the labor-intensive sectors in Mexico and shift labor into the capital-intensive sectors in the United States and Canada. Productive resources will then presumably be allocated more efficiently as compared to the pre-NAFTA position as each nation specializes in the production of tradable goods in which it has a comparative advantage. Welfare improvement for each country as a result of NAFTA liberalization thus appears likely.

There may of course be transition costs once an agreement is in place, but these costs are not expected to be large, particularly for the United States. What is important to note is that the Mexican economy is so much smaller than the U.S. economy. It thus appears unlikely that even a substantial percentage increase in Mexican exports to the United States would noticeably alter U.S. production levels in most sectors, including such sensitive sectors as agriculture and clothing.

The impact of a NAFTA on the terms of trade - that is, the relation between export prices and import prices - will also play a key role in determining the welfare effects for the countries involved. The NAFTA countries can be expected to enjoy a terms-of-trade gain at the expense of the rest of the world insofar as intra-NAFTA trade will increase. The reason is that the NAFTA countries will reduce supply to and demand from the rest of the world, thereby worsening the latter's terms of trade. Within NAFTA, the countries that reduce their trade barriers the most will tend to experience a deterioration

in their terms of trade. Since, as will be noted below, U.S. tariffs facing both Mexico and Canada are comparatively low, the United States may experience a terms-of-trade gain relative to its two NAFTA trading partners.

Beyond the conventional welfare gains from sectoral specialization and the effects stemming from changes in the terms of trade, trade liberalization brought about by a NAFTA may have a "pro-competitive" effect on domestic firms, resulting in additional gains from the realization of economies of large scale production. When firms are protected by tariffs from foreign competition, they may take advantage of their market power by raising prices and reducing their domestic sales. The result is that protected firms may produce at levels below their minimum-cost plant size. Trade liberalization should then bring about competitive pressures on formerly protected firms and induce them to raise production and productivity and to achieve more efficient plant size and lower per unit costs. These effects will be reinforced to the extent that the NAFTA liberalization lowers the cost to firms of their production inputs that are traded among the NAFTA members.

Greater sectoral specialization can also be expected to narrow the wage gap between the United States and Mexico, thus possibly reducing immigration pressure on the United States. In principle, a narrowing of the wage gap may come about by lowering wages for U.S. workers, but this outcome is not inevitable. Given the disparity of size, the ability of Mexican exports to affect the United States may be limited in any event. But downward pressure on U.S. wages may be offset by a fall in the prices of U.S. imports, which improves the purchasing power of a given wage. There may also be a favorable impact on U.S. wages due to realization of economies of scale.

One would also normally expect greater specialization to draw

returns to capital closer together, raising them in the United States and reducing them in Mexico. As the United States expands exports and therefore production in capital-intensive sectors, the increased demand for capital should raise its return, while the opposite could be expected to happen in Mexico. In fact, however, as will be noted below, our calculations indicate a rise in returns to capital in both countries. In Mexico it appears that the benefits of economies of scale outweigh the losses due to intersectoral specialization. It is quite conceivable, therefore, that both labor and capital may gain from a NAFTA in both countries.

III. The NAFTA CGE Model²⁾

In order to analyze the sectoral employment effects of a NAFTA, a specially constructed economic model will be used. The type of model is known technically as a computable general equilibrium (CGE) model. The advantage of using a CGE model is that it permits analysis of both economy-wide and sectoral impacts. It takes into account a variety of indirect effects that occur due to interindustry relations within countries and also due to international trade effects that take place among countries as relative prices are changed.

The NAFTA CGE model used in this study is an extension of the model constructed by Brown and Stern (1989) to analyze the economic effects of the U.S.-Canada Free Trade Agreement (FTA).³⁾ Countries

2) Readers who are not concerned with the technical details of the model being used may wish to proceed to the results of the analysis reported in the sections immediately following.

3) See USITC (1992) for a summary of the technical properties and results of the

in the model are aggregated into three broad groups. Each of the NAFTA members (United States, Canada, and Mexico) is modeled individually, a group of 31 other major industrialized and developing countries are combined to create a fourth country, and the remaining countries of the world are consigned to a residual nest-of-the-world. The sectoral coverage in each country/region includes 23 "tradable" (import/export) product categories covering agriculture and manufacturing and 6 "nontradable" categories covering services and government.

Each sector in the model is characterized as being either perfectly competitive or monopolistically competitive with free entry. The products that are produced and traded are assumed to be differentiated, either by country of origin or by firm, to correspond to the two market structures.⁴⁾ The reference year for the data base of the model is 1989.⁵⁾ The input-output relations used in the model refer to 1977 for the United States, 1980 for Mexico, and 1976 for Canada.⁶⁾ More complete

NAFTA CGE model as well as several other related models that have been used for computational analyses of the implications of a NAFTA.

- 4) Issues of the modeling of market structures are discussed in Brown and Stern (1989).
- 5) These data for 1989 were the latest available for all the countries included in the model at the time the study was initiated.
- 6) The 1977 input-output table for the United States and the 1980 input-output table for Mexico were the most recent officially published tables available when the study was initiated. A 1985 input-output table exists for Mexico, but it could not be used because it contained data only for domestic transactions. The authors of the present study are cognizant that there have been significant changes in technology and productivity in the past decade or more in all the countries included in the NAFTA model. These changes would alter the input-output coefficients for particular sectors. However, the NAFTA model relies mainly on the intermediate input value shares and the shares of primary factors (i.e., capital and labor) as data. These shares tend to be more stable over time than physical input requirements. The results based on the NAFTA model will therefore not be especially sensitive to the particular

technical details and a description of the parameters and data base of the model are contained in Brown, Deardorff, and Stern (1992).⁷⁾

There are several important assumptions that are either built into the model or are implemented by the model for the present analysis. It is important that these be understood in interpreting the results to be reported below.

Full Employment - The analysis assumes throughout that the aggregate, or economy-wide, level of employment is held constant in each country. The NAFTA is therefore not permitted to change any country's overall rates of employment or unemployment. This assumption is made because overall employment is determined by macroeconomic forces and policies that are not contained in the model and are not the subject of the NAFTA negotiations. The focus here instead 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 a NAFTA will alter.

Balanced Trade - The analysis assumes that trade remains balanced for each country, or more accurately that any initial trade imbalance remains constant, as trade barriers are changed with a NAFTA. This assumption is intended to reflect the reality of mostly flexible exchange rates among the countries involved. It also, like the full employment assumption, is appropriate as a way of abstracting from the macroeconomic forces and policies that are the main determinants of trade imbalances.⁸⁾

input-output tables being used. For more discussion of this point, see Deardorff and Stern (1990, pp. 61-79).

7) The main data used cover trade, production, and employment, and these data come from United Nations sources. The model parameters are constructed from the trade and input-output data for the countries included in the NAFTA model and from published studies of trade and capital/labor substitution elasticities. For a comprehensive discussion of the data and parameters, see Deardorff and Stern (1990, pp. 37-45).

Fixed Relative Wages - As will be discussed further below, while the economy-wide wage in each country is permitted to adjust so as to maintain full employment, the wages across sectors, occupations, and locations are held fixed relative to one another. This permits the analysis to focus on the labor market adjustments that a NAFTA will require, independently of any relative wage changes that may facilitate those adjustments.

Fixed Labor Supply - Except in Section XI that allows for international migration, the total labor supply in each country is assumed to be held fixed in the analysis. This is not to say that changes in labor supply will not occur during the phase-in period of a NAFTA agreement, but only that they are assumed not to be the result of such an agreement.

The policy inputs into the model are the tariffs and nontariff barriers (NTBs) that are currently (as of the late 1980s) applied to the bilateral trade of the United States, Mexico, and Canada with respect to each other and to the other two aggregated regions included in the model. These tariff rates are listed in Table A-1 in the Statistical Appendix.⁹⁾ As will be noted below, in order to investigate the sectoral employment effects of a NAFTA, it will be assumed that the existing bilateral tariffs for the three nations will be removed and selected NTBs relaxed all

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- 8) The results reported below for changes in total exports and imports may appear to contradict this assumption of balanced trade. This is because what are reported are measures of the quantities traded, which are relevant for output and employment changes. They are not the values of trade, which undergo additional change due to changing relative prices. It is the values of exports relative to imports that are held fixed by the balanced trade assumption.
- 9) The tariff rates for Canada and the United States are post-Tokyo Round (1987) rates, and those for Mexico refer to 1989. The tariff rates for each country are weighted by bilateral imports. An adjustment of the U.S. tariff rates on imports from Mexico was made to take the maquiladora imports into account. NTBs are represented in terms of import coverage ratios. For more information on the tariffs and NTBs being used, see Brown, Deardorff, and Stern (I 992) and Deardorff and Stern (I 990, p. 4 2).

at one time rather than in stages.

When the policy changes are introduced into the model, the method of solution yields percentage changes in sectoral employment and other variables of interest for the United States and the other countries. Multiplying the percentage changes by the actual levels of sectoral employment given in the data base yields the absolute employment changes, positive or negative, that might result assuming, as noted, that existing tariffs are removed and NTBs relaxed all at one time. More realistically, if the U.S.-Canada FTA is any guide, the removal of tariffs and NTBs in a NAFTA will be phased in over a period of a decade or longer. If information were available for the different phases, the model could in principle be solved sequentially taking into account the reductions in tariffs and NTBs for each time period.¹⁰

The results reported below will thus provide insight into what might plausibly happen to sectoral employment in the United States at a national level as the result of a NAFTA. In particular, it will be possible to identify the sectors that will experience increases as well as declines in employment in both percentage and absolute terms in relation to 1989 sectoral levels. These employment changes will then provide some indication of the numbers of American workers who might have to change jobs due to a NAFTA.

While the bilateral removal of tariff; and NTBs constitute the main changes in trade policies that will be brought about by a NAFTA, there may be other changes as well. These relate especially to changes in foreign direct investment (FDI) and to the cross- border movement of workers as the result of changes in the rate of return on capital

10) Allowance would have to be made as well for adjustment lags between the policy changes and responses and for the effects of changes in the stocks of physical and human capital.

and changes in real wages. It is difficult to know how FDI and cross-border movements of workers will be affected by changes in their rates of return. What is done therefore is to assume that investment or worker migration change by certain specified amounts in conjunction with the trade liberalization that occurs. It can then be determined on the basis of these assumptions how sectoral employment in the United States will be affected by the combined changes engendered by a NAFTA.

Labor Market Elaboration

The NAFTA CGE model used in Brown, Deardorff, and Stern (1992) did not include a breakdown of employment by occupations or locations, but only by sectors. For the purpose of the present study, a procedure for providing such a breakdown has been appended to the model. As will be discussed in more detail below, data on the distribution of U.S. employment across industries, occupations, and states were used to allocate the employment changes produced by the CGE model across these several dimensions. Thus it is possible to provide estimates of how a NAFTA, under various assumptions about its implementation and effects, will alter patterns of employment not only across industries, but also across major occupational categories, across geographic regions and states of the United States, and across occupation/region and occupation/state combinations. The accuracy of such detailed estimates depends, of course, on an assumed constancy of the distribution of sectors across occupations and locations, and is therefore certainly subject to considerable error. These breakdowns are very useful, nonetheless, in indicating the extent of labor-market dislocation that may arise due to a NAFTA.

In modeling the labor market, it should be noted that the major purpose of the analysis is to quantify the extent of these labor-market adjustments and dislocations. These adjustments consist first of changes in disaggregated demands for labor that then require labor to move from sectors, occupations, and locations where demand falls to sectors, occupations, and locations where demand rises. In fact these movements may be ameliorated somewhat by market adjustments – changes in relative wages that bring supplies and demands together without the need for such movement. However, these possible wage changes and their effects are much more uncertain and difficult to ascertain than the quantitative changes they correct.¹¹⁾ In any case, the substitutions in demand are likely to be limited, while those in supply are likely to be large. Therefore it is to be expected that most of the labor market adjustments take the form of movements of labor across these various dimensions. Thus attention is focused here on the changes in labor demands that occur at constant relative wages.

To implement this assumption, it would be simplest if the money wage could be held constant in the calculations. However, to do so in the context of reductions in barriers to trade that are unlikely to be perfectly balanced among countries would lead, in the model's calculations, to a certain amount of expansion or contraction of aggregate employment in some countries. A decision was made to abstract from these aggregate changes, since in part they can be regarded as more properly determined by the stance and

11) Such corrections through relative wages depend upon the abilities of both workers and firms to substitute among sectors, occupations, and locations of employment. What are needed are measures of elasticities of substitution—quantitative estimates of how quantities supplied and demanded respond to price—in these various dimensions. Unfortunately, no reliable information exists on these substitution elasticities.

accommodation of macroeconomic policies, rather than by the trade policies that the model is equipped explicitly to examine. In addition, because the model focuses on disaggregated changes in employment and their implications for adjustment, the disaggregated effects need to be examined independently of such aggregates. For both of these reasons, then, the NAFTA is modeled as accompanied by adjustment of each country-wide wage so as to stabilize aggregate employment. That is, the country-wide (money) wage in each country rises or falls as necessary to keep aggregate employment equal to the aggregate supply of labor.¹²⁾ However the relative wages across industries, occupations, and locations are at the same time held fixed in order to identify the corresponding changes in labor demands.¹³⁾

Using the NAFTA model, it is possible to calculate several measures of labor-market dislocations, including: (1) dislocations across sectors for the economy nationwide; (2) dislocations across occupations; (3) dislocations across regions; (4) dislocations across states; (5) dislocations across occupations and regions; and (6) dislocations across occupations and states. The estimates of sectoral employment effects for the U.S. economy nationwide provide the essential starting point for identifying where the most serious adjustment problems for American workers are likely to occur as the result of a NAFTA. Using

12) This assumption of full employment thus rules out any changes in aggregate U.S. employment due to a NAFTA. It is conceivable that the NAFTA may result in net job creation, but one would have to make some possibly arbitrary macroeconomic employment and related policy assumptions to determine how aggregate employment might change. A case in point is Hufbauer and Schott (1992, pp. 55-56), who estimate that about 130,000 additional U.S. jobs would be created by a NAFTA. Their estimate is based on a \$9 billion increase in U.S. net exports, with each \$1 billion of net exports increasing employment by 14,500 workers.

13) No account is taken therefore of wage difference for different industries, occupations, and locations that may in fact exist and that will change in response to a NAFTA.

constructed estimates of the duration of unemployment and wage losses based upon the 1990 Displaced Workers Survey conducted by the U.S. Department of Labor, it should be possible to determine what the societal costs are for the United States for workers who may be displaced by a NAFTA. This will then provide some indication of the need for special measures for adjustment assistance for workers in particular sectors, occupations, and regions.

IV. Computational Results - Aggregate Effects

The negotiations to form a NAFTA were completed in August 1992. As this analysis was conducted prior to the completion of the negotiations, this study relies on a NAFTA CGE model to explore the economic implications of several scenarios that were presumed to include some of the likely features of the final agreement.

The Scenarios

The scenarios are indicated schematically in Figure 1. They include the five scenarios A.-E. plus another four scenarios, F-1, involving migration that will be considered below in Section XI.

A. *Tariff Elimination*: Trilateral removal of all tariffs on trade among the United States, Canada, and Mexico. This is the base case. since it includes the minimal amount of trade liberalization that is likely to be included as part of a NAFTA.

B. *Tariff Elimination and U.S. NTBs Against Mexico Relaxed*: Same as scenario A. plus 25 percent expansion of U.S. import quota limits applied to Mexican exports of agriculture, food, textiles, and clothing.

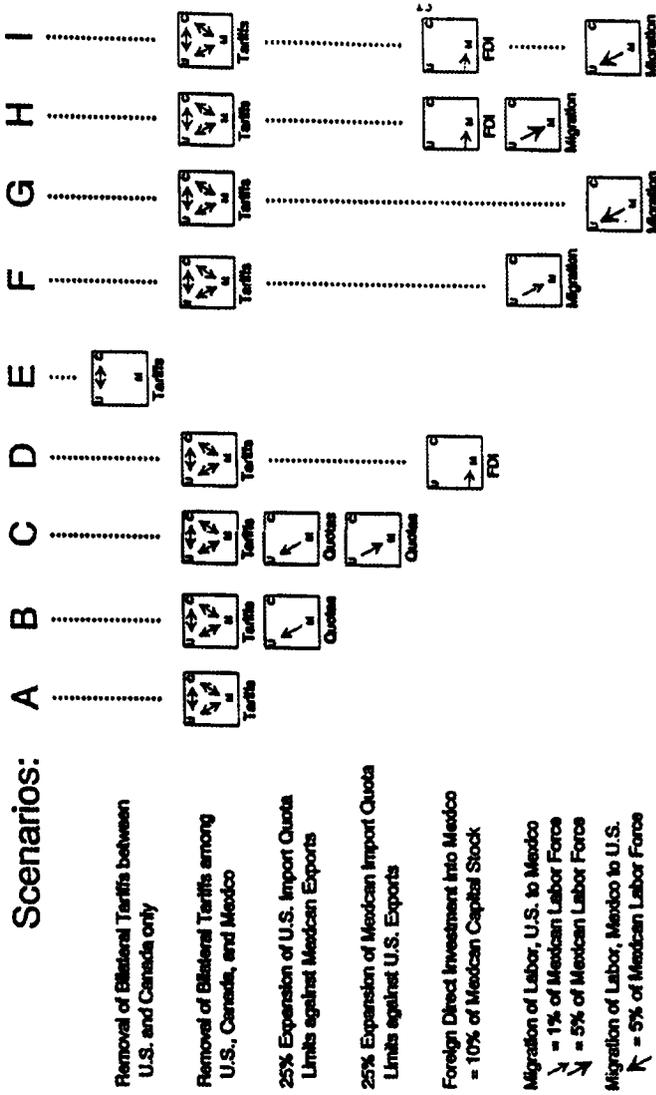


Figure 1: Schematic Representation of the Scenarios

A partial expansion of import quota limits was chosen, instead of complete elimination, because it is viewed that any liberalization of these NTBs is to some extent unlikely.¹⁴⁾ This scenario has only U.S. NTBs being relaxed, to reflect the possibility that Mexico will be accorded some preferential treatment due to its developing country status.

C. Tariff Elimination and U.S. and Mexican NTBs Relaxed: Same as scenario B. plus 25 percent expansion of Mexican import quota limits applied to U.S. exports of agriculture, transport equipment, and other particular Sectors. This scenario requires Mexico to yield on NTBs in amounts comparable to the concessions given by the United States.¹⁵⁾

D. Tariff Elimination and Capital Flows into Mexico: Same as A. plus Mexico is assumed to relax foreign direct investment (FDI) restrictions, resulting in a capital inflow from outside of the NAFTA that expands Mexico's capital stock by 10 percent.¹⁶⁾ In this scenario, NTBs are not liberalized. The inflow of FDI from the Other- 31 group of countries is motivated by the rise in the return to capital found in Scenario A. for Mexico and the fall in return to capital in the Other-31 group.¹⁷⁾

14) In the U.S.-Canada FTA, there was comparatively little relaxation of existing NTBs. This may also be true of a NAFTA, although there is no way to determine this until a final agreement is made public. It was in recognition of some possible expansion of U.S. import quota limits applied to selected Mexican exports that an arbitrary 25 percent expansion of these limits was assumed.

15) The same consideration applies here as in the preceding footnote.

16) Very little is known empirically about how FDI responds to changes in relative rates of return to capital. The 10 percent figure chosen is thus arbitrary. A similar capital inflow into Mexico was assumed to occur in the KPMG Peat Marwick (1991) model of a U.S.- Mexico FTA.

17) Within the model there is no role for ownership of capital, and therefore no distinction among various methods of financing a capital expansion. The assumption here is only that the real capital stock of Mexico is expanded. Earnings on the additional capital are assumed to leave Mexico and go to the Other-31, without regard to

E. Canada United States Free Trade - Tariff Elimination: Removal of post-Tokyo Round (1987) bilateral tariffs on trade between the United States and Canada. This case is included for comparison with the formulations of the NAFTA in the other four scenarios.

Scenarios A. - D. represent alternative versions of a NAFTA that could obtain with varying degrees of likelihood. Scenario A. is probably the most likely, involving only tariff elimination, for several reasons. Tariffs are the easiest trade policies to negotiate. There is ample precedent for including tariff elimination and not much more in FTAs, as in the U.S-Israel and U.S.-Canada agreements that are already in place. Tariffs cuts are also the least likely to be resisted by sectoral lobbying interests, which tend, because of four decades of GATT discipline, to have secured protection instead through NTBs. Those sectoral interests are sure to provide stiff resistance to the relaxation of NTBs included in Scenarios B. and C. Scenario A. is therefore the base case for the analysis, and Scenarios B. - D. represent departures from it.

Scenario E, representing U.S.-Canada free trade, is included for comparison purposes. Since Scenarios A. - D. include tariff elimination among all three countries of the NAFTA, they subsume the effects of the U.S.-Canada FTA that has already been negotiated and is in the process or being implemented. It is appropriate, therefore, to infer the incremental effects of adding Mexico to that agreement by comparing the NAFTA scenarios with Scenario E. Thus the difference between the effect on any particular variable reported for Scenario A. and the corresponding effect for Scenario E. represents the effect on that same variable that would arise if tariffs between the United States and Canada were already zero and those countries' tariffs against

whether these earnings leave as interest payments or as returns to ownership.

Mexico were then eliminated along with Mexico's tariffs against them.

None of these scenarios includes cross-border migration of labor. Four additional scenarios taking this also into account will be introduced below in Section XI. In all of the scenarios, it will be recalled that the changes are assumed to take place all at once rather than being phased in over a period of years as would likely be the case in the negotiated agreement. A summary of the results for the individual scenarios A.-E. is provided in Table 1.

Trade Effects

The changes in the quantity of imports and exports measured in base period U.S. dollars are reported in columns two and three and the percent changes in the terms of trade are reported in column four of Table 1. It was noted above that NAFTA countries might experience an improvement in their terms of trade insofar as intra-NAFTA trade would increase. Countries that enjoy such an improvement in the terms of trade also tend to increase imports relative to exports. This outcome is simply 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 trade balanced in the model.

The impact of a NAFTA on trade volumes appears particularly lopsided for Mexico and the Other 31 countries in scenario D. This imbalance is caused primarily by the capital flows assumed to occur. The Other 31 countries are assumed to install capital in Mexico, generating sizable interest payments from Mexico to them. The remittance of interest payments by Mexico must be offset by a trade surplus if the current account balance is to remain at the level prevailing in the base period. The opposite is the case for Other 31,

TABLE 1

SUMMARY RESULTS OF A NORTH AMERICA FREE TRADE AGREEMENT.
 CHANGES IN COUNTRY IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE, AND RETURN TO LABOR AND CAPITAL
 (Trade in Millions of U.S. Dollars)

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COUNTRY	IMPORTS* (2)	EXPORTS* (3)	TERMS OF TRADE PERCENT CHANGE (4)	EQUIVALENT VARIATION		WAGE RATE PERCENT CHANGE (7)	RETURN TO CAPITAL PERCENT CHANGE (8)
				PERCENT (5)	MILLIONS (6)		
A. NAFTA: Tariff Elimination							
United States	8886.1	7677.1	0.3	0.1	3253.0	0.2	0.2
Other	-712.8	-416.5	-0.0	-0.0	-1858.0	-0.1	-0.1
Canada	4959.0	5771.0	-0.7	0.7	3819.7	0.5	0.6
Mexico	2629.8	2872.2	-0.9	1.4	1766.0	0.3	0.5
B. NAFTA: Tariff Elimination and U.S. NTBs Against Mexico Relaxed							
United States	8932.3	7745.6	0.3	0.1	3458.3	0.2	0.2
Other	-714.3	-425.6	-0.0	-0.0	-1774.7	-0.1	-0.1
Canada	4960.5	5774.1	-0.7	0.7	3829.3	0.5	0.6
Mexico	2674.1	2899.8	-0.9	1.3	1633.0	0.4	0.5
C. NAFTA Tariff Elimination and U.S. and Mexican NTBs Relaxed							
United States	9360.4	8098.4	0.3	0.1	3753.4	0.2	0.2
Other	-736.0	-418.4	-0.0	-0.0	-1875.4	-0.1	-0.1
Canada	4961.1	5777.0	-0.7	0.7	3823.1	0.5	0.6
Mexico	3091.9	3377.5	-1.1	2.2	2854.3	0.4	0.8
D. NAFTA Tariff Elimination and Capital Flows into Mexico							
United States	9713.9	9064.0	0.1	0.1	6082.1	0.2	0.2
Other	6772.3	-4435.4	0.2	0.0	143.7	0.0	0.2
Canada	4998.9	5851.6	-0.7	0.7	3811.2	0.6	0.7
Mexico	802.7	11514.9	-4.6	4.6	5837.3	7.1	2.7
E. Canada-United States Free Trade: Tariff Elimination							
United States	5918.4	5050.0	0.2	0.0	1007.5	0.1	0.1
Other	-485.6	-326.9	-0.0	-0.0	-985.2	-0.1	-0.1
Canada	4875.7	5672.5	-0.7	0.7	3696.1	0.6	0.6
Mexico	7.3	14.8	-0.0	0.0	32.6	-0.1	-0.0

*Exports and imports valued in U.S. dollar base period prices.

A. Trilateral tariff removal.

B. Trilateral tariff removal and a 25 percent expansion of U.S. import quota limits applied to Mexican exports of agriculture, food, textiles and wearing apparel.

C. Trilateral tariff removal plus a 25 percent expansion of U.S. and Mexican bilateral import quota limits

D. Trilateral tariff removal plus a 10 percent increase in Mexico's capital stock imported from the rest of the world

E. Canada-U.S. bilateral tariff removal.

which increases imports by \$6.8 billion but reduces exports by \$4.4 billion under scenario D.

A second interesting point is that, as expected, the United States enjoys an improvement in its terms of trade relative both to the rest of the world and Canada. For example, in scenario A.. U.S. terms of trade improve by 0.3 percent, while Canada experiences a small deterioration of 0.7 percent. The impact on Mexico varies according to the experiment conducted. Mexico's terms-of-trade loss is largest under the assumption that Mexico's capital stock rises, as in scenario D. as compared to scenarios A., B., and C., respectively. This is a consequence of the FDI inflow, which leads to an increase in export supply by Mexican firms and a resulting fall in Mexican export prices on the world market, particularly in comparison to the Other 31-country aggregate.

Economic Welfare

The economic welfare effects of the various liberalization scenarios are reported in columns five and six of Table 1.¹⁸⁾ It is evident that each liberalization scenario is welfare improving for the NAFTA countries. For the United States, welfare in scenario A. rises by \$2.5 billion with the assumed NAFTA trilateral removal of tariffs and by roughly comparable amounts in scenarios B.-D. While these welfare increases are a relatively small 0.1 percent of U.S. gross domestic product (GDP), they are nonetheless indicative that the United States stands to gain from the NAFTA. It is also interesting that the United States has a welfare gain of \$734 million from a U.S.-Canada FTA

18) These welfare effects are measured conceptually as the "equivalent variation," which is the change in income valued at base period prices that yields the same change in welfare that occurs with the assumed liberalization.

in scenario E. as compared to the \$2.5 billion gain from a NAFTA in scenario A. This suggests that the policy of sequentially negotiating FTAs with Canada and then with Mexico results in increasing gains for the United States.

Mexico appears to experience the largest percentage welfare improvement from a NAFTA. Mexican welfare rises by 1.0 percent of GDP under scenario A. and, when capital inflows are incorporated under scenario D., Mexican welfare rises by 3.7 percent of GDP. The large additional increment to Mexico's welfare when capital formation is taken into account is partly a consequence of the realization of economies of scale in manufacturing as the Mexican economy grows.

The welfare results also suggest that it is in Canada's interest to participate in the NAFTA negotiations, although the gain to Canada of doing so appears to be relatively small. That is, the formation of a NAFTA indicated by scenarios A.-D. raises Canada's welfare by somewhat more than the Canada-U.S. bilateral tariff elimination in scenario E.¹⁹⁾

It may also be noted that the Other 31 countries experience comparatively small reductions in economic welfare as the result of the NAFTA changes being modeled. This reflects the fact that a very large fraction of trade of the three NAFTA countries already occurs among themselves, so that the volume of trade that could be potentially diverted is relatively small. Also, given that U.S. tariffs are already quite low, the induced preferences in favor of intra-NAFTA trade would be small.

19) Scenario E. assumes that the Canada-U.S. FTA occurs all at once in 1989. It thus does not take into account the fact that the FTA has been in effect since the beginning of 1989.

Real Wages and Return to Capital

The percentage changes in real wages and in the real return to capital are reported in the last two columns of Table 1. It can be seen that real wages rise in both Mexico and the United States in all four NAFTA scenarios A.-D. However, the real wage in Mexico also rises relative to that in the United States, increasing by 0.4 percent in scenario A.-C. compared to only 0.2 percent in the United States. The relative improvement increases to 7.0 percent in Mexico versus 0.2 percent in the United States when capital flows are added in scenario D. At least some of this gain is the result of a fall in consumer prices in Mexico caused by its relatively large tariff reductions. These increases in Mexican real wages suggest that the incentive for Mexican workers to migrate to the United States may be lessened somewhat. This possibility will be explored further in Section XI. It is interesting moreover that the narrowing of the Mexican-U.S. wage gap is not accomplished at the expense of U.S. workers, whose real wage rises in scenarios A. and D. despite the fact that after the formation of a NAFTA the protection of U.S. labor would be reduced. One reason for the increase in U.S. real wages is that the United States experiences an improvement in its terms of trade, as already noted, which raises the value of what U.S. workers produce on the world market. Also, there is a small increase in the scale of U.S. manufacturing production as a result of the NAFTA liberalization.

It may be noted finally that the real return to capital tends to rise in all three NAFTA countries in scenarios A.-D. This may have been expected for the United States and Canada, but not for Mexico. However, it appears that the realization of economies of scale will tend to raise the average product of both labor and capital in the Mexican

manufacturing sector. This is especially the case in scenario D., which makes allowance for the expansion of FDI in Mexico. The results of scenarios A.-C. that the real return to capital rises most in Mexico relative to the Other 31 group suggests that the inflow of capital may come primarily from outside the NAFTA countries, not from the United States. This suggests in turn that the fear that U.S. firms will relocate to Mexico may be exaggerated.²⁰⁾ This is consistent with the modeling of the capital flow in scenario D.

V. Computational Results - Sectoral Effects

Sectoral results for each of the three NAFTA countries are reported in Tables 2-4 for liberalization scenario A., which refers to trilateral tariff removal. As mentioned above, Scenario A. may be interpreted as a base case insofar as it seems likely that a NAFTA would be focused, at least initially, mainly on tariff elimination, and that there would be some degree of uncertainty attached to the changes in NTBs and how FDI and cross-border migration would be affected. The analogous results for Scenarios B.-E. are shown in Tables A-2 to A-13 in the Statistical Appendix.

20) The capital inflow into Mexico is assumed in Scenario D. to take the form of foreign direct investment that increases the capital stock across all sectors. As noted above, this inflow is induced by the fall in the rate of return to capital in the Other-31 countries and the increase in the rate of return to capital in Mexico. It can be thought of as representing what might occur if a NAFTA results in an investment boom in Mexico.

TABLE 2
 SECTORAL EFFECTS ON THE UNITED STATES OF NORTH AMERICAN FREE TRADE
 TARIFF ELIMINATION
 PERCENT CHANGE

SECTOR	EXPORTS (2)	IMPORTS (3)	BILATERAL IMPORTS		OUTPUT (6)	NO. FIRMS (7)
			CANADA (4)	MEXICO (5)		
Tradables						
1 Agriculture	0.04	2.04	4.14	10.92	-0.04	0.00
2 Mining, Quarrying	-0.33	0.77	1.27	4.97	-0.34	-0.38
310 Food	1.85	1.42	9.92	4.73	0.10	-0.02
321 Textiles	7.62	0.01	16.95	3.30	1.08	0.63
322 Clothing	10.20	0.56	47.47	0.29	0.73	0.23
323 Leather Products	1.07	2.08	12.43	15.74	-0.02	-0.23
324 Footwear	11.05	2.64	29.72	11.91	0.19	-0.06
331 Wood Products	1.91	0.82	1.06	2.04	0.15	0.02
332 Furniture, Fixtures	9.62	3.97	13.69	10.24	0.29	0.10
341 Paper Products	2.44	-0.57	-0.78	6.66	0.33	0.17
342 Printing, Publishing	1.81	0.25	-0.45	-0.37	0.11	0.01
35A Chemicals	3.57	-0.47	-2.05	1.04	0.59	0.42
35B Petroleum Products	-0.26	0.89	1.57	4.38	-0.01	-0.05
355 Rubber Products	5.88	0.76	11.10	-6.73	0.46	0.23
36A Nonmetal Min. Prod.	4.71	0.83	2.12	2.13	0.13	0.05
362 Glass Products	3.80	11.95	34.98	14.50	-1.19	-1.33
371 Iron, Steel	5.76	2.00	13.10	-0.39	0.06	-0.03
372 Nonferrous Metals	-2.47	7.97	19.08	35.21	-1.75	-1.65
381 Metal Products	5.43	3.40	15.71	5.10	0.14	0.06
382 Nonelec. Machinery	3.57	0.59	4.58	-18.34	0.56	0.43
383 Electrical Machinery	2.11	6.94	15.30	65.13	-0.49	-0.57
384 Transport Equipment	-1.54	3.90	13.37	-5.14	-0.71	-0.81
38A Misc. Mfrs.	3.83	-0.15	-1.04	1.80	0.71	0.59
Nontradables						
4 Utilities					0.00	0.00
5 Construction					0.03	0.00
6 Wholesale Trade					0.00	0.00
7 Transportation					0.01	0.00
8 Financial Services					-0.01	0.00
9 Personal Services					-0.01	0.00
Total	2.09	1.88	6.90	13.49	0.02	-0.00

TABLE 3
 SECTORAL EFFECTS ON CANADA OF NORTH AMERICAN FREE TRADE
 TARIFF ELIMINATION
 PERCENT CHANGE

SECTOR	EXPORTS (2)	IMPORTS (3)	BILATERAL IMPORTS		OUTPUT (6)	NO. FIRMS (7)
			U.S. (4)	MEXICO (5)		
Tradables						
1 Agriculture	0.29	3.42	4.89	-4.74	-0.14	0.00
2 Mining, Quarrying	0.95	0.85	1.03	4.88	1.29	0.81
310 Food	4.92	4.75	12.50	11.84	0.35	-0.29
321 Textiles	7.02	20.20	43.33	16.46	-2.77	-3.78
322 Clothing	31.84	10.78	56.26	0.90	1.16	0.13
323 Leather Products	8.99	0.82	7.33	41.21	4.50	3.48
324 Footwear	27.34	7.33	45.10	47.03	3.41	1.84
331 Wood Products	0.79	4.58	6.48	20.40	0.35	-0.40
332 Furniture, Fixtures	12.04	20.72	35.35	39.95	-0.02	-1.14
341 Paper Products	-0.82	12.52	18.74	26.32	-0.83	-1.40
342 Printing, Publishing	-0.58	3.04	3.69	10.62	-0.91	-1.11
35A Chemicals	-2.25	13.03	21.53	20.14	-3.85	-4.52
35B Petroleum Products	1.40	0.39	0.70	3.60	1.16	0.33
355 Rubber Products	9.36	7.33	18.42	-9.04	2.12	1.23
36A Nonmetal Min. Prod.	2.09	4.54	11.71	3.66	0.63	-0.21
362 Glass Products	31.65	0.78	3.41	-2.47	18.62	17.06
371 Iron, Steel	10.36	4.99	11.57	-6.43	5.15	3.37
372 Nonferrous Metals	15.40	-5.13	-3.16	19.05	12.80	9.69
381 Metal Products	12.37	11.55	18.49	21.26	1.35	-0.84
382 Nonelec. Machinery	3.15	7.14	9.82	-20.06	-2.42	-3.60
383 Electrical Machinery	11.27	9.62	16.03	70.12	0.53	-1.19
384 Transport Equipment	12.52	-5.27	-5.60	-11.00	9.79	7.27
38A Misc Mfcs.	-1.37	7.26	11.50	18.45	-4.41	-5.58
Nontradables						
4 Utilities					0.10	0.00
5 Construction					0.30	0.00
6 Wholesale Trade					-0.02	0.00
7 Transportation					0.23	0.00
8 Financial Services					-0.01	0.00
9 Personal Services					-0.27	0.00
Total	4.83	4.30	7.73	11.01	0.52	0.02

TABLE 4
 SECTORAL EFFECTS ON MEXICO OF NORTH AMERICAN FREE TRADE
 TARIFF ELIMINATION
 PERCENT CHANGE

SECTOR	EXPORTS (2)	IMPORTS (3)	BILATERAL IMPORTS		OUTPUT (6)	NO FIRMS (7)
			U.S. (4)	CANADA (5)		
Tradables						
1 Agriculture	6.94	2.64	2.82	1.42	0.13	0.00
2 Mining, Quarrying	4.59	2.63	4.04	4.58	4.07	3.07
310 Food	2.90	11.82	20.18	3.94	-0.68	-1.06
321 Textiles	1.12	22.04	32.24	28.94	-1.01	-1.33
322 Clothing	0.09	30.44	50.69	50.43	-1.75	-2.08
323 Leather Products	14.72	14.24	30.42	27.08	1.82	1.13
324 Footwear	11.89	37.07	47.62	51.94	1.09	0.22
331 Wood Products	1.93	28.47	35.58	39.51	-1.54	-1.92
332 Furniture, Fixtures	10.78	13.36	33.11	32.90	6.22	5.45
341 Paper Products	6.12	7.01	8.34	7.21	-0.79	-1.29
342 Printing, Publishing	-0.32	9.19	21.86	15.58	-1.58	-2.24
35A Chemicals	-0.70	12.73	18.50	21.19	-3.11	-4.01
35B Petroleum Products	3.88	1.26	1.87	11.98	1.19	-0.45
355 Rubber Products	-6.45	24.11	33.58	27.63	-6.37	-6.69
36A Nonmetal Min. Prod	1.85	25.44	37.28	38.70	-1.21	-1.88
362 Glass Products	10.14	15.92	26.97	58.50	-1.60	-2.94
371 Iron, Steel	-1.22	10.22	20.08	16.58	-5.58	-6.26
372 Nonferrous Metals	31.07	-5.55	-0.63	8.71	24.79	21.50
381 Metal Products	4.40	15.91	23.56	25.05	-2.39	-3.52
382 Nonelec. Machinery	-17.39	17.20	29.91	27.08	-22.47	-23.70
383 Electrical Machinery	63.69	-12.91	3.58	6.15	53.38	48.75
384 Transport Equipment	-5.60	16.86	21.33	25.92	-9.26	-9.33
38A Misc. Mfrs.	1.78	13.01	24.93	16.11	-2.70	-4.00
Nontradables						
4 Utilities					0.30	0.00
5 Construction					-0.01	0.00
6 Wholesale Trade					-0.30	0.00
7 Transportation					-0.25	0.00
8 Financial Services					-0.37	0.00
9 Personal Services					-0.33	0.00
Total	11.16	11.18	18.64	14.23	0.31	-1.71

Trade Effects

The percent changes in total sectoral exports and imports are shown in columns two and three of Tables 2-4, while the changes in bilateral imports with each NAFTA trade partner are reported in columns four and five. The bilateral trade changes between the United States and Canada exhibit a strong indication of increased intra-industry trade in most product categories. The broad similarity between the U.S. and Canadian economies in terms of their endowments of labor and capital, labor force quality, and per capita income suggest that the benefits of U.S.-Canada trade stem primarily from increased product variety rather than intersectoral specialization. The NAFTA CGE model, which combines both the roles of national factor endowments and product variety in the manufacturing sector in determining the pattern of trade, allows this result to emerge.

Mexican imports from its two trading partners rise in virtually every product category, whereas its bilateral exports fall in some sectors and rise in others. For example, the United States reduces imports from Mexico in printing and publishing (-0.4%), rubber products (-6.7%), iron and steel (-0.4%), nonelectrical machinery (-18.3%), and transport equipment (-5.1%). In contrast, U.S. imports from Mexico rise substantially in agriculture (10.9%), leather (15.7%), footwear (11.9%), furniture and fixtures (10.2%), glass products (14.5%), nonferrous metals (35.2%), and electrical machinery (65.1%). These results suggest a somewhat stronger pattern of intersectoral specialization for Mexico, which would be expected given Mexico's very different factor abundance as compared to the United States and Canada.

The results in Table 2 also suggest that Canada's fear that a U.S.-Mexico agreement may seriously erode the position of Canadian

firms in the U.S. market may be unfounded. There are only three product categories - paper products, chemicals, and miscellaneous manufactures - in which U.S. imports from Mexico appear to displace

Canadian exports. Canadian exports to the United States of rubber products, iron and steel, nonelectrical machinery, and transport equipment all rise while Mexican exports to the United States in these product categories fall. There are a number of cases in which exports from both Canada and Mexico to the United States increase. It is evident in Table 3 that U.S. producers displace Mexican producers in four different Canadian sectors, whereas the opposite occurs in nonferrous metals. The foregoing results reflect especially the different sectoral tariff rates that are applied by the individual countries against their NAFTA partners.

As already noted, Mexico's increased exports to the U.S. market are quite substantial in several product categories. However, the impact on total U.S. imports is relatively small due to Mexico's small share of the U.S. market, as can be seen from column three of Table 2. The main exceptions include glass products, nonferrous metals, and electrical machinery, which show the largest percentage increases in total U.S. imports.

Industry Output and Number of Firms

Columns six and seven of Tables 2-4 report the percent changes in industry output and number of firms for each country. These results can also be used to calculate the percent change in output per firm by taking the difference between these two columns.²¹⁾ It is especially worth noting that output per firm

21) For example, in Table 2, industry output in textiles rises by 1.08 percent, which is greater than the 0.63 percent increase in the number of firms. Industry output falls by -0.34 percent in mining and quarrying, which is less than the -0.38 percent change in the number of firms. In both of these cases, therefore, output per firm rises.

rises in all three countries in virtually every industry, therefore contributing to gains from economies of scale.

Despite the increases noted in intra-industry trade, inter-sectoral specialization also emerges, particularly in Mexico. For example, it can be seen in Table 4 that output declines in 20 of the 29 industries in Mexico, shifting instead towards such labor-intensive sectors as: mining and quarrying (4.1%); leather products (1.8%); footwear (1.1%); and furniture and fixtures (6.2%). The largest percentage increases in output are in durable goods sectors, such as nonferrous metals (24.8%) and electrical machinery (53.4%).

There is also evidence of inter-sectoral specialization in Canada, with output declining in 11 of the 29 sectors noted in Table 3. The largest increases in sectoral output in Canada occur in: leather products (4.5%); footwear (3.4%); glass and glass products (18.6%); iron and steel (5.2%); nonferrous metals (12.8%); and transport equipment (9.8%).

Employment Effects

The employment effects for the United States for scenarios A.-E. are shown in percentage and absolute terms in Table S. In comparison to Mexico and Canada, whose employment effects are not reported here, the U.S. employment effects are more diffuse and are generally small, with percent employment declines generally less than one percent in each sector. The only exceptions are the glass and glass products sector, with employment declines exceeding one percent in scenarios A., B., C., and E., nonferrous metals in all five scenarios, and electrical machinery in scenario D.

While the percentage employment effects provide some indication of the relative changes that may occur in individual sectors as the result of a NAFTA, it is important to consider the absolute changes in employment in order to have an indication of the numbers of workers that may have to move from

Table 5
Sectoral Employment Effects on the United States of North American Free Trade
Scenarios A. - E.
Percentage Change; Thousands of Workers

ISIC Sector	Percentage Change in Employment					Change in Thousands of Workers				
	NAFTA Tariffs only	NAFTA Tariffs and NTBs vs Mexico	NAFTA Tariffs and NTBs (both)	NAFTA Tariffs and FDI Tariffs	US-Can FTA	NAFTA Tariffs only	NAFTA Tariffs and NTBs vs Mexico	NAFTA Tariffs and NTBs (both)	NAFTA Tariffs and FDI Tariffs	US-Can FTA
	(A)	(B)	(C)	(D)	(E)	(A)	(B)	(C)	(D)	(E)
1 Agr., For., & Fish.	-0.04	-0.06	0.05	0.33	0.02	-1.829	-2.349	2.226	13.524	0.776
2 Min. & Quarry.	-0.36	-0.34	-0.39	-0.49	-0.18	-4.154	-3.874	-4.502	-5.642	-2.010
310 Food, Bev., and Tob.	-0.01	-0.03	-0.02	0.08	-0.02	-0.239	-0.597	-0.465	1.725	-0.404
321 Textiles	0.68	0.62	0.62	0.90	0.64	8.951	8.221	8.160	11.851	8.494
322 Wearing Apparel	0.29	0.15	0.15	0.46	0.23	4.390	2.373	2.234	7.077	3.610
323 Leather Prod.	-0.20	-0.22	-0.25	0.18	-0.04	-0.221	-0.236	-0.266	0.198	-0.038
324 Footwear	-0.01	-0.01	-0.02	0.19	0.07	-0.016	-0.022	-0.048	0.374	0.139
331 Wood Prod.	0.03	0.03	0.02	0.16	-0.02	0.211	0.210	0.118	1.063	-0.113
332 Furn. & Fixt.	0.13	0.13	0.11	0.16	0.28	0.772	0.769	0.658	0.918	1.652
341 Paper & Paper Prod.	0.17	0.17	0.16	0.22	0.18	1.512	1.491	1.368	1.907	1.584
342 Print & Publ.	0.04	0.04	0.03	0.05	0.03	0.638	0.644	0.571	0.903	0.487
35A Chemicals	0.42	0.42	0.41	0.51	0.37	5.322	5.308	5.172	6.411	4.594
35B Petrol. & Rel. Prod.	-0.04	-0.03	-0.04	-0.06	-0.02	-0.072	-0.066	-0.082	-0.110	-0.043
355 Rubber Prod.	0.29	0.29	0.30	0.59	0.04	0.905	0.912	0.932	1.826	0.130
36A Nonmetal Min. Prod.	0.07	0.07	0.07	0.09	0.02	0.419	0.442	0.405	0.534	0.144
362 Glass & Glass Prod.	-1.29	-1.29	-1.36	-0.85	-2.06	-2.917	-2.935	-3.093	-1.924	-4.680
371 Iron & Steel	-0.02	-0.01	-0.01	-0.05	-0.19	-0.233	-0.098	-0.086	-0.510	-1.860
372 Nonferrous Metals	-1.66	-1.60	-1.70	-3.36	-1.19	-6.541	-6.275	-6.676	-13.206	-4.679
381 Metal Prod.	0.08	0.08	0.09	0.09	0.02	1.566	1.673	1.716	1.818	0.455
382 Nonelec. Mach.	0.46	0.48	0.47	0.49	0.22	15.631	15.992	15.833	16.435	7.456
383 Elec. Mach.	-0.55	-0.51	-0.57	-1.25	0.11	-14.554	-13.514	-15.250	-33.027	2.808
384 Transp. Equip.	-0.80	-0.79	-0.68	-0.53	-0.99	-20.328	-20.121	-17.387	-13.583	-25.341
38A Misc. Manuf.	0.64	0.65	0.59	0.43	0.57	12.755	12.931	11.729	8.686	11.474
4 Elec., Gas & Water	-0.00	0.00	-0.01	-0.03	-0.01	-0.047	0.026	-0.119	-0.516	-0.105
5 Construction	0.03	0.03	0.03	0.02	0.01	2.003	2.128	1.912	1.374	0.722
6 Whole. & Ret. Trade	-0.00	0.00	-0.00	-0.01	-0.00	-0.180	0.178	-0.501	-2.309	-1.075
7 Transp., Stor., & Comm.	0.01	0.01	0.01	-0.00	0.00	0.688	0.789	0.598	-0.053	0.094
8 Fin., Ins., & Real Est.	-0.02	-0.01	-0.02	-0.03	-0.01	-1.597	-1.350	-1.826	-2.724	-0.806
9 Comm., Soc., & Pers. Serv.	-0.01	-0.01	-0.01	-0.01	-0.01	-2.834	-2.652	-3.333	-3.018	-3.465
Total*	0.00	0.00	0.00	0.00	0.00	0.000	0.000	0.000	0.000	0.000

*Total employment was held fixed by variation in the economy wide wage

one sector to another. These absolute changes are listed for all 29 sectors in the right-hand five columns in Table 5 for each scenario. Totals for the entire economy are also reported, but are zero under the assumption that aggregate employment is held fixed. For ease of exposition, the positive and negative employment effects for selected U.S. sectors for NAFTA scenarios A.-D. are presented in Table 6.

Table 6
Positive and Negative Employment Effects for Selected U.S. Sectors
Due to North American Free Trade (Scenarios A.-D.)
(Number of Workers)

ISIC Sector	NAFTA Tariffs only (A)	NAFTA Tariffs and NTBs vs Mexico (B)	NAFTA Tariffs and NTBs (both) (C)	NAFTA Tariffs and FDI (D)
Positive Employment Effects				
382 Nonelectrical Machinery	15631	15992	15833	16435
38A Miscellaneous Manufactures	12755	12931	11729	8686
321 Textiles	8951	8221	8160	11851
35A Chemicals	5322	5308	5172	6411
322 Wearing Apparel	4390	2373	2234	7077
Negative Employment Effects				
384 Transport Equipment	-20328	-20121	-17387	-13583
383 Electrical Machinery	-14554	-13514	-15250	-33027
372 Nonferrous Metals	-6541	-6275	-6676	-13206
2 Mining & Quarrying	-4154	-3874	-4502	-5642
9 Comm., Soc., & Pers. Serv.	-2834	-2652	-3333	-3018
Negative/Positive Employment Effects				
1 Agriculture, For., & Fish.	-1829	-2349	2226	13524
310 Food, Beverages, and Tobacco	-239	-597	-465	1725
323 Leather Products	-221	-236	-266	198
324 Footwear	-16	-22	-48	374

It is evident from Table 6 that the greatest expansion of U.S. employment due to a NAFTA occurs in: nonelectric machinery; miscellaneous manufactures; textiles; chemicals; and wearing apparel. The negative employment effects are concentrated in: transport equipment; electric machinery; nonferrous metals; mining and quarrying; and community, social, and personal services which includes government services. There is a tendency for the expansion of employment to be enhanced in scenario D., which includes an increase in FDI in Mexico. However, the increase of FDI in Mexico also results in larger negative employment effects for the United States in electric machinery, nonferrous metals, and mining and quarrying. It is also noteworthy that the agricultural sector shows positive employment effects in scenario C., which includes an expansion of import quota limits in both the United States and Mexico. The inclusion of FDI in Mexico in scenario D. leads to a larger employment increase in U.S. agriculture as compared to scenario C. There are also positive employment changes in: food, beverages, and tobacco; leather products; and footwear.

These results for textiles, wearing apparel, and agriculture merit further comment. The employment results for textiles and wearing apparel reflect the different tariff rates applied to these sectors in the three countries. For example, U.S. tariffs against Canada are 7.2 percent and 18.4 percent, respectively, for textiles and wearing apparel, and 2.8 percent and 6.2 percent against Mexico. The rates for Mexico reflect the relatively high maquiladora coverage that reduces the effective U.S. tariff against Mexico. In contrast, Canada's tariffs in these sectors against the United States are 16.9 percent and 23.7 percent, while Mexico's tariffs are 11.6 percent and 19.8 percent. So for the most part, the United States has lower tariffs than the other two countries in these sectors and thus has more to gain from tariff removal. At the same

time, it should be noted that U.S. NTBs are substantial against Mexico in the textile and wearing apparel sectors, thus protecting U.S. interests from even the tariff changes that do occur, while Canadian and Mexican NTBs in these sectors against the United States are taken to be zero. Given these data, the U.S. textile and wearing apparel sectors show positive employment changes.

Regarding agriculture, the tariffs that are assumed to be eliminated in scenario A. for the agricultural sector are relatively low. They are highest for U.S. imports from Mexico (4 percent). That alone might suggest a small adverse effect on U.S. agriculture. Add to this the fact that the United States had only 11 percent and 3 percent NTB coverage against Canada and Mexico, respectively, in agriculture, while these countries had 20 percent and 46 percent NTB coverage, respectively, against the United States. It is not surprising then that employment in U.S. agriculture declines, when Mexican NTBs are unchanged, since the U.S. tariff is being reduced the most and the (smaller) tariff reductions in the other two countries are being rendered partially ineffective by their NTBs.

These results for both textiles/apparel and agriculture underscore the fact that the analysis here deals only with the effect of the NAFTA per se, and therefore depends critically on the existing levels of tariffs that will be removed and the extent to which nontariff barriers constrain their effects. In particular, as has been mentioned before, these effects should not be confused with the effects on these industries that may already be occurring as a result of previous Mexican liberalization and that will continue to occur whether or not a NAFTA is enacted.

In interpreting these sectoral employment results, one should also recall the assumption used in the various scenarios that the reductions

in NAFTA tariffs, relaxation of U.S. and Mexican NTBS, and the expansion of FDI in Mexico take place all at once. If one were to take into account more realistically the likelihood that the trade liberalization would be phased in over a decade or more and that the expansion of Mexican investment would similarly take place over a series of years, the resulting changes in U.S. sectoral employment noted in Tables 5 and 6 would be considerably smaller when measured on an annual basis.

VI. Computational Results - Occupational Effects

While the economy-wide effects just discussed are useful in identifying the sectors that will be most impacted by a NAFTA, it is also desirable and important for policy purposes to have more detailed information concerning the occupational characteristics of the American workers involved. With this in mind, as mentioned above, a procedure has been incorporated into the NAFTA model that permits the employment changes to be broken down by major occupational groupings.

For this purpose, the "national matrix tape" was obtained from the U.S. Department of Labor. This tape contains two data sets: matrix data records and occupation/industry codes. The employment data are wage and salary employment. The occupation and industry code records consist of occupation titles and 8-digit codes and industry titles and 6-digit codes that relate to the 1972 3-digit Standard Industrial Classification (SIC).

The tape contains 602 occupational titles, including 491 detailed occupations and 111 summary occupations, for 1988 as well as

projections for the year 2000. Nine categories were selected for purposes of aggregation for use in the NAFTA model, as follows:

- (1) executive, administrative, and managerial occupations;
- (2) professional specialty occupations;
- (3) technicians and related support occupations;
- (4) marketing and sales occupations;
- (5) administrative support occupations, including clerical;
- (6) service occupations;
- (7) agriculture, forestry, fishing and related occupations;
- (8) precision production, craft, and repair occupations (skilled); and
- (9) operators, fabricators, and laborers (semi-/unskilled).

The occupational data for 1988 have been concorded from the SIC to the ISIC (International Standard Industrial Classification) used in the NAFTA model and have been used to estimate the occupational breakdown of the employment data for 1989, as reported in Appendix Table A-14. The percentage distributions across occupations appear in Table A-15.

With this occupational breakdown, it is possible to determine the occupational impacts by sector of a NAFTA for each of the five scenarios that have been run. This is done by multiplying the sectoral employment changes in Table 5 by the occupational percentages in Table A-15. This will permit identification of the occupations that will experience increases in employment and those that will experience declines.²²⁾ The detailed results are recorded in Tables A-16 to A-20. The positive and negative occupational changes for NAFTA scenarios A.-D. are shown in Table 7. It should be noted that the total changes for each scenario in Table 7 sum to zero since, as discussed above,

22) Further disaggregation of occupational groups beyond the nine categories is feasible and could be carried out in case the added details would be useful.

aggregate employment is being held constant throughout the various scenarios. 1 Note: The employment changes listed sum to zero because aggregate employment is assumed constant in each scenario.

Table 7
Employment Changes by Occupational Group
Due to North American Free Trade (Scenarios A.-D.)
(Number of Workers)

Occupation	NAFTA Tariffs only (A)	NAFTA Tariffs and NTBs vs Mexico (B)	NAFTA Tariffs and NTBs (both) (C)	NAFTA Tariffs and FDI (D)
Executive	629	762	335	-833
Professional	-956	-738	-1016	-1806
Technical	245	358	223	-497
Marketing/Sales	1992	1663	1226	1510
Administrative/Clerical	485	742	56	-1922
Service	-794	-684	-982	-1239
Agriculture	-1296	-1721	1960	11162
Skilled	-1256	-853	-1442	-4418
Semi-/Unskilled	952	472	-362	-1958

Note: The employment changes listed sum to zero because aggregate employment is assumed constant in each scenario.

It is evident in NAFTA scenarios A.-C. in Table 7 that employment of executive, technical, marketing/sales, and administrative/clerkal workers increases while there are declines in the employment of professional, service, and skilled workers. Employment of agricultural workers declines in scenarios A. and B. and increases in scenario C., due apparently to the expansion of Mexican quota limits applied to imports from the United States.

The inclusion of FDI in Mexico in scenario D. leads to an increase in employment of marketing/sales and agricultural workers and a

decline in all other occupational categories.²³⁾ These occupational employment shifts in scenario D. apparently reflect the stimulating effect that the capital inflow into Mexico has on Mexican manufacturing sectors coupled, as a result, with a lessening of the extent to which Mexican agriculture competes with the United States. This connection between a capital flow into one country and the employment of an occupation in another country is a good example of the multiple interconnections that the NAFTA CGE model can illuminate. It is further evident in Tables A-16 to A-19 that sectoral employment within individual occupational groups rises or falls. To trace through these changes, the positive/negative sectoral employment effects noted in Tables 5 and 6 should be consulted.

VII. Computational Results - Regional Effects

The NAPTA model also includes a facility for breaking down the Sectoral employment results by state and region in addition to occupations. This is accomplished on the basis of a data sample of workers obtained from the Census Public Use Tapes. Each line of data in these files contains the number of individuals in a particular state, census industry, and occupation. The disaggregated occupational data have been classified into the nine occupational categories mentioned above, percentages calculated for sectors by state, and the states aggregated into nine major regions, as follows: New England; Middle

23) These changes in the number of workers constitute very small percentages of the various occupational categories. For example, the increase in agricultural employment of 11,162 workers in scenario D. represents about 0.4 percent of total agricultural employment. Most of the other percentage changes are even smaller.

Atlantic; East North Central; West North Central; South Atlantic; East South Central; West South Central; Mountain; and Pacific.²⁴⁾ These percentages were used to estimate the regional and state breakdowns of the 1989 employment data, the levels of which are reported in Tables A-21 and A-23, with the percentages themselves in A-22 and A-24.

These percentages were used to calculate the region and state breakdowns of the sectoral employment changes from the various scenarios.²⁵⁾ Because of the details involved, only the changes in U.S. employment by sector and region for scenario A. (elimination of NAFTA tariffs only) and D. (same as A. plus increased FDI in Mexico) are included here as Tables 8 and 9. The sector/region and the sector/state employment changes, for all remaining scenarios, are reported in Tables A-25 to A-32.

It is evident for scenario A. in Table 8 that there are total regional employment declines in: East North Central (-5,441 workers); West North Central (-17 workers); West South Central (-1,078 workers); Mountain (-331 workers); and Pacific (-1,173 workers).²⁶⁾ Within each region, there are both increases and decreases in sectoral employment. For scenario D. in Table 9, the regional totals have the same signs

24) The states that comprise each region are: New England: CT, ME, MA, NH, RI, VT; Middle Atlantic: NJ, NY, PA; East North Central: IL, IN, MI, OH, WI; West North Central: IA, KS, MN, MO, NE, ND, SD; South Atlantic: DE, DC, FL, GA, MD, NC, SC, VA, WV; East South Central: AL, KY, MS, TN; West South Central: AR, LA, OK, TX; Mountain: AZ, CO, ID, MT, NV, NM, UT, WY; and Pacific: AK, CA, HI, OR, WA.

25) As in the occupational breakdowns, the procedure was to multiply the sectoral employment changes in Table 5 by the region and state percentages in Tables A-22 and A-24.

26) The regional changes are very small in relation to total regional employment. For example, the decline of 5,441 workers in the East North Central region represents only about .03 percent of total employment in that region.

Table 8
 Change in U.S. Employment by Sector and Region
 due to NAFTA, Tariffs Only
 Scenario A.
 (Number of Workers)

Sector	Region									Total
	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	
1 Agr., For., & Fish.	-52	-111	-256	-329	-296	-130	-210	-117	-326	-1829
2 Min. & Quarry.	-15	-261	-355	-226	-539	-413	-1470	-657	-216	-4154
310 Food, Bev., and Tob.	-9	-36	-46	-26	-38	-17	-26	-8	-32	-239
321 Textiles	666	1096	374	128	5123	810	248	93	413	8951
322 Wearing Apparel	242	1058	422	220	903	539	415	111	480	4390
323 Leather Prod.	-14	-58	-17	-9	-48	-33	-18	-4	-21	-221
324 Footwear	-4	-3	-2	-2	-2	-2	-1	0	-1	-16
331 Wood Prod.	12	20	29	13	34	22	19	11	50	211
332 Furn. & Fixt.	44	79	123	41	148	73	67	35	163	772
341 Paper & Paper Prod.	151	251	351	81	261	124	121	15	157	1512
342 Print & Publ.	46	138	139	53	83	28	45	24	83	638
35A Chemicals	367	1320	1178	317	792	349	453	106	439	5322
35B Petrol. & Rel. Prod.	-1	-15	-19	-3	-5	-3	-16	-2	-8	-72
355 Rubber Prod.	56	144	172	62	138	68	123	33	110	905
36A Nonmetal Min. Prod.	13	62	87	36	62	30	53	25	52	419
362 Glass & Glass Prod.	-102	-798	-733	-62	-522	-168	-204	-39	-290	-2917
371 Iron & Steel	-10	-49	-96	-10	-17	-15	-14	-6	-17	-233
372 Nonferrous Metals	-394	-1026	-2063	-351	-638	-553	-570	-156	-790	-6541
381 Metal Prod.	131	273	445	107	170	90	121	44	185	1566
382 Nonelec. Mach.	1520	2474	3610	1376	1450	641	1324	657	2578	15631
383 Elec. Mach.	-1245	-2755	-3651	-825	-1588	-726	-1063	-506	-2194	-14554
384 Transp. Equip.	-1372	-2254	-7366	-1415	-1765	-901	-1518	-417	-3320	-20329
38A Misc. Manuf.	1052	2362	2621	936	1786	723	1126	489	1660	12755
4 Elec., Gas & Water	-2	-7	-8	-4	-8	-4	-6	-3	-6	-47
5 Construction	89	225	274	151	379	133	321	148	283	2003
6 Whole. & Ret. Trade	-9	-27	-32	-15	-29	-10	-19	-10	-28	-180
7 Transp., Stor., & Comm.	32	118	117	67	106	36	73	38	102	688
8 Fin., Ins., & Real Est.	-95	-295	-257	-109	-245	-74	-174	86	-263	-1597
9 Comm., Soc., & Pers. Serv.	-168	-471	-484	-218	-488	-161	-277	-150	-416	-2834
Total	925	1456	-5441	-17	5204	456	-1078	-331	-1173	0

Table 9

Change in U.S. Employment by Sector and Region
 due to NAFTA, Tariffs Only Plus 10% Capital Flow into Mexico
 Scenario D.
 (Number of Workers)

Sector	Region									
	New England	Middle Atlantic	East Central	North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific
1 Agr., For., & Fish	387	821	1893	2434	2188	965	1555	868	2414	13524
2 Min. & Quarry	-21	-355	-482	-307	-732	-562	-1997	-893	-293	-5642
310 Food, Bev., and Tob.	66	263	336	186	274	120	186	60	234	1725
321 Textiles	882	1450	495	169	6782	1073	329	124	546	11851
322 Wearing Apparel	389	1706	681	355	1456	869	668	179	774	7077
323 Leather Prod.	12	52	15	8	43	30	16	3	18	198
324 Footwear	90	60	41	49	40	53	24	2	15	374
331 Wood Prod.	63	103	146	64	171	111	86	55	254	1063
332 Furn. & Fixt.	52	94	146	49	176	87	79	41	194	918
341 Paper & Paper Prod.	190	317	442	102	329	157	153	19	197	1907
342 Print & Publ.	64	195	196	75	117	40	64	34	117	903
35A Chemicals	443	1591	1420	381	954	420	546	128	528	6411
35B Petrol. & Rel. Prod.	-2	-23	-28	-4	-8	-4	-25	-3	-12	-110
355 Rubber Prod.	112	291	347	124	278	138	248	67	221	1826
36A Nonmetal Min. Prod.	16	79	111	45	79	38	68	32	66	534
362 Glass & Glass Prod.	-67	-526	-484	-41	-344	-111	-134	-26	-191	-1924
371 Iron & Steel	-23	-107	-209	-22	-36	-32	-32	-12	-37	-510
372 Nonferrous Metals	-795	-2071	-4166	-709	-1287	-1117	-1151	-314	-1595	-13206
381 Metal Prod.	152	317	517	124	197	104	141	51	215	1818
382 Nonelec. Mach.	1599	2601	3796	1447	1525	674	1392	691	2711	16435
383 Elec. Mach.	-2826	-6252	-8285	-1872	-3605	-1647	-2413	-1148	-4979	-33028
384 Transp. Equip.	-917	-1506	-4922	-945	-1180	-602	-1014	-279	-2218	-13583
38A Misc. Manuf.	716	1609	1785	637	1216	493	767	333	1131	8686
4 Elec., Gas & Water	-23	-75	-86	-38	-89	-48	-61	-34	-63	-516
5 Construction	61	154	188	103	260	91	220	101	194	1374
6 Whole. & Ret. Trade	-120	-346	-413	-189	-371	-130	-248	-131	-360	-2309
7 Transp., Stor., & Comm.	-2	-9	-9	-5	-8	-3	-6	-3	-8	-53
8 Fin., Ins., & Real Est.	-162	-503	-438	-186	-418	-126	-297	-147	-448	-2724
9 Comm., Soc., & Pers. Serv.	-179	-501	-516	-233	-520	-172	-295	-160	-443	-3018
Total	158	-570	-7483	1802	7484	910	-1122	-361	-819	0

as in Table 8, except for the Middle Atlantic region, which is now negative. The differences in sectoral results for the individual regions in Tables 8 and 9 reflect the inclusion of FDI in Mexico. The main sectors showing overall increases or decreases in employment correspond to the sectors identified in Table 6 above.

It should be recalled that these regional effects, like the others presented in this report, refer only to the effects of the NAFTA per se, and they should not be confused with the effects on these regions that may already be occurring as a result of previous Mexican liberalization. The Mexican liberalization has already caused expansion of trade with Mexico in regions close to the border, and this expansion will likely continue. It is not, however, the result of the tariff and NTB liberalization that will be carried out in a NAFTA.

VIII. Computational Results - Occupation and Region

The Census data also permit the employment changes for each industry to be broken down by both occupation and region simultaneously. Summing these results over all industries, the total changes in employment by occupation and region were obtained. Thus, in Table 10, for scenario A., which refers to NAFTA tariff elimination, the changes in employment by occupation are reported for each of the nine regions. The totals along the bottom and side of this table match those reported in Tables 7 and 8. The declines in the employment of skilled and semi-/unskilled workers are evidently concentrated in the East North Central, West South Central, Mountain, and Pacific regions. In the East North Central region, all of the occupational categories except marketing/sales show a decline. There are generally positive

occupational employment effects in the other regions noted, except for agricultural and service workers.

The corresponding results for scenario D., which includes NAFTA tariff elimination plus an increase in FDI in Mexico, are shown in Table 11. The pattern of total changes for the individual occupational groups is different from the pattern for scenario A. noted in Table 10. There are declines for all of the occupational groups except marketing/ sales and agriculture. There is now an overall negative employment result for the Middle Atlantic region, and the overall negative effects are larger for the East North Central, West South Central, and Mountain regions. The occupational/regional employment results for scenarios B., C., and E. are given in Tables A-33 to A-35 in the Statistical Appendix.

IX. Computational Results - Effects by State

The changes in employment by sector for each of the 50 states and the District of Columbia are reported in Tables A-28 to A-32. These data broken down by state correspond to the data broken down by region that have just been discussed. For scenario A., which refers to NAFTA tariff elimination, it is evident from Table A-28 that there are two states that experience an overall decline in employment in excess of 1,000 workers: Michigan (-2,629) and Ohio (-1,404). There are four states that experience an overall increase in employment in excess of 1,000 workers: Georgia (1,063); New York (1,360); North Carolina (2,691); and South Carolina (1,373). In Georgia and the Carolinas, these increases are largely the result of the expansion in textiles that has been discussed above. In New York, the largest

Table 10
 Change in U.S. Employment by Region and Occupation
 due to NAFTA, Tariffs Only
 Scenario A.
 (Number of Workers)

Occupation	Region									Total
	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	
Executive	162	302	-172	93	334	17	-93	-1	-14	629
Professional	19	83	-414	-28	-25	-36	-233	-78	-243	-956
Technical	63	127	-87	56	122	19	-49	8	-12	245
Mktg./Sales	113	360	339	185	301	99	238	93	263	1992
Admin./Clerical	151	363	-369	71	498	50	-165	-8	-106	485
Service	-30	-102	-299	-59	25	-48	-112	-50	-121	-794
Agriculture	-33	-71	-199	-283	-188	-94	-154	-76	-198	-1296
Skilled	81	38	-1095	10	660	-69	-334	-143	-405	-1256
Semi-/Unskilled	398	356	-3145	-62	3476	517	-177	-75	-336	952
Total	925	1456	-5442	-17	5204	456	-1078	-331	-1173	0

Region		Occupation										
		New	Middle	East Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	Total
Executive	25	9	-475	-3	-271	-29	-273	-88	-271	-833	-833	-833
Professional	-76	-147	-561	-36	-108	-48	-354	-127	-347	-1806	-1806	-1806
Technical	6	-9	-213	15	41	4	-134	-45	-164	-497	-497	-497
Mkng./Sales	84	323	236	149	250	75	167	70	156	1510	1510	1510
Admn./Clerical	-67	-190	-995	-45	344	-27	-417	-100	-425	-1922	-1922	-1922
Service	-70	-190	-430	-90	19	-70	-156	-83	-168	-1239	-1239	-1239
Agriculture	295	649	1626	2263	1741	786	1308	673	1821	11163	11163	11163
Skilled	-124	-597	-1842	-160	523	-280	-778	-384	-776	-4418	-4418	-4418
Sem-/Unskilled	84	-418	-4830	-290	4403	499	-486	-276	-645	-1958	-1958	-1958
Total	158	-570	-7483	1802	7484	910	-1122	-361	-819	0	0	0

Change in U.S. Employment by Region and Occupation due to NAFTA, Tariffs Only Plus 10% Capital Flow into Mexico Scenario D. (Number of Workers)

Table 11

increases are in nonelectrical machinery and miscellaneous manufactures, reflecting that state's more diverse industrial base. For scenario D., which includes NAFTA tariff elimination plus an increase in FDI in Mexico, the results in Table A-31 indicate that there are six states that experience an overall decline in employment in excess of 1,000 workers: California (-1,022); Illinois (-1,218); Indiana (-1,673); Michigan (-2,091); Ohio (-2,338); and Pennsylvania (-1,303). There are three states for scenario D. that experience an overall increase in employment in excess of 1,000 workers: Georgia (1,656); North Carolina (3,681); and South Carolina (1,868).²⁷⁾

The changes in employment by occupation broken down by state for scenarios A.- E. are reported in Tables A-36 to A-40. These breakdowns provide an indication of how the statewide changes are distributed across the different occupational groups. Aggregation of these statewide changes by region was indicated in Section VIII.

X. Labor Market Dislocation Measures and Wage Losses

The results of the different NAFTA scenarios discussed in the preceding sections indicate, as one would expect, that a NAFTA will favor some sectors, occupations, and locations over others in terms of demands for labor and thus employment. This suggests that workers will need to move among these various segments of the labor force in order to remain employed and therefore, depending on how difficult

27) The changes in state employment noted are very small in relation to total state employment. For example, the employment declines of 2,629 workers in Michigan and 1,404 workers in Ohio constitute 0.06 percent and 0.03 percent, respectively, of each state's total employment.

and costly such movement turns out to be, that there could conceivably be considerable cost in terms of labor-market dislocation as a result of a NAFTA. An important purpose of this study is to quantify the extent of this dislocation.

Unfortunately, labor-market dislocations can take several forms, and it is difficult to know which are the most serious and how they can be compared. Some workers may lose their jobs in particular industries, but because they live in regions where employment is otherwise expanding, they may have little difficulty finding work in another industry. Similarly, other workers in contracting sectors may possess skills that are in great demand elsewhere, and they too may be able to relocate without significant difficulty. Since one cannot know how individual workers will experience these different effects, this study instead reports a variety of different measures of labor market dislocation. Each focuses on a different dimension of adjustment that workers may have to make.

All of the measures are necessarily derived for the level of aggregation that is built into the model.²⁸⁾ It could be objected that this level of aggregation is too large and that it therefore understates the extent of dislocation that will actually occur. For example, it may be that the employment decline of 20,328 workers in the transport equipment industry that is reported in Table 5 for scenario A. is actually the result, say, of a larger decline in the auto industry combined with a gain in employment in the truck industry. If so, then the analysis understates the numbers of workers who will lose their jobs as a result of a NAFTA. Were it possible to repeat the analysis using

28) It should be noted that the 29-sector aggregation used in the model was dictated by considerations of data availability on employment in UN sources for all the countries included in the model.

progressively more and therefore smaller sectors, the extent of dislocation as measured here would almost certainly rise.

On the other hand, as this example indicates, what is important is not that the industry be somehow completely disaggregated, but rather that the level of aggregation correspond well to the problems of dislocation that are being measured. If auto workers are readily re-employed in the truck industry, then regarding autos and trucks as separate sectors for this purpose would be misleading. It is therefore not clear what the most appropriate level of aggregation may be. In any case, comparable employment data on a more disaggregated basis are not readily available.

Labor Market Dislocation Measures

Thus, the first measure to be reported focuses only on industrial sectors, that is, the numbers of workers who will have to move from one sector to another, at prevailing relative wages, in order to find work. This is calculated for each scenario as just the sum of the employment changes for those sectors where employment declines. This would be the best measure of labor market dislocation under the assumption that the most difficult transition for a worker to make is from one industry to another, while changes in occupation and/or location are relatively easy. Since the latter assumption is in fact implausible, however, several other measures of labor market dislocation are calculated to reflect alternative assumptions that occupations and/or locations are the most difficult to change.

Table 12 then presents results for six measures of labor market dislocation for each of the five scenarios. All of these have been calculated by summing the negative entries in the relevant tables, with

the six measures defined as follows:

(1) labor dislocations across sectors - number of workers who would have to change industries;²⁹⁾

(2) labor dislocations across occupations - number of workers who would have to change occupations;³⁰⁾

(3) labor dislocations across regions number of workers who would have to change regions;³¹⁾

(4) labor dislocations across states number of workers who would have to change states;³²⁾

(5) labor dislocations across occupations and regions - number of workers who would have to change either their occupation or their region;³³⁾ and

(6) labor dislocations across occupations and states - number of workers who would have to change either their occupation or their state.³⁴⁾

The measure of labor market dislocation across sectors represents the number of workers who would have to shift their employment out of their present sector to some other sector. For NAFTA scenario A., 55,760 workers would be affected, and for NAFTA scenario D., 76,620 workers would be affected. These workers would presumably find employment in the sectors for which employment is expanded, but without regard to) their particular occupation or region. Workers who

29) Derived from Table 5.

30) Derived from Tables 7 and A-16 to A-20.

31) Derived from Tables 8, 9, and A-25 to A-27.

32) Derived from Tables A-28 to A-32.

33) Derived from Tables 10, 11, and A-33 to A-35. This is smaller than the sum of measures (2) and (3) by the number of workers who must change both occupation and region.

34) Derived from Tables A-36 to A-40. This is smaller than the sum of measures (2) and (4) by the number of workers who must change both occupation and state.

Table 12

**U.S. Labor Market Dislocation Measures
(Numbers of Workers over Ten Years)**

Labor Dislocation ^a	NAFTA Tariffs only (A)	NAFTA Tariffs and NTBs vs Mexico (B)	NAFTA Tariffs and NTBs (both) (C)	NAFTA Tariffs and FDI (D)	US-Can FTA Tariffs (E)
Across Sectors	55763	54089	53632	76623	44619
Across Occupations	4303	3996	3800	12673	4048
Across Regions	8041	7304	6934	10355	7954
Across States	10220	9480	9335	13763	9935
Across Occupation and Region	10092	9369	9170	18918	9869
Across Occupation and State	12501	11797	11677	21681	11972

*In each case, dislocation is measured as the sum of the negative employment changes in sectors, occupations, etc. Since employment changes for occupations, regions, and states are constructed from those for sectors, it would be inappropriate to add the numbers in the table.

would have to change occupation and possibly move across regions/states as well would probably experience the most severe dislocation. But it is interesting that the labor market dislocation measures across occupations, across regions/states, and across occupation and regions/states are all considerably smaller than the intersectoral employment shifts noted.

Comparing across the scenarios, it is notable that the greatest numbers of workers are dislocated, in terms of any of the measures, by the formation of the full NAFTA together with induced FDI into Mexico (scenario D.). The dislocations associated with NAFTA tariff removal and with expansion of import-quota limitations in the United States and Mexico are roughly comparable. It is interesting that in scenario E., which refers to a U.S.-Canada FTA only, the sectoral dislocation is smaller than with a NAFTA, but is comparable to the other NAFTA dislocation effects in scenarios A.-C.

It should also be noted that these results for labor-market dislocation are really very small. Total employment in the United States is 116 million workers in the data base for 1989. Thus even the largest measure of labor-market dislocation reported - 76,620 workers for dislocation across industries due to a NAFTA with FDI in Mexico - is less than one tenth of one percent of the labor force. Since, as will be discussed below, there are a number of reasons to expect that even this is an overestimate, the calculations noted suggest that labor market dislocation due to a NAFTA will not be a serious problem.

Wage Losses Due to Labor Market Dislocation

The various employment changes reported in the foregoing tables can also be used to calculate estimates of wage losses due to the

different NAFTA scenarios. For this purpose, data have been drawn from the January 1990 Displaced Worker Survey (DWS) that provides information on the wage before displacement and the duration of unemployment.³⁵⁾ It is then possible to calculate the average wages lost by sector, occupation, region, and state to correspond with the categories used in the employment change calculations. The calculations of the average wages lost for each of these categories are shown in Tables A-41 to A-44 in the Statistical Appendix.

Assuming that this experience would be characteristic of the workers who would experience displacement as the result of a NAFTA, one can then multiply the number of displaced workers times the average wage loss. The results are reported in Table 13. That is, for each of the workers identified as displaced in Table 12, the data from Tables A-41 to A-44 have been used to calculate the cost to them of their displacement. In the case of labor dislocation across industries, for example, the decline in employment in each contracting sector was multiplied by the lost wages per displaced worker in that sector, and the results were then summed over all contracting sectors. Similarly, labor dislocation across occupations, regions, and states was obtained by using the lost wages for these categories to value the declines in employment in those where employment contracted. In the final two measures that combine occupations with locations, a simple average of the lost wages for these two categories was used.³⁶⁾

35) The DWS, which is conducted by the U.S. Bureau of the Census, is a special supplement to the monthly Current Population Survey (CPS). For an analysis and compilation of the evidence based on the January 1984, 1986, 1988, and 1990 DWS, see Podgursky (1991).

36) These calculations of wage losses do not take into account the characteristics of individual workers and the ease or difficulty experienced in finding new employment. Rather, the wage losses should be interpreted as representing the

It can be seen for NAFTA scenarios A. and D. that the total wage losses over ten years across sectors are \$285.4 and \$392.8 million, respectively. For NAFTA scenarios B. and C., the wage losses across sectors are \$274.3 million and \$278.8 million, respectively. For a U.S.-Canada FTA in scenario E., the wage loss across sectors is \$223.4 million.

In interpreting these sectoral wage loss calculations, it should be noted that they are based on the assumed introduction of the NAFTA all at one time. Realistically, of course, the NAFTA would be phased in over a period of a decade or more, depending on what is actually decided in the negotiations. If the effects were spread uniformly, it might be assumed that about one-tenth of the wage losses indicated would be experienced in any given year. But even this may be an exaggeration of the wage loss since no account is taken here of worker attrition due to voluntary quits and retirement decisions. Further, no allowance has been made for sectoral relative wage adjustments that would affect worker incentives for changing employment between sectors.

Later in the report, these costs of labor market dislocation will be compared with the resources that are available through various programs of adjustment assistance in the United States. For that purpose, based upon these results in Table 13, a plausible upper bound on the wage loss due to a NAFTA appears to be \$40 million annually. This is based on the largest entry in Table 13, assumed to be spread uniformly over a phase-in period of ten years.³⁷⁾

average experiences of displaced workers during the period in 1989 covered by the DWS.

37) It is conceivable that the labor market dislocations and associated wage losses could be concentrated more in some years than in others, depending upon time lags in the adjustment process in the labor market and in additions to sectoral capital stocks.

Table 13
 U.S. Labor Market Dislocation Measures: Millions of Dollars of Lost Wages

Labor Dislocation	NAFTA Tariffs only (A)	NAFTA Tariffs and NTBs vs Mexico (B)	NAFTA Tariffs and NTBs (both) (C)	NAFTA Tariffs and FDI (D)	US-Can FTA Tariffs (E)
Across Sectors	285.35	274.30	278.84	392.82	223.36
Across Occupations	14.07	11.83	14.38	49.79	15.46
Across Regions	33.87	30.79	28.94	43.12	33.73
Across States	41.18	38.20	37.17	52.91	41.66
Across Occupation and Region	38.42	34.98	36.09	75.19	38.94
Across Occupation and State	47.15	43.90	45.04	83.45	47.21

In the absence of information about those lags, it was decided to assume a uniform response annually.

XI. Effects of Cross-Border Migration

In the results for the scenarios reported in the preceding sections, it was assumed that no change in the total labor force of any country occurs as a result of the NAFTA and the U.S.-Canada FTA considered. In the case of the United States and Mexico especially, however, there are reasons to think that a NAFTA might have some effect on migration flows between the two countries. In this section several additional scenarios are provided that take migration flows into account. These scenarios, denoted through F.-I., are described schematically in Figure 1. The choices of assumptions about migration that they include require further explanation.

Determinants of Migration

There are two distinct and quite different ways that migration might be affected by a NAFTA, depending upon the interpretation of the barriers to migration that exist between the United States and Mexico and the expectation of what may happen to these barriers as a result of a NAFTA. Implicitly the analysis so far has assumed that such barriers exist, and that neither they nor their effects on migration will be altered by a NAFTA.

A NAFTA is not expected formally to change the barriers to migration. Under that assumption, however, the amount of migration could nonetheless be changed if a NAFTA alters the incentives to permeate those barriers. Suppose that the level of migration is the result of an interaction between the barriers to migration themselves, on the one hand, and the incentive to migrate, on the other, this incentive being the wage differential that exists between the two

countries. Then if that wage differential changes, the equilibrium amount of migration will also change and thus should be taken into account in the calculation.

As already noted, the results in Table 1 above suggest that a NAFTA will increase the wage in Mexico relative to the United States. This then implies that, given a fixed level of resistance to migration, the actual amount of migration into the United States seeking the higher wage will decline. This is modeled, therefore, as a movement of workers from the United States into Mexico.

The extent of this change should depend theoretically on the interactions between the barriers to migration and the incentives to migrate. A simple assumption, however, is to allow enough migration to occur to leave the wage differential between the two countries unchanged. This is the approach chosen in scenario F. below, and it turns out to involve a movement of labor into Mexico equal to about one percent of the Mexican labor force.

A second and quite different effect is possible, on the other hand, if a NAFTA serves to reduce barriers to migration. While it has not been suggested that a NAFTA will include any formal relaxation of such barriers, many observers do expect that the increased economic interactions between the United States and Mexico in other dimensions will nonetheless make it easier for workers to cross the border. If this is true, since most of the large differential between wages in the two countries will in any case remain, an increase might be expected in migration from Mexico to the United States. This is taken into account in scenario G. below, in which the reductions in trade barriers due to a NAFTA are accompanied by movements of labor from Mexico to the United States. Since there is no basis for determining the amount of migration that would take place in this case, it is arbitrarily assumed

that there is a movement of 5 percent of the Mexican labor force into the United States. Both scenarios F. and G. combine these migration flows with a NAFTA excluding FDI, identical to scenario A. above but with migration added.

Finally, there are two additional scenarios H. and I., which include FDI into Mexico along with a NAFTA and migration flows. Since the inclusion of FDI in scenario D. above resulted in a substantial rise in the Mexican wage, scenario H. assumes migration into Mexico to the extent of 5 percent of the Mexican labor force. Scenario I., like scenario G., assumes migration of this same amount into the United States, together with a NAFTA that includes FDI.

Cross-Border Migration Employment Results

The aggregate results for scenarios F.-I. are reported in Table 14. It is noteworthy in scenarios F. and H. that U.S. welfare declines and Mexican welfare rises when there is a remigration of workers from the United States to Mexico. Correspondingly, U.S. welfare increases in scenarios G. and I. when there is out migration of workers from Mexico to the United States. The reason for these results is that migration is assumed to reduce/add to the respective countries' labor forces. In scenario I., the increase in FDI in Mexico is apparently sufficient to offset the negative welfare effects of the assumed out migration of Mexican workers to the United States. The effects on real wages and the return to capital are shown in the last two columns of Table 14. It is interesting that U.S. real wages rise by 0.2 percent in all four scenarios, whereas the return to capital falls somewhat in scenarios F. and H. with the assumed remigration of Mexican workers from the United States to Mexico.

TABLE 14

SUMMARY RESULTS OF A NORTH AMERICA FREE TRADE AGREEMENT AND LABOR MIGRATION:
 CHANGES IN COUNTRY IMPORTS, EXPORTS, TERMS OF TRADE, WELFARE, AND RETURN TO LABOR AND CAPITAL
 (Trade in Millions of U.S. Dollars)

COUNTRY	IMPORTS* (2)	EXPORTS* (3)	TERMS OF TRADE PERCENT CHANGE (4)	EQUIVALENT VARIATION		WAGE RATE PERCENT CHANGE (7)	RETURN TO CAPITAL PERCENT CHANGE (8)
				PERCENT (5)	MILLIONS (6)		
F. NAFTA: Tariff Elimination and Remigration of 1% of Mexican Labor Force							
United States	8575.0	7346.3	0.3	-0.1	-7218.8	0.2	-0.0
Other	-696.0	-447.0	-0.0	-0.0	-1511.3	-0.1	-0.1
Canada	4923.0	5724.1	-0.7	0.7	3804.7	0.6	0.6
Mexico	2594.5	2825.9	-0.9	1.9	2376.8	0.0	0.9
G. NAFTA: Tariff Elimination and Out Migration of 5% of Mexican Labor Force							
United States	10422.8	9311.6	0.2	1.1	56052.2	0.2	1.1
Other	-893.8	-306.2	-0.1	-0.0	-3560.0	-0.0	-0.1
Canada	5127.1	5999.3	-0.7	0.7	3917.4	0.2	0.3
Mexico	2808.5	3104.8	-1.1	-1.0	-1226.4	1.8	-1.0
H. NAFTA: Tariffs, FDI and Remigration of 5% of Mexican Labor Force							
United States	8174.4	7424.0	0.1	-0.9	-45495.7	0.2	-0.7
Other	6921.8	-4565.4	0.3	0.0	1976.7	-0.1	0.1
Canada	4828.2	5621.9	-0.7	0.7	3768.2	0.9	0.9
Mexico	624.7	11282.6	-4.4	7.2	9134.9	5.5	4.2
I. NAFTA: Tariffs, FDI and Out Migration of 5% of Mexican Labor Force							
United States	11258.1	10704.0	0.1	1.2	58438.8	0.2	1.1
Other	6591.8	-4325.6	0.2	-0.0	-1618.2	0.1	0.3
Canada	5169.7	6081.3	-0.8	0.7	3906.9	0.3	0.4
Mexico	980.6	11747.1	-4.8	2.1	2653.0	8.7	1.1

*Exports and imports valued in U.S. dollar base period prices.

F. Trilateral tariff removal and labor migration into Mexico from the United States equal to one percent of the Mexican labor force.

G. Trilateral tariff removal and labor migration into the United States from Mexico equal to 5 percent of Mexico's labor force.

H. Trilateral tariff removal with foreign direct investment into Mexico equal to 10 percent of Mexico's capital stock and labor migration from the United States into Mexico equal to 5 percent of Mexico's labor force.

I. Trilateral tariff removal with foreign direct investment into Mexico equal to 10 percent of Mexico's capital stock and labor migration from Mexico into the United States equal to 5 percent of Mexico's labor force.

Table 15 reports sectoral employment changes in percentages and in thousands of workers for these migration scenarios, F.-I. In addition, these employment changes are allocated across occupations and regions in Tables 16 and 17 for scenarios F. and G. only. Not surprisingly, when labor is assumed to migrate from the United States to Mexico, as in scenarios F. and H., employment in most if not all U.S. sectors declines, while an inflow of migration leads to the opposite effect. What is surprising perhaps is that there are a few exceptions to this pattern. Even when five percent of the Mexican labor force migrates into the United States along with the formation of a NAFTA with FDI in scenario I., there are still three sectors in which employment declines: glass and glass products (-922 workers), nonferrous metals (-8,150 workers), and electrical machinery (2,205 workers). This is in part a reflection of the small size of the Mexican labor force compared to the United States, and also of the importance of the investment flow into Mexico.

U.S. Labor Market Dislocation Due to Cross-Border Migration

In the earlier NAFTA and FTA trade liberalization scenarios, labor market dislocation was inferred whenever the level of employment in a cell of the economy - an industry, region, state, or occupation - was calculated to fall. This simple approach is no longer appropriate when there is migration, since the aggregate levels of employment are also changing. What is appropriate, however, is not altogether clear.

Consider for example a situation in which there is an outflow of migration, as in the United States in scenario F. Overall employment, falls, and therefore the sum of the negative employment changes is naturally much larger than it was in the earlier scenarios where

Table 15
Sectoral Employment Effects on the United States of North American Free Trade
With Migration, Scenarios (F) - (I)
Percentage Change; Number of Workers

ISIC Sector	Percentage Change in Employment				Change in Number of Workers			
	NAFTA Tariffs only 1% into Mex.	NAFTA Tariffs only 5% into U.S.	NAFTA Tariffs and FDI 5% into Mex.	NAFTA Tariffs and FDI 5% into U.S.	NAFTA Tariffs only 1% into Mex.	NAFTA Tariffs only 5% into U.S.	NAFTA Tariffs and FDI 5% into Mex.	NAFTA Tariffs and FDI 5% into U.S.
	(F)	(G)	(H)	(I)	(F)	(G)	(H)	(I)
1 Agr., For., & Fish.	-0.19	0.67	-0.38	1.04	-7,717	27,573	-15,891	42,937
2 Min. & Quarry	-0.67	1.18	-2.04	1.05	-7,690	13,567	-23,350	12,079
310 Food, Bev., and Tob	-0.29	1.38	-1.31	1.47	-6,169	29,413	-27,927	31,376
321 Textiles	0.43	1.94	-0.36	2.16	5,629	25,556	-4,755	28,456
322 Wearing Apparel	-0.06	2.01	-1.26	2.18	-910	30,886	-19,416	33,573
323 Leather Prod	-0.65	2.03	-2.05	2.42	-702	2,186	-2,209	2,604
324 Footwear	-0.33	1.62	-1.44	1.82	-650	3,151	-2,793	3,541
331 wood Prod.	-0.13	0.84	-0.65	0.96	-897	5,747	-4,474	6,600
332 Furn. & Fixt.	-0.13	1.46	-1.17	1.48	-770	8,483	-6,793	8,628
341 Paper & Paper Prod.	-0.04	1.23	-0.84	1.28	-315	10,648	-7,230	11,043
342 Print & Publ.	-0.14	0.94	-0.85	0.96	-2,407	15,860	-14,320	16,124
35A Chemicals	0.28	1.16	-0.23	1.24	3,474	14,562	-2,831	15,651
35B Petrol. & Rel Prod.	-0.22	0.87	-0.96	0.85	-428	1,708	-1,889	1,670
355 Rubber Prod.	0.03	1.61	-0.74	1.91	81	5,021	-2,290	5,943
36A Nonmetal Min. Prod.	-0.14	1.13	-0.97	1.15	-832	6,673	-5,720	6,788
362 Glass & Glass Prod.	-1.37	-0.84	-1.29	-0.41	-3,117	-1,917	-2,925	-922
371 Iron & Steel	-0.21	0.92	-0.99	0.89	-2,119	9,193	-9,938	8,916
372 Nonferrous Metals	-1.92	-0.38	-4.64	-2.07	-7,552	-1,485	-18,259	-8,150
381 Metal Prod.	-0.13	1.12	-0.95	1.13	-2,643	22,609	-19,227	22,861
382 Nonelec. Mach.	0.25	1.53	-0.58	1.56	8,437	51,584	-19,529	52,389
383 Elec. Mach.	-0.78	0.61	-2.41	-0.08	-20,721	16,268	-63,856	-2,205
384 Transp. Equip.	-1.10	0.75	-2.07	1.01	-28,206	19,046	-52,967	25,791
38A Misc. Manuf.	0.32	2.23	-1.16	2.03	6,383	44,608	-23,171	40,538
4 Elec., Gas & Water	-0.42	2.10	-2.13	2.07	-6,962	34,524	-35,087	34,056
5 Construction	-0.20	1.16	-1.11	1.15	-14,404	84,030	-80,651	83,403
6 Whole. & Ret. Trade	-0.31	1.53	-1.54	1.52	-72,632	362,090	-364,570	359,958
7 Transp., Stor., & Comm.	-0.25	1.30	-1.29	1.29	-14,775	77,992	-77,357	77,252
8 Fin., Ins., & Real Est.	-0.38	1.82	-1.86	1.81	-37,449	177,689	-182,002	176,560
9 Comm., Soc., & Pers. Serv.	-0.24	1.14	-1.16	1.14	-87,560	420,841	-426,675	420,647

Table 16

Change in U.S. Employment by Region and Occupation
 due to NAFTA, Tariff Elimination and Remigration
 of 1% of Mexican Labor Force, Scenario F
 (Number of Workers)

Occupation	Region									
	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	Total
Executive	-1723	-4987	-5575	-2348	-5113	-1593	-3474	-1842	-5379	-32034
Professional	-2404	-6328	-6654	-2687	-5795	-1928	-3687	-2059	-5915	-37458
Technical	-516	-1316	-1617	-603	-1387	-485	-1033	-537	-1504	-8997
Mktg./Sales	-1719	-4745	-5610	-2484	-5122	-1795	-3537	-1690	-5164	-31867
Admin./Clerical	-3123	-9459	-10062	-3926	-8102	-2783	-5794	-2669	-8386	-54305
Service	-2214	-6342	-7576	-3258	-6196	-2206	-4003	-2263	-5846	-39902
Agriculture	-254	-593	-1278	-1685	-1281	-568	-968	-551	-1387	-8563
Skilled	-2004	-5338	-7779	-2825	-5624	-2533	-5144	-2377	-5672	-39296
Semi-/Unskilled	-2463	-7640	-13667	-3894	-5534	-3643	-5611	-2274	-6473	-51200
Total	-16420	-46749	-59817	-23709	-44153	-17533	-33251	-16262	-45727	-303620

Table 17
 Change in U.S. Employment by Region and Occupation
 due to NAFTA, Tariff Elimination and Out Migration
 of 5% of Mexican Labor Force, Scenario G
 (Number of Workers)

Occupation	Region									Total
	New England	Middle Atlantic	East North Central	West North Central	South Atlantic	East South Central	West South Central	Mountain	Pacific	
Executive	9589	26751	26842	12297	27571	8067	16817	9204	26810	163949
Professional	12138	32139	30784	13266	28830	9426	17043	9828	28118	181569
Technical	2959	7343	7560	3347	7666	2540	4867	2729	7449	46459
Mktg./Sales	9273	25890	30083	13533	27419	9574	19114	9008	27399	171292
Admin./Clerical	16525	49475	48098	20054	43496	14217	27987	13294	41297	274443
Service	10887	31098	36091	15937	31133	10742	19346	11016	28505	194754
Agriculture	1070	2534	5189	6721	5274	2272	3912	2294	5743	35008
Skilled	10504	26920	32324	14183	32082	12252	23717	11033	25926	188940
Semi-/Unskilled	14703	40333	49461	19096	48523	21316	26994	10923	30347	261695
Total	87647	242484	266430	118433	251993	90406	159798	79327	221593	1518098

aggregate employment was constant. Not all of this reduction in employment is likely to represent dislocation in the United States, however, since by assumption a number of workers are leaving their jobs voluntarily and crossing national borders. Only in the unlikely event that all of the migrating workers were to leave the expanding sectors would all of the declines in employment in other sectors represent dislocations. At the opposite extreme, if all of the migrating workers happened to leave from cells where employment was contracting, then the appropriate measure of dislocation would be the sum of the employment decreases minus the amount of migration.

There is no way of knowing from which industries migrating workers will leave (and enter, in the other country), and therefore no way of choosing between these two extremes. The approach chosen is therefore a more neutral course, as follows. It is assumed that workers who migrate out of a country leave the various employment cells in proportion to initial employment there. Thus the direct effect of emigration of some percentage of the aggregate labor force is assumed to be a voluntary decline in employment by that same percentage in every part of the economy, and these direct employment reductions are not regarded as dislocations in that country. Only employment decreases in excess of this percentage are taken as dislocations, and it is these that are aggregated to obtain the measures of total dislocation reported below.

A similar assumption is made for aggregate employment increases due to immigration. These workers are assumed also to attempt to distribute themselves across the economy in proportion to initial employment levels. Then if demand for labor in a cell fails to expand by enough to absorb these immigrants, they are regarded as dislocated. Thus, in a cell where demand for labor contracts, that contraction plus

the percentage of immigration are both dislocated. And in a sector where labor demand expands, dislocations are zero only if the expansion is greater than the percentage of immigration. Note that even if the migrating workers themselves are lucky enough to find jobs, this calculation takes into account the dislocations of any workers they may displace.

Computational Results of Dislocation

Tables 18 and 19 report the various measures of labor-market dislocation for the four scenarios involving migration. Comparing to Tables 12 and 13, it is not surprising that the additional disturbance of migration generally leads to greater amounts of labor-market dislocation and wage losses. For example, when a small amount of emigration is added to the basic NAFTA run, comparing scenario A. (tariffs only) to scenario F. (tariffs only and emigration from the United States to Mexico), dislocation across sectors rises from 55,760 workers to 75,700 workers over ten years and the associated wage losses rise from \$285.4 million to \$366.2 million. The comparable results for scenario D (tariffs and FDI in Mexico) and scenario H (tariffs, FDI in Mexico, and emigration from the United States to Mexico) are 76,623 and 195,210 workers and \$392.8 million and \$845.8 million in lost wages over ten years.³⁸⁾ On this basis, a plausible upper bound on the wage loss due to a NAFTA, taking cross-border migration into account, can

38) Interestingly, the amount of dislocation does not seem to differ appreciably between scenario H. in which 5% of the Mexican labor force moves from the United States into Mexico and scenario I in which the same amount of labor moves in the other direction. However, examination of the sectoral, occupational, and location details indicates that the cells in which these dislocations occur do depend importantly on the direction of the migration flow.

be taken to be \$80 million annually spread over ten years. As was the case for scenarios A.-E., it is evident that the dislocations and wage losses across occupations/regions/states are all considerably smaller than across sectors when allowance is made for cross-border migration.

Thus, it is clear that the assumptions about cross-border migration are important to the detailed results. It is unfortunate that there is so little understanding concerning what these flows will be. Nevertheless, even though these results indicate a substantial increase in dislocations when migration is included, the total dislocations still remain very small in comparison to the U.S. labor force and, as will be noted below, the costs of these dislocations remain manageable in comparison to the total expenditures of various existing U.S. adjustment assistance programs.

XII. Adjustment Assistance for Workers Displaced by a NAFTA

Providing adjustment assistance to workers displaced by imports has long been acknowledged as a desirable goal of government policy in the United States. Arrangements for such assistance were first introduced in the Trade Expansion Act of 1962 and have been continued in subsequent years. The current authorization for trade adjustment assistance (TAA), which is provided in the Omnibus Trade and Competitiveness Act of 1988, runs through 1993.

In order to put TAA in perspective, it should be noted that the United States has several other programs that are intended to provide help to unemployed and disadvantaged workers. The amounts authorized for the various programs currently administered by the

Table 18
U.S. Labor Market Dislocation Measures
Scenarios F. - I., with Migration
(Number of Workers)

Labor Dislocation	NAFTA Tariffs only 1% into Mex. (F)	NAFTA Tariffs only 5% into U.S. (G)	NAFTA Tariffs and FDI 5% into Mex. (H)	NAFTA Tariffs and FDI 5% into U.S. (I)
Across Sectors	75,700	166,500	195,210	168,930
Across Occupations	7,050	48,340	47,670	43,980
Across Regions	8,200	10,100	13,270	9,980
Across States	10,630	13,820	18,640	14,460
Across Occupation and Region	11,610	51,770	52,440	48,160
Across Occupation and State	14,350	53,590	55,090	50,130

Table 19
 U.S. Labor Market Dislocation Measures
 Scenarios F. - I., with Migration: Millions of Dollars of Lost Wages

Labor Dislocation	NAFTA Tariffs only 1% into Mex. (F)	NAFTA Tariffs only 5% into U.S. (G)	NAFTA Tariffs and FDI 5% into Mex. (H)	NAFTA Tariffs and FDI 5% into U.S. (I)
Across Sectors	366.22	617.22	845.85	685.05
Across Occupations	24.93	162.39	178.09	171.09
Across Regions	34.51	39.21	55.03	40.70
Across States	42.91	51.69	73.20	53.73
Across Occupation and Region	44.56	187.38	199.73	187.56
Across Occupation and State	54.61	190.98	206.76	191.24

Employment and Training Administration (ETA) of the U.S. Department of Labor for the 1991 and 1992 fiscal years and the President's budget authorization for fiscal year 1993 are listed in Table 20. It is evident that the main authorizations are for the Job Training Partnership Act (JTPA) and the state unemployment insurance (UI) and employment service (ES) activities. TAA benefits and training account for less than 3 percent of the total ETA budget authority. To put the U.S. labor market policies and programs in perspective, some comparisons with other major industrialized countries may be useful.

International Comparisons of Labor Market Policies

The main features of the unemployment insurance programs in the United States, Canada, France, Germany, Japan, and the United Kingdom are summarized in Table 21. It is evident, as Rosen (1991, p. 16) notes, that the United States has the lowest benefits package and the shortest time periods as compared to the other major industrialized countries listed. Further, it can be seen in Table 22 that total U.S. expenditures on all labor market programs and, in Table 23, U.S. expenditures on training are significantly below expenditures in the other major industrialized countries.

While the United States is evidently on the low end of the spectrum in its expenditures on labor market programs, it should be pointed out that the United States may rely more on private sector programs as compared to other major countries. For this and other reasons, the data in Tables 21-23 need to be treated cautiously. As noted in OECD (1990, p. 51):

Table 20

Employment and Training Administration, U.S. Department of Labor
 Summary of Budget Authority, Fiscal Years 1991-1993
 (Millions of Dollars)

	Fiscal Year 1991	Fiscal Year 1992	Fiscal Year 1993 President's Budget
Training and Employment Services	<u>4,079.3</u>	<u>4,029.2</u>	<u>4,136.4</u>
Job Training Partnership Act (JTPA)	<u>4,066.6</u>	<u>4,019.9</u>	<u>4,119.4</u>
Grants to States	<u>2,988.3</u>	<u>2,845.7</u>	<u>3,031.4</u>
Block Grant	1,778.5	1,773.5	1,771.5
Summer	682.9	495.2	682.9
EDWAA	527.0	577.0 ^a	577.0 ^a
Federally Administered Programs	<u>1,078.3</u>	<u>1,174.2</u>	<u>1,088.0</u>
Homeless Job Training	<u>12.7</u>	<u>9.3</u>	<u>17.0</u>
Community Service Employment for Older Americans	<u>390.4</u>	<u>395.2</u>	<u>342.8</u>
Federal Unemployment Benefits and Allowances	<u>269.5</u>	<u>226.2</u>	<u>211.2</u>
TAA Benefits	198.0	154.0	136.0
TAA Training	71.0	72.0	75.0
Other	0.5	226.2	0.2
State Unemployment Insurance (UI) and Employment Service (ES) Operations	<u>3,019.0</u>	<u>3,400.1</u>	<u>3,207.5</u>
Unemployment Compensation	<u>2,134.4</u>	<u>2,476.3</u>	<u>2,315.9</u>
Employment Service	<u>884.5</u>	<u>923.8</u>	<u>891.6</u>
Program Administration	<u>122.1</u>	<u>128.3</u>	<u>136.3</u>
Advances	<u>328.0</u>	<u>237.0</u>	<u>665.0</u>
Grand Total, ETA	<u>8,208.3</u>	<u>8,416.0</u>	<u>8,699.2</u>

^aIncludes \$50.0 appropriation for dislocated workers in connection with the Clean Air Act.

Source: U.S. Department of Labor, Employment and Training Administration (ETA).

Table 21

International Comparison of Unemployment Insurance Programs

06

	Eligibility	Benefits	Financing
United States	Varies by state.	Income maintenance payments average 35 to 40 percent of previous year's wages for 26 weeks. Benefits can be extended for 13 weeks in cases of severe economic downturn. Some job search assistance is available. Training provided under JTPA (EDWAA).	Employer contributions vary by state
Canada	Minimum of 10 weeks of work with contributions.	Sixty percent of previous earnings up to \$680/week. Term of coverage depends on employment history and regional unemployment level. No possibility of extension. Some training available.	Employer and employee contributions. Employer contribution is 140 percent of employee contribution
France	Minimum employment of 3 months, with contributions.	Benefits based on length of previous employment, ranging from 30 to 75 percent of previous wages. Training and job counseling also available.	Employer and employee contributions. Employer contributions are between 150 and 180 percent of employee contributions.
Germany	Must be employed for at least one year over a 3 year period	Benefits range from 63 to 68 percent of previous earnings, depending on family status. Benefit term depends on days worked and age, with a minimum of 22 weeks.	Equal employer and employee contributions
Japan	Must be employed for 6 months prior to layoff.	Benefits range from 60 to 80 percent of previous wages, for 90 to 300 days, depending on worker's age and length of contribution to insurance fund.	Employer and employee contributions
United Kingdom	Must be employed for at least one full year, making contributions.	Benefits based on marital and family status, and not linked to previous earnings. Can receive benefits for up to one year. No extensions are available. Job counseling and training are available	Employers contribute between 5 and 10 percent of wages and employees contribute between 7 and 9 percent of their wages

Source: Adapted from Rosen (1991, Table 2).

Table 22

Public Sector Expenditure on Labor Market Programs as a Percentage of Gross Domestic Product (GDP) in the Major Industrialized Countries, 1988

Country	Labor Market Training	Unemployment Compensation	All Other	Total Labor Market Programs
Australia	0.06%	0.99%	0.24%	1.29%
Austria	0.09	0.83	0.32	1.24
Belgium	0.14	2.25	1.84	4.23
Canada	0.27	1.58	0.24	2.09
Denmark	0.53	3.24	1.94	5.71
Finland	0.26	0.66	1.34	2.26
France	0.32	1.34	1.21	2.87
Germany	0.30	1.30	0.72	2.32
Italy	0.03	0.40	1.09	1.52
Japan	0.03	0.36	0.13	0.52
Netherlands	0.21	2.64	0.92	3.77
New Zealand	0.45	1.06	0.20	1.71
Norway	0.29	1.05	0.62	1.96
Sweden	0.52	0.60	1.26	2.38
Switzerland	0.01	0.19	0.16	0.36
United Kingdom	0.25	0.94	0.43	1.62
United States	0.10	0.38	0.14	0.62

Source: Adapted from OECD (1990, pp. 52-53).

"As with all attempts to arrive at internationally comparable micro data the principal difficulty stems from differences in the institutional arrangements in individual countries. These institutional differences, in turn, reflect national traditions, priorities and customs. The present data system emphasizes the quantitative aspects and neglects the qualitative aspects of a country's labour market policy. It was already stressed ... that countries which rely more heavily on non-financial means of public action and those in which the private sector plays an important role in improving labour market outcomes will appear in a less favourable light in the present data set than is actually the case. This, for instance, may well hold for countries like Japan and the United States.

Another important general consideration is that budget figures reported here measure only the ex-post amount of public resources spent on the various programmes. Thus, they do not permit a judgement as to whether the programmes themselves are effective, nor whether they are sufficient

Table 23

Government Sponsored Training Programs for Unemployed
Adults and Those at Risk in the
Major Industrialized Countries, 1988

Country	Participation as Percent of Labor Force	Average Duration (months)	Expenditures	
			Per Starting Participant (U.S. \$)	As Percent of Average Income
Australia	0.4%	3	\$1,500	10%
Austria	0.9	3	2,700	16
Belgium	1.6	na	3,000	19
Canada	1.1	6	7,000	37
Denmark	1.4	7	6,500	31
Finland	1.2	6	8,800	42
France	2.3	2.5	4,600	27
Germany	1.5	8	7,200	37
Netherlands	2.3	4	3,500	22
New Zealand	4.4	4	3,000	24
Norway	2.7	2.5	4,500	20
Sweden	1.7	5	12,000	60
Switzerland	0.3	na	2,800	10
United Kingdom	1.4	na	5,000	31
United States	1.0	3.5	1,800	9

Source: Adapted from OECD (1990, p 35).

in relation to needs. If a country spends little on such programmes, this could mean either that the country has no major labour market problems to worry about; or that it gives low priority to solving these problems, or that it does not consider the available policy instruments as appropriate and effective. Conversely, high spending may reflect simply a sizeable and protracted unemployment problem - the effort could still be insufficient, ineffective or both.

In spite of these methodological difficulties, comprehensive budget data can be a useful, even if limited, guide for understanding a government's approach to labour market policy. If outlays on all the major types of labour market programmes are included, it is possible to obtain a broad picture of the priorities given by a country within the menu of available policy options. The most straightforward interpretation of the data may be to consider the relative weight countries place, or have placed, on "passive" income maintenance (unemployment compensation and early retirement) as distinct

from "active" measures to help the jobless find work. Among the active measures may be distinguished, as a sub-set, those which improve labour market efficiency. Employment services, labour market training, youth measures and recruitment subsidies are examples of programmes aiming to improve the efficiency of the labour market, and hence of the economy. For other types of measures commonly referred to as "active" - such as direct job creation outside the regular labour market and certain measures for the disabled - social objectives are generally the more important consideration."

Description of Major U.S. Programs Dealing with Worker Displacement

With the preceding discussion of overall labor-market policies in the United States and other major countries as background, it is appropriate now to review briefly the salient characteristics of the major U.S. programs that deal with worker displacement. These programs include:

1. Unemployment Insurance (UI)
2. Employment Service (ES)
3. Trade Adjustment Assistance (TAA)
4. Economic Dislocation and Worker Adjustment Assistance (EDWAA)

Unemployment Insurance (UI)

As noted by Rosen (1991, pp. 4-6), UI is the largest and most comprehensive of the existing programs. UI provides up to 26 weeks of benefits, equal to 35-40 percent of the previous wage, for unemployed workers covered by contributions to the UI trust fund. An

additional 13 weeks of benefits may be authorized if warranted by economic conditions. It is expected that workers receiving benefits should actively be seeking employment.

UI is intended mainly to deal with income losses during unemployment. It provides only a limited amount of job search assistance. No provision is made for training. Since UI is designed for short-term income maintenance in relation to previous wages, it does not take into account the characteristics and situations of individual workers who are seeking new employment.

Employment Service (ES)

According to Jones (1991, p. 4), the Employment Service (ES) provides information, counseling, job development, and job placement services for individuals seeking employment. It is especially useful for workers who can be readily employed.³⁹⁾

Trade Adjustment Assistance (TAA)

Golding (1991, pp. 1-3), notes that TAA is intended to assist workers who are adversely impacted by imports. There is a two-step process for establishing eligibility: (1) Department of Labor certification that involves submission of a petition, an investigation into the role that increased imports have played in reducing a firm's sales and production and thus worker layoffs, and determining whether the group of workers involved is deemed eligible to apply for TAA; and (2) following

39) See National Commission for Employment Policy (1991a,b,c) for an analysis of the issues involved in assessing and improving the effectiveness of the Employment Service.

certification, individual workers are required to apply for and be found eligible under specified criteria for the monetary benefits involved in the TAA program.

The TAA program is distinctive in being an entitlement program. The eligibility requirements for trade readjustment allowances (TRA) include total separation from employment and participation in an approved training program. An eligible worker can receive basic TRA for up to 26 weeks after exhaustion of available UI benefits. Further, an additional 26 weeks of TRA may be available to workers in approved training programs. The combined UI and TRA benefits may thus add up to a maximum of 78 weeks of benefits. The TAA program also covers allowances for job search, relocation, training-related travel, and subsistence.

The *Employment and Training Administration (ETA)* of the U.S. Department of Labor administers the TAA program by means of cooperative agreements with individual States. These cooperative agreements with the States require the coordination of the training and other services provided under TAA and the Economic Dislocation and Worker Adjustment Assistance (EDWAA) program.

Economic Dislocation and Worker Adjustment Assistance (EDWAA)

As Golding (1991, pp. 3-6) states, EDWAA was introduced in 1988 in an effort to serve the needs of dislocated workers more effectively than previous programs had done. EDWAA has been operating since July 1989. It is designed as a State grant program with local service delivery. It is not an entitlement program. Eighty percent of EDWAA funds are distributed to the States according to formula. A minimum

of 60 percent of the funds is to be distributed locally and up to 40 percent can be retained for State activities. All administrative and funding decisions are decentralized to the States as a means of tailoring the assistance most effectively to the needs of local areas. The ETA reserves the remaining 20 percent of EDWAA funds for special grants to States in which major job displacements have occurred. The criteria for EDWAA eligibility are very, broad and thus cover workers who are displaced in a variety of circumstances. It is not necessary for eligibility to determine the cause of the dislocation.

The major services and activities of EDWAA include:

- (1) on-site rapid response in cases of plant closings and mass layoffs, with specially trained teams that can provide early intervention;
- (2) provision of basic readjustment services, including job counseling and development, job search and placement assistance, and a variety of other support and information services;
- (3) establishment of labor-management committees to plan and administer adjustment assistance on a community-wide basis;
- (4) provision of a variety of retraining services; and
- (5) authorization of needs-related payments for workers who are participating in an approved retraining or education program and have exhausted their UI eligibility.

Current Status and Effectiveness of TAA and EDWAA⁴⁰⁾

Golding (1991, p. 3) notes that the TAA program served 42,000 workers in Fiscal Year (FY) 1989 and 38,500 in FY 1990. In FY 1990, nearly 25 percent of workers eligible for and requesting TAA services

40) The role of the Employment Service in serving dislocated workers under EDWAA is investigated in National Commission for Employment Policy (1991a,b,c).

were also participating in a JTPA Title III program. In the two years following its inception in July 1989, the EDWAA program served about 500,000 workers, and Golding (p. 6,) states that the three-year total is expected to reach between 760,000 and 800,000 workers. Further, there are significant differences in the job placement rates of the two programs, with EDWAA job placement rates being 69 percent in Program Year (PY) 1988 and 66 percent in PY 1989. This compares to a TAA job placement rate of 30 percent in FY 1989 and 32 percent in FY 1990.

In her capacity as Deputy Assistant Secretary of ETA, Golding concludes (pp. 6-7) that:

"...the EDWAA program combined with the unemployment system, is the best means for responding to the retraining and related needs of dislocated workers, regardless of the cause of their dislocation. EDWAA is based on experience with earlier dislocated worker programs and studies (including a major study by the Office of Technology Assessment) that indicate that to be successful, worker adjustment programs should emphasize early intervention, build on labor- management cooperation, and provide a full range of services.

EDWAA seeks to provide services to dislocated workers before or soon after they lose their jobs so they can return to productive employment. Those dislocated workers who do not qualify for or have ceased to qualify for unemployment compensation are eligible to receive needs-related payments if they are enrolled in training by the end of the 13th week of the worker's initial unemployment compensation benefit period. More than 60 percent of EDWAA participants receive training ranging in length from a few weeks to several months; others receive basic readjustment services and job referral. The average length of participation in EDWAA is 19 weeks, but 10 percent of all EDWAA participants receive training lasting 26 weeks or more. In contrast, the TAA certification requirement may delay services for

60 days and often much longer after layoffs begin.

The early intervention and broad range of basic adjustment services EDWAA can quickly deliver are essential to effective adjustment. In addition, EDWAA provides an incentive for workers to begin retraining early in their spell of unemployment by requiring that a participant be enrolled in training by the 13th week of their VI benefit period (or eight weeks after being informed that the layoff will extend beyond six months) to qualify for the needs-related payments. It is well documented that the earlier the readjustment process begins, the more effective the adjustment will be. If a worker waits too long to begin retraining, job search, or relocation to a new job market, he or she may become discouraged, or even drop out of the labor market, and the adjustment process thus becomes more difficult. EDWAA's emphasis is on positive and early adjustment rather than prolonged income support followed by training."

It is evident from the foregoing statement that official policy favors EDWAA over TAA as the approach to be followed in dealing with unemployment. Indeed, as Golding (1991, p. 3) notes, the Bush Administration recommended that TAA be terminated effective October 1, 1991, with a phaseout period for workers receiving TAA benefits. Thereafter, trade-impacted unemployed workers would be eligible for services provided in the EDWAA program.

Needless to say, the official view of the Bush Administration favoring EDWAA is not shared by all. In particular, state administrators of labor adjustment programs and labor union representatives especially have argued that EDWAA is seriously underfunded and has been made available to only a comparatively small fraction of the total number of workers who are displaced each year. Further, a series of case studies in 15 states and 30 substate areas during the 1989 program year by SRI International (1992) called attention to a number of problems encountered in EDWAA's first year of operation. These

problems included weak links between rapid response and implementation of early intervention services and lack of clarity in state policies in establishing priorities among eligible populations.⁴¹⁾

XIII. Policy Options for Adjustment Assistance Programs

In light of the experience with various labor market adjustment programs just described, it has been urged that TAA be continued and strengthened as a separate program in its own right and/or in conjunction with EDWAA. However, there are a number of problems with the current TAA program, relating to the time involved in the certification process, the rather strict criteria for determining TAA eligibility for trade impacted workers, inadequate financing, too short benefit period, the lack of appropriate benefits to cover medical insurance and meeting the financial needs especially of workers approaching retirement, and the difficulties of targeting job creation. By the same token, the proponents of TAA emphasize the importance of the entitlements for income support and retraining.⁴²⁾

The question thus arises as to whether EDWAA and TAA should be merged into a single program or kept separate. The choice involves issues of cost effectiveness in the administration of unemployment

41) There is reason to believe, however, that many of these start-up problems have since been overcome. See National Commission for Employment Policy (1991a,c).

42) See the statements of the various panelists in the U.S. House of Representatives, Committee on Ways and Means (1991) and the U.S. Senate, Committee on Finance (1991). See also Bednarzik (1991, pp. 6-8) for a succinct summary of the issues raised in hearings. There are several earlier studies dealing with TAA, including Aho and Bayard (1984), Bednarzik and Orr (1984), Corson et al. (1979), Office of Technology Assessment (1987), and Richardson (1982).

policies and programs at the federal, state, and local levels as well as political perceptions and priorities in how best to address unemployment.

On economic grounds, it can be argued that the funding and administration of programs to assist displaced workers should be concentrated in a single program. As discussed above, EDWAA has been designed to offer a flexible array of financial support and adjustment services that may be tailored by individual States and localities to address all varieties of dislocations and the special needs of individual workers. EDWAA is available to all workers, regardless of the factors responsible for their dislocation. In contrast, TAA is predicated on the need to distinguish the trade impacts on workers from the many other possible sources of dislocation that occur in a large and complex economy like the United States. The experience with TAA suggests that the filing, investigation, and certification of claims of worker displacement due ostensibly to trade can be time consuming and costly. It is difficult therefore to make a compelling case for TAA as a separate program.

However, the question of whether or not TAA can be subsumed under EDWAA raises some important political considerations that must also be addressed. As noted above, EDWAA has been criticized by representatives of organized labor especially for being underfunded and for covering only a limited fraction of the total number of U.S. workers who are displaced each year. In contrast, TAA is perceived by labor interests and some influential members of the U.S. Congress as having definite advantages especially because of its entitlement and related features. In the course of the Congressional hearings held in the spring of 1991 with regard to granting the President fast-track authority to enter into the negotiation of a NAFTA, it was evident

that there was a strong undercurrent of opposition to the fast track because of fears that a NAFTA would be detrimental to U.S. employment. While the results of the present study indicate that these fears may not be justified, it may nonetheless be important on political grounds to respond to them.⁴³⁾

This suggests accordingly, that it may not be judicious politically to advocate the total abandonment of TAA. In these circumstances, we recommend that the best features of EDWAA and TAA be combined. In this connection, as Bednarzik (1991, p. 3) notes, from EDWAA this would include: availability of assistance to displaced workers regardless of the factors resulting in their displacement; rapid response teams; ability to start assistance before displacement occurs; joint labor-management committees and local community involvement in helping to reemploy workers; and systematic tracking of program outcomes. From TAA, this would include: entitlement to income support; entitlement to training; and the ability to carry over funds on a three-year cycle. Job search and relocation assistance would also be provided.

There appears to be a consensus among those involved in the administration and analysis of the existing adjustment assistance programs that providing assistance for job search is the most cost-effective way of accomplishing the reemployment of displaced workers. Yet assistance for worker training has a great deal of appeal, and there may in fact be cases in which workers could benefit from special, longer term support for training in basic skills and in the acquisition of new skills. The question then would be to change the TAA program in ways that would speed up the certification procedure

43) A discussion of the political rationale for a program of TAA is to be found especially in Aho and Bayard (1984) and Richardson (1982).

and broaden the eligibility criteria, emphasize the process of job search, and provide incentives for rapid reemployment. At the same time, the longer-term training features of the TAA program could be maintained and improved for those trade-impacted workers in need of longer-term assistance.⁴⁴⁾

The results presented in the foregoing tables in the text and in the more detailed tables in the Statistical Appendix provide a useful starting point in identifying the sectors/ occupations/regions/states that may be most vulnerable to a NAFTA. Once the exact details of a NAFTA become known and the agreement becomes operative, it will then be necessary to monitor the actual adjustments that take place and to target the TAA towards those individuals in greatest need of income support and retraining.

The question then to be considered is the adequacy of the existing adjustment assistance programs and funding in coping with the worker dislocation that might be experienced as a consequence of a NAFTA.

In Section X, an upper bound for lost wages due to a NAFTA (scenario D.) was an estimated \$40 million annually, for a period of ten Years, although this estimate did not take into account the possible additional dislocations that might occur due to cross-border migration. The results in Section XI of a NAFTA accompanied by various assumptions about migration led to an approximate doubling of the upper bound estimate of lost wages (scenario H.). If adjustment assistance were to be made available for complete coverage of lost wages in connection with a NAFTA, the amount required is estimated to be between \$40 and \$80 million annually for a period of ten years.

The amounts just noted assume that displaced workers would be compensated fully for lost wages due to a NAFTA. This may not be

44) Rosen (1991) also contains some recommendations for improving the TAA program.

realistic, however, since the existing programs for income support of displaced workers set the proportion of coverage of lost wages at a much lower level, typically 40 percent or less of the pre-displacement wage. Thus, for example, Friedman (1991) notes that in 1990 the average unemployment insurance benefit was 37 percent of the average wage in covered employment. Trade readjustment allowances, which can be received when the unemployment benefits are exhausted, are set at this same level. If the 37 percent is applied to the lower and upper bounds of the wage losses associated with a NAFTA, the amount of assistance required would then be \$15 and \$30 million annually for a period of ten years.⁴⁵⁾

The question now is how the foregoing calculations relate to the current levels of worker displacement and assistance provided under TAA and EDWAA. According to Bednarzik (1991) and Jones (1991), in fiscal 1990, 38,500 workers were declared eligible for TAA and 250,000 workers qualified for assistance under EDWAA. Assuming that the fiscal 1990 displacement experiences would be characteristic of what might occur under a NAFTA, this suggests that 13.34 percent (i.e., $38,500/285,500 \times 100$) of the workers displaced would qualify for TAA and 86.66 percent ($250,000/285,500 \times 100$) would qualify for EDWAA.

While it might be thought that the percentage of workers qualifying for TAA due to a NAFTA would be higher than 13.3 percent, it should be pointed out that TAA eligibility depends on demonstration of trade-related injury while EDWAA eligibility covers all types of

45) Friedman also notes that, between 1974 and 1981, the payments made to trade-displaced workers were to be equivalent to 70 percent of prior pay. If this 70 percent level were chosen, as Friedman recommends, the amounts of assistance would then be between \$28 and \$56 million annually for a period of ten years.

displacement regardless of cause. Because our NAFTA CGE model takes into account a variety of interactions among the various sectors of the U.S. economy, including both sectors that are engaged in trade as well as the so-called nontradable (service) sectors, the calculations of worker displacement presented are capturing both the direct and indirect employment effects of a NAFTA. Workers who are displaced due to such indirect effects would be difficult to identify and therefore would be unlikely to be certified for TAA. It seems reasonable to assume therefore that the percentages of TAA and EDWAA eligible workers noted can be applied to the NAFTA-related worker displacement effects that have been calculated.

Farnsworth (1991) has reported, based on Department of Labor sources, that in fiscal 1990 the TAA payments for income support plus training averaged \$7,000 per eligible worker, and expenditures for the various services provided under EDWAA averaged \$1,200 per eligible worker. Applying the 13.34 and 86.66 percentages for the proportions of workers receiving TAA and EDWAA assistance respectively in fiscal 1990, the expected TAA payment is \$933.80 (i.e., 13.34% x \$7,000) and the expected EDWAA expenditure is \$1,039.92 (i.e., 86.66% x \$1,200) per eligible worker. The total expected TAA and EDWAA payment is then \$1,973.72 per eligible worker.

According to scenario D. in Table 12, 76,623 workers would be displaced across sectors as the result of the removal of tariffs coupled with an increase of FDI in Mexico. Multiplying the number of displaced workers by the combined TAA and EDWAA payment per eligible worker gives a total of \$151 million as the amount of assistance required over ten years, or about \$15 million per year. For scenario H. in Table 18, which takes into account cross-border migration, there would be a total of 195,210 workers displaced. The amount of assistance

needed in this case would then be \$385 million over ten years, or \$38.5 million per year. These amounts correspond reasonably closely with the calculations based on the 37 percent wage coverage noted above.

How do the foregoing amounts compare to what is actually being spent annually for the various assistance programs in effect? According to the data in Table 20, in fiscal year 1992, JTPA grants to states were \$2.8 billion, with \$577 million earmarked for EDWAA. TAA benefits and training authorizations were \$226 million. The budgeted authorization for fiscal year 1993 is \$577 million for EDWAA and \$211 million for TAA benefits and training. Assuming that an additional budget authorization of \$38.5 million annually for a period up to ten years were earmarked explicitly to help mitigate wage losses that might arise from a NAFTA, this would appear to be quite manageable in relation to the existing budget magnitudes for EDWAA and other JTPA programs, TAA benefits and training, and unemployment compensation and employment services.

The other calculations of wage losses across occupations, regions, and states in Tables 17 and 19 appear to be significantly smaller than the wage losses across sectors. Workers who might have to change occupation and/or move from one region/state to another, could potentially experience significant adjustment costs. Yet, on an annual basis, the calculations here suggest that these total wage losses could range between about \$1.5 and \$20 million annually. Again, these amounts appear to be quite small compared to the recent and prospective budget authorizations for the various federally funded labor market programs.

The question arises whether any special procedures for allocating adjustment assistance should be implemented for the special purpose of dealing with the effects of a NAFTA. It might be suggested, for example, that special provisions be made for those regions of the U.S. economy that are expected to be hardest

hit. In view of the relatively small size of the adjustments that this study has identified as resulting from a NAFTA, however, it does not appear that such special provisions would be needed or appropriate. The existing programs do have deficiencies that need to be corrected in any case, as has been discussed above. But they do not need to be reconstructed specially to deal with a NAFTA.

On the contrary, targetting extra adjustment assistance for particular regions in anticipation of the hardships that they may endure prospectively is a questionable practice in any case, even assuming that the identities of those regions could be accurately identified through studies such as the present one. Allowing such targetting opens up the incentive for regions to waste resources lobbying to get that special treatment. In addition, while the effects of a NAFTA will indeed be more severe in some regions than in others, those individuals who are affected even in regions that are otherwise not hard hit deserve the same access to adjustment assistance programs as those elsewhere.

XIV. Summary of Results and Policy Options

An effort has been made in this study to provide a quantitative assessment of the economic effects of a NAFTA. While the various scenarios analyzed are not exhaustive of all the possible changes that may be negotiated in connection with a NAFTA, they are nonetheless indicative of the orders of magnitude on trade, output, number of firms, factor returns, and employment that could result from trilateral trade liberalization, increased investment in Mexico, and cross-border migration between Mexico and the United States.

Overall, the results of the study suggest that the formation of a

NAFTA will have positive benefits for the United States, Canada, and Mexico on several counts, as follows:⁴⁶⁾

(1) The individual countries all experience an increase in aggregate welfare.

(2) The wage gap between the United States and Mexico will narrow, thereby reducing the incentive for illegal immigration. However, the real wage in the United States still rises as a result of trade liberalization.

(3) A NAFTA will have beneficial effects through the realization of economies of large scale production in all three countries.

(4) A reduction in barriers against foreign direct investment in Mexico will stimulate new capital formation, which has the beneficial effect of alleviating poverty in Mexico.

(5) The inflow of capital into Mexico may come primarily from outside the NAFTA, not from the United States, suggesting that the fear that U.S. firms will relocate production in Mexico may be largely unfounded.

(6) While there are negative effects on the rest of the world, they appear to be relatively small.

(7) There appears to be relatively little displacement of workers especially in the United States, so that the associated adjustment costs due to a NAFTA will likely be small. This is the case even when allowance is made for cross-border migration between Mexico and the United States.

All of these are effects only of a NAFTA itself, relative to what would happen otherwise and for other reasons. They do not include, in

46) These results are in broad agreement with the results found in a number of other modeling studies of a NAFTA. For detailed comparisons, see Brown (1992) and USITC (1992).

particular, any of the effects of the growth of trade between the U.S. and Mexico that is already occurring without a NAFTA and that may continue to increase independently of whether a NAFTA is enacted.

The conclusion that a NAFTA is expected to result in a relatively small amount of worker displacement in the United States overall suggests that there will be comparably small displacement effects when measured across sectors, occupations, and regions/states. The calculated wage losses due to a NAFTA also appear to be fairly small. An upper limit may be \$40-\$80 million and a lower limit may be \$2.5-20 million annually for a period up to a decade during which the full transition to a NAFTA could be expected. The amount of additional funding that might be required to help offset these wage losses would constitute a small fraction of what is currently being spent in the United States for existing federally funded labor market programs.

Currently, EDWAA is the major U.S. labor market program designed specifically to assist displaced workers. It offers a flexible array of financial support and adjustment services at the State and local levels. TAA, which is a separate but much smaller program compared to EDWAA, is based on the premise that a distinct program is needed to assist workers who are displaced by trade. TAA offers income support and retraining opportunities.

In implementing TAA, it has been necessary to develop special criteria that distinguish trade from other causes of displacement. This creates difficulties, however, because in an economy as large and complex as the United States, the effects of trade cannot be readily distinguished from other factors that lead to worker displacement. A case can be made therefore that the United States should abandon TAA and instead concentrate all forms of assistance in EDWAA. However, while such a change may be justified on economic grounds, it may

not be politically expedient. The fact is that TAA currently has considerable support in the Congress and with organized labor precisely because of the income support features that provide greater certainty of assistance to trade impacted workers. In this light therefore, it seems preferable to combine the best features of EDWAA and TAA.

In assessing the present study, it must be borne in mind that the results are based on an economic model that has been designed to reflect the economic structure and relations within and between the individual NAFTA nations. Any model like the NAFTA CGE model is of necessity, an abstraction that leaves out many important details of economic life. The modeling framework used in this study has a number of limitations, suggesting that further research would be useful. The directions for additional research include especially the need to make allowance for relative wage adjustment in labor markets and to clarify the determinants and consequences of foreign direct investment and cross-border migration.

On the basis of the foregoing conclusions, we offer the following policy options:

- (1) An appropriation of \$15-\$38.5 million annually be made by the U.S. Congress for a period of ten years for the purpose of providing income support and retraining opportunities for U.S. workers who may be displaced by a NAFTA. Based on our calculations, this amount should be sufficient to cover wages and additional training costs for dislocated workers at a level of 40 percent of the pre-displacement wage, which corresponds to the percentage wage coverage for displaced workers in 1990.

- (2) In view of the relatively small size of the adjustments that may result from a NAFTA, the existing arrangements for TAA do not need

to be reconstructed or targetted to particular sectors, occupations, or regions.

(3) Workers displaced by, a NAFTA should follow existing certification procedures in order to be eligible for TAA benefits. Because of the difficulty that may be experienced in demonstrating that displacement may be due solely to a NAFTA, the eligibility for TAA should be broadly construed. This will serve to obviate the need to identify a NAFTA as the sole or single most important cause of worker displacement.

(4) The income supports aspects of TAA should be maintained in order to assure workers of a well defined safety net in the event that they experience displacement due to a NAFTA. Efforts have been made in individual States and localities to improve the rapid response team coordination of TAA and EDWAA. This progress should be continued. In particular, it is imperative to provide displaced workers with pertinent information and effective assistance for job search and relocation and to expedite the availability of retraining in cases where it may be needed.

(5) Further economic analysis of the effects of a NAFTA is warranted. It is especially important to devise more effective analysis of the relative wage adjustments that may occur for workers in particular sectors, occupations, and geographic locations than has been feasible in the present study. Also, more attention should be given to analysis of the determinants and consequences of a NAFTA with regard to changes in foreign direct investment and cross-border migration.

XV. Implications for Further Research

The research undertaken in this study is by no means the last word on the subject of the employment and related effects of a NAFTA. In particular, there are a number of directions in which the research might be extended.

One possibility would be to incorporate a certain amount of relative wage adjustment into the analysis. As explained earlier, this would require either information so about, or assumptions regarding, a variety of substitution elasticities affecting labor supplies and demands. It may be that more information is available on these substitution elasticities than the present authors are aware of, and if so this information could be incorporated into an extension of the basic model. Alternatively various elasticities could simply be assumed in order to determine what they imply in a variety of scenarios. In either case it would be necessary to modify the current NAFTA model to allow these elasticities to play their appropriate roles. As currently constructed, the only alternative to fixed relative wages is to assume that relative wages adjust totally to accommodate fixed quantities. However, experiments that have been carried out along these lines suggest that this assumption leads to implausible results. Therefore an expansion of the model to include these effects would definitely be necessary.

Another aspect of the analysis that could be improved would be the modeling of labor migration and foreign direct investment. In the scenarios reported here, a given amount and direction of these international factor movements were assumed. While it is not at all clear what the appropriate strategy for modeling these as endogenous factor flows may be, it would nonetheless be desirable to explore the implications of several alternatives. Most extreme, of course, would

be that labor and/or capital move internationally to equalize their returns. This, of course, is likely to be excessive. Alternatively, mechanisms of partial factor mobility might be developed. One mechanism would be that a certain differential or ratio of returns needs to be exceeded before any international factor flow takes place at all. Or, as another possibility, factor flows could be modeled as an increasing function of the international differential in returns. Both of these assumptions would, again, require additions to the current model in order to implement them, but those additions should be relatively straightforward.

A final extension would be to bring in other determinants of international direct investment and/or migration than relative international factor returns. An important example of this would involve environmental considerations. It is possible that capital will flow more readily in some industries than in others in response, say, to the advantages provided by ostensibly lax enforcement of environmental regulations in Mexico. Starting with data on the vulnerability of various industries to such regulations - which would have to be collected - international direct investment could be modeled on an industry basis in the hope of capturing the movement of various environmentally sensitive industries from the United States into Mexico. This might considerably alter the sectoral patterns of worker displacements that have been calculated in the present study.

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