CAST · COUNCIL FOR AGRICULTURAL SCIENCE AND TECHNOLOGY · JULY 1993

U.S. AGRICULTURE AND THE NORTH AMERICAN · FREE TRADE AGREEMENT ·

Council for Agricultural Science and Technology

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Foreword

The CAST National Concerns Committee recommended to the board of directors that CAST prepare a report addressing issues related to the North American Free Trade Agreement with emphasis on Mexico. The topic was approved by the CAST Board of Directors at the February 1991 board meeting.

Dr. G. Edward Schuh, dean of the Hubert H. Humphrey Institute of Public Affairs, University of Minnesota, Minneapolis, was selected to serve as chair of the task force. A highly qualified group of scientists was chosen to serve as authors and reviewers and includes persons with expertise in agricultural economics, animal science, economics, food processing, food science, plant sciences, and world trade.

Dr. Schuh prepared an initial draft of the report. A task force meeting was held for the authors to discuss the issues and to modify the draft document. All authors and reviewers assisted in revising all subsequent drafts and reviewing the proofs. The CAST Executive and Editorial Review committees reviewed the final draft. The CAST staff provided editorial and structural suggestions and published the report. The chair, authors, and reviewers are responsible for all scientific content in the report.

On behalf of CAST, we thank the authors and reviewers who gave of their time and expertise to prepare this report as a contribution of the scientific community to public understanding of the implications of the agreement. Also, we thank the employers of the authors and reviewers who made the time of these individuals available at no cost to CAST. The members of CAST deserve special recognition because the unrestricted contributions they have made in support of the work of CAST have financed the preparation and publication of this report.

This report is being distributed to members of Congress, the U.S. Department of Agriculture, the Environmental Protection Agency, the Food and Drug Administration, the Agency for International Development, Office of Technology Assessment, Office of Management and Budget, media personnel, and to institutional members of CAST. Individual members of CAST may receive a copy upon request. The report may be republished or reproduced in its entirety without permission. If copied in any manner, credit to the authors and CAST would be appreciated.

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Abbreviations and Tables

Abbreviations

ad valorem	In proportion to the value of the good
BST	Bovine somatotropin
CGE	Computable general equilibrium
CONASUPO	Compañía Nacional del Subsistencia
CWB	Canadian Wheat Board
EC	European Community
EC–92	European Community–92
EEC	European Economic Community
ERS	Economic Research Service
GATT	General Agreement on Tariffs and Trade
GSP	Generalized System of Preferences
ITO	International Trade Organization
MERCOSUR	Mercado Común del Sur
MFN	Most Favored Nation
MTN	Multilateral Trade Negotiations
NAFTA	North American Free Trade Agreement
SPS	Sanitary and phytosanitary
USDA	U.S. Department of Agriculture

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Summary

Introduction

The Prime Minister of Canada and the Presidents of Mexico and the United States have initialed a North American Free Trade Agreement (NAFTA). This agreement must be ratified by the legislative bodies of the three countries before taking effect. The objective of this report is to clarify the issues involved in liberalizing trade by means of such an agreement, with special emphasis on agriculture.

The report is divided into six parts: (1) a brief description of the setting for the agreement, (2) a discussion of general issues in international trade and trade liberalization, (3) a description of agricultural trade patterns on the North American continent, (4) a discussion of agriculture in the agreement, (5) an analysis of the overall NAFTA impacts on the agricultural sector, and (6) a discussion of some special issues. Because of the subtleties of trade liberalization and the lack of "hard" analytical data that provide precise estimates of the impact of the agreement, the report attempts to provide a qualitative analysis of expected consequences, costs, and benefits.

Setting

The United States has provided global leadership during the post-World War II period to lower international barriers to trade. It also has provided much of the leadership for the current round of multilateral trade negotiations, with special emphasis on lowering barriers to trade in agricultural products.

The proposed North American Free Trade Agreement has been proceeded by a Canada–United States Free Trade Agreement, which was signed in 1988. The NAFTA offers an historic opportunity for Mexico and the United States to forge a new relationship, in a setting in which relations in the past have been strained. With formal mechanisms for dispute settlement, whatever tensions that may emerge as barriers to trade are lowered can be resolved without erupting into larger confrontations. If approved, the NAFTA will become the world's largest free trade area—360 million people annually producing $6.2 trillion of goods and services and exporting and importing more than $1 trillion worth of goods.

Mexico is well into a process of unilaterally reforming its domestic economic policies and lowering its barriers to trade. Average tariffs have been slashed from 29 to 10%, and import licenses, once required for virtually all products, now apply to fewer than 5%. Price controls and product standards favoring domestic suppliers and cartels have been relaxed or eliminated. Limits on foreign participation in petrochemicals, finance, and manufacturing have been eased, and protectionist industrial policies for automobiles, computers, and pharmaceuticals have been liberalized. An important benefit of the NAFTA to the United States is that it will lock in the reforms Mexico has undertaken to date and commit the country to timetables for dismantling most remaining interventionist policies.

The NAFTA will phase out 90% of all tariffs among the three countries over 10 years and eliminate remaining tariffs on politically sensitive products over 15 years. Virtually all import quotas and licensing requirements will be eliminated. These provisions will end most U.S. restrictions on imports of apparel and Mexican limits on imported cars and trucks. They also will create bilateral free trade in corn, beans, fruits, vegetables, and other farm products.

General Issues in International Trade

1. The president of the United States has the right to negotiate treaties with other countries, but the U.S. Congress must approve such treaties when they have an impact on the provisions of domestic legislation. Under what is referred to as "fast track" authority, Congress can only vote such treaties up or down; it can not alter them. Moreover, it has 90 calendar days followed by 90 session days from the time such an agreement is signed to vote on it.
2. The politics of trade liberalization are difficult because the benefits tend to be widely diffused and

in favor of consumers, while the costs tend to be more concentrated and experienced by private firms and labor. When benefits are small to the recipient and widely diffused, there is little incentive to organize to bring them about, even though they may be quite large in their sum total. When the costs are larger for the individual and those individuals are concentrated, there are ample incentives to organize to avoid them.

3. There has been a remarkable expansion in international trade in the period since the end of World War II. This growth in trade is rooted in significant technological breakthroughs in the transportation, communication, and computer sectors which have enormously expanded the scope for trade.
4. Increased international trade can be a powerful source of economic growth. It creates a more efficient use of resources, the realization of external economics that significantly lower costs, and promotes increased competition that also lowers costs for both producers and consumers. These dynamic effects literally swamp the static effects usually accounted for in assessing the benefits and costs of trade liberalization.
5. The increases in per capita income associated with trade-induced economic growth can be a powerful source of expanding markets. This will be especially important in the case of Mexico because its per capita income is relatively low, it has come through a decade of economic stagnation, and international trade is relatively important to it. Thus, the prognosis is that the lowering of barriers to trade between Mexico and the United States will create strong markets for U.S. agricultural producers.
6. U.S. labor groups tend to be concerned by the low wages in Mexico, which they believe will result in the loss of jobs to that country. That concern is, for the most part, misguided. The real issue is the cost of labor services, not the wage rate. High levels of productivity in the United States tend to give U.S. workers an advantage even though their wages are much higher than in Mexico. This advantage is reinforced by the efficient marketing system and physical infrastructure in the United States. The rise in the real value of the peso as capital flows into Mexico in response to recent economic reforms will also cause Mexican producers to become less competitive relative to U.S. producers.
7. Protectionist measures tend to engender additional protection because they cause the domestic economy to lose its competitiveness relative to other countries. Moreover, the benefits of protection usually are short-lived because protection attracts additional resources to the sector, which soon drives the rate of return in the sector down to the level it was prior to the protection. Incomes and employment can only be protected in the long run by investing in the education and training of the labor force and in research and development to sustain the competitive edge of the sector.

Agricultural Trade on the North American Continent

The United States is already the dominant supplier of agricultural imports to Mexico and would tend to strengthen its position under the agreement because of preferential reductions in some barriers to trade. In 1989, Mexico imported approximately $2.7 billion of U.S. agricultural goods, while, at the same time, exporting nearly $2.3 billion of agricultural goods to the United States. The United States accounted for an estimated 90% of Mexican exports and supplied 75% of Mexico's agricultural imports. Mexico, for its part, accounted for less than 7% of U.S. agricultural imports and 11% of U.S. agricultural exports in that same year.

Mexico's principal exports to the United States are coffee, fruits and vegetables, and live cattle. Mexico's processed agricultural exports (frozen and canned vegetables, fruit juices, and beer) to the United States have become increasingly important, however. The main farm exports from the United States to Mexico have been feed grains, oilseeds, live animals, meat, and dairy products.

Detail on relative levels of agricultural protection in the three countries and on trade patterns with Canada are included in this section of the report. Canada is a relatively small trading partner with Mexico.

Agriculture in the NAFTA Agreement

The detailed provisions of the NAFTA entail a rather sizeable volume of fine print. The material presented here covers only the main provisions pertinent to understanding the agreement.

Background

Barriers to trade can be reduced by a number of means. The most comprehensive institution for discussing such reductions is the General Agreement on Tariffs and Trade (GATT) and the periodic Multilateral Trade Negotiations (MTN) it sponsors. The eighth round (Uruguay) of such multilateral negotiations is now underway. Provision is made in the NAFTA for whatever agreement might be reached in those negotiations.

Another means of lowering barriers to trade is to negotiate agreements for economic integration, such as EC–92, the Canada–United States Free Trade Agreement, and the NAFTA. Still another is the unilateral reduction in barriers to trade, much as Mexico has done in recent years.

General Trade Provisions

General provisions of the NAFTA that have implications for agriculture include those that clarify and streamline the customs administrative procedures, those that attempt a clear statement of principles to govern the operation of national standards that affect trade, those that aim to improve the dispute settlement provisions of the Canada–United States Free Trade Agreement, and the addition of a permanent commission and secretariat to offer a degree of institutional support and continuity to the agreement. There also are agricultural implications for the decisions on intellectual property rights and on investment in Mexico.

Two important features of the general provisions of the agreement are the general tendency to replace nontariff barriers to trade with tariffs and the tendency to phase out current levels of protection over a period of years. No nontariff barriers are to remain from the date of entry into force of the treaty, except for those specifically allowed by the GATT or by the NAFTA text.

All tariffs on agriculture are, in principle, subject to elimination on the schedules agreed to in Chapter Three of the accord. Although a number of agricultural tariffs are scheduled for immediate reduction, a few that are politically sensitive have relatively slow reduction schedules.

The agricultural component of the NAFTA can be viewed as a trilateral agreement that covers a range of agricultural trade issues, together with two new bilateral agreements between Mexico and the United States and between Canada and Mexico. It is the United States–Mexico bilateral that breaks new ground, in that it includes a waiver of the right to impose quantitative restrictions when domestic programs are threatened by imports.

Sugar is a particularly contentious issue from the U.S. side. Negotiators have worked out a complicated path toward complete liberalization by the end of 15 years. U.S. marketing orders are a concern of Mexico; the NAFTA text ensures "domestic treatment."

Sanitary and Phytosanitary Regulations

Sanitary and phytosanitary regulations are often used as disguised barriers to trade. The NAFTA gives considerable attention to these regulations, in contrast to the Canada–United States Trade Agreement, which largely deferred a discussion of them to the future. Although individual countries are given a great deal of latitude in setting their own standards, they are constrained to offering national treatment to imports and equal treatment to countries with similar conditions.

Environmental Provisions

Environmental concerns have been a controversial issue for agricultural producers in the United States. The provisions on sanitary and phytosanitary standards entail many of the environmental issues and should, in principle, provide ample protection against discriminatory practices.

The environmental provisions of the agreement attempt to establish the same standards for Mexico as those that prevail in the United States. The difficulty is in the disparity in enforcement capabilities between the two countries, with Mexico having much less capability for enforcement than the United States. President Clinton has proposed a side agreement that will provide stronger provisions than in the agreement itself. Mexico and Canada both object to such a side agreement.

Projected NAFTA Effects on U.S. Agriculture

There have been a relatively large number of attempts to estimate the expected impact of trade liberalization under the NAFTA. Unfortunately, there is considerable variation in the size of the predicted effects, based in large part on differences in approaches and in the assumptions on which the models used to estimate the effects are based. Fortunately, there is considerable consistency in the direction of the expected effects. The projected effects are thus discussed for the most part in general terms rather than in terms of point estimates.

This section of the summary begins with a brief review of existing trade patterns and of recent reforms in the Mexican agricultural sector. The following sections present, in a summary fashion, the projected effects of the NAFTA on U.S. agriculture at the following levels: (1) economy-wide, (2) sectoral, (3) commodity-specific, (4) processed foods, and (5) regional effects.

Background

Mexico is the third largest trading partner of the United States, after Canada and Japan, with bilateral trade amounting to $59 billion in 1990. U.S.-Mexican bilateral trade in agricultural products reached a record level of $5.1 billion in that same year, about $1 billion higher than in 1988. Mexico was the fourth largest single market for U.S. farm exports, after Japan, Canada, and Korea. U.S. farm exports to Mexico attained a record high of $2.55 billion in 1990. Mexico was this nation's second largest supplier of agricultural imports, with total Mexican shipments a record $2.6 billion in 1990.

Agricultural trade relative to agricultural gross domestic product is far more important to Mexico than it is to the United States. In addition, much of the United States and Mexican agricultural trade tends to be complementary in the sense that each country exports products that the other country produces in limited quantities. For example, the major U.S. agricultural imports from Mexico in 1990 were fresh vegetables, live (feeder) cattle, coffee, fresh noncitrus fruits, and fresh melons. The major U.S. agricultural exports to Mexico in 1990 were corn, grain sorghum, soybeans and soybean products, sugar, dried beans, seeds, beef and veal, animal fats and oils, cattle hides, dairy products, poultry meat, live cattle, and wheat.

Horticultural products now make up a major part of U.S. agricultural imports from Mexico and have grown more rapidly than other imports from that country. In recent years, Mexico also has become an important U.S. supplier of processed foods, including tomato paste and beverages, such as fruit juices and beer. From the U.S. side, grains have typically been the largest export item. Exports of dairy, livestock, and poultry products have grown the most rapidly in recent years.

Assessing the expected effects of the NAFTA is complicated by the significant process of policy reform Mexico has been undertaking. It has shifted the domestic terms of trade in favor of agriculture by substantially devaluing its currency in real terms and unilaterally reducing the protection of its manufacturing sector. The communal system of owning land (the *ejido* system) is being phased out and the land transferred to private ownership. The large parastatal, CONASUPO, which spans a large part of the food distribution system, is being phased out and the food distribution sector privatized. Finally, Mexico's banking and financial system is being privatized. All of these reforms should make agriculture a more vital and productive sector.

Economy-Wide Impacts of Trade Liberalization

As noted earlier in the summary, the dynamic effects of trade liberalization, through their induced effects on investment and the adoption of new production technology, can be expected to swamp the static effects that are usually reported from empirical studies, including those reported below. These dynamic effects arise because Mexico had one of the most closed economies in the world when it started its reform process.

Trade liberalization and the reduction of restrictions in the capital market have resulted in a substantial flow of capital to Mexico, much of it the return of Mexican capital that left the country in the 1960s and 1970s. This inflow of capital has caused the real value of the peso to rise substantially. The rise in the value of the peso could outweigh the effects of the reduction in trade barriers. Since it is a disincentive to Mexican exports and a boost to imports, the effects of trade liberalization may be significantly more favorable to U.S. producers than the static estimates suggest.

Foreign direct investment in Mexico will also help raise wage rates and help close the gap with the United States. It will also help the economy to expand, thus increasing imports from the United States. These dynamic effects of trade liberalization will redound to U.S. producers.

Agricultural Sector Impacts

Three conceptually different approaches have been taken to estimating the effects of the NAFTA on agriculture. These include the use of computable general equilibrium (CGE) models that encompass entire national economies, partial (sectoral) models that nonetheless treat a broad range of products, and specific commodity studies. The CGE approach is most satisfactory on conceptual grounds, although existing models almost necessarily simplify what are complex relationships.

The short period of time since the negotiations were concluded has precluded the development and testing of comprehensive models. However, the U.S. Department of Agriculture's Economic Research Service has developed estimates of the sectoral effects of trade liberalization for both the United States and Mexico.

U.S. exports of agricultural products to Mexico are expected to increase by $480 million, while Mexican exports to the United States are expected to increase by $170 million. U.S. farm income is expected to increase by up to $200 million. U.S. consumers are expected to pay somewhat higher prices due to firmer markets, and the government will save some on program costs. On balance, the U.S. economy gains about $300 million from the agreement, ignoring dynamic effects.

Prospects for Mexican farmers are less positive. Farm income in that country may experience a decline of $440 million. Because of significant gains to consumers from declines in prices, net benefits to Mexico are positive, at about $100 million, somewhat less than to the United States. U.S. grain and oilseed exports are estimated to rise by $370 million, and Mexican horticultural exports to expand by $100 million. This model also predicts a gain in Mexican exports of livestock, largely from increased sales of feeder cattle to the United States.

In summary, both the United States and Mexico gain from the mutual reduction in trade barriers, but so long as only static effects are taken into account, Mexican farmers would be adversely affected while U.S. farmers would stand to benefit.

Commodity-Specific Studies

Results reported in this section draw on a study by the American Farm Bureau, as reported by Barichello and Josling. These results confirm the size of the income losses on the Mexican side (reported above) due to the increased imports from the United States. Another important finding from the Farm Bureau study is that U.S. exports of fruits to Mexico could actually increase, in addition to a more widely expected increase in vegetables exports from Mexico. This is in contrast to the fears in both the United States and Mexico that freer trade in this sector will result in substantial competitive pressures from Mexico.

In summary, there is general agreement on the estimated effects by commodities when models using the same assumptions are used. There is generally a gain to U.S. producers of grain, oilseeds, and livestock, and losses for producers who compete with Mexican fruits and vegetables. U.S. corn sales to Mexico are forecast to increase in the range of 64 to 71%. Mexican exports of melons, cucumbers, green peppers, and tomatoes are expected to increase substantially. Frozen orange juice exports from Mexico are expected to increase substantially, but at the expense of Brazil, not Florida. To the extent there is a net increase in supply of orange juice, prices will decline. Consumers will benefit and producers will suffer income losses unless they become more efficient and lower their costs of production.

Food Processing

Substantial shifts in food processing are taking place in the North American market, some of which will be reinforced by the NAFTA. Because the restrictions on U.S. ownership of processing in Mexico has been lifted recently, U.S. investment in horticultural processing has been growing rapidly there. Most of the major integrated fruit and vegetable producers now operate in both countries. However, some observers have been cautious about forecasting a substantial shift of horticultural processing towards the source of Mexican imports. The competitive advantage still seems to lie with the United States.

There also seems to be little likelihood that processing of grains and oilseeds will shift to Mexico. The three principal processing industries (fats and oils, milled grain, and animal feed) are in highly concentrated, high technology, capital-intensive industries, and the larger U.S. firms are generally regarded as lower cost producers. Very considerable Mexican transportation and storage problems must be added to these advantages of location in the United States.

In summary, it is especially difficult to assess the full impact of the NAFTA on the food processing sector. The lack of research gives little basis for making judgements and the uncertainties are rather great.

Regional Effects

The dislocations and benefits of the agreement will tend to have strong regional effects. The fruit and vegetable producers in Florida, California, and Arizona will bear a significant share of the adjustment costs from trade liberalization. Most analysts believe these adjustments will tend to be concentrated in Florida. A major share of the producer benefits of freer trade will be realized in the midwest grain producing and livestock states, and possibly in dairy areas. Thus the benefits will be realized in one part of the country while the costs will be borne in another.

Some Final Thoughts on Expected Effects

The benefits to agriculture will go beyond the narrow subsector effects discussed above since the result of liberalization will be an increase in the demand for total agricultural output in the United States. Increased demand for specific commodities will spill over into other sectors. In addition, the effects of the agreement will be spread out over time. This gives both producers and policy makers time to deal with the implied adjustment problem.

Special Issues

A number of special issues follow from the material presented in the previous sections. In some cases these issues involve "what if" questions about the future.

A Different Cuban Government

Cuba has the potential to produce almost any of the fruits and vegetables that might be involved in trade among Mexico, Canada, and the United States, and is currently a significant producer of sugar. If Cuba should shift to a more market oriented policy associated with a change in government, the United States would almost surely want to trade with it.

This would not likely raise an immediate threat to U.S. producers because the shift to a market economy would not occur overnight, as illustrated in Eastern Europe and the former Soviet Union. Moreover, if reform of the economy would lead to significant increases in per capita income, the domestic economy would absorb a significant part of the increased production, although that would not likely be the case with sugar. Finally, the United States could negotiate a trade agreement specifically with Cuba, or help to bring it into the NAFTA. By that means the pace at which trade would be liberalized would be spread out over time.

Failure of the GATT Negotiations

This issue arises because the NAFTA has much of the proposed GATT agreement written into its text. If the GATT negotiations should fail, these parts of the NAFTA would have to be negotiated independently. In effect, this would mean that the negotiations would have to be reopened.

Immigration Flows

The past decade has witnessed very sizeable flows of migrants from Mexico to the United States. There are significant differences of opinion over whether a successful ratification of the NAFTA will increase or decrease that flow. The balance of opinion, however, suggests that the flow might well accelerate in the short term, but decline over the longer term. The short term acceleration will come about because of the response to lower prices in Mexico from increased imports of grain, and the ability of peasants to leave the land, given the reform of the *ejido* system, without losing the rights to whatever land they might own. The decline over the longer term will be due to the expansion of the Mexican economy and the increased jobs it will create.

Dealing with the Adjustment Problem

Trade liberalization, as proposed in the NAFTA, creates special adjustment problems. Positive adjustment policies are needed to ease the burden of adjustment for those who experience dislocation due to freer trade. In fact, such policies are essential if the effects of dislocation are to be cushioned and the benefits of the liberalization of trade are to be fully realized.

The provision of training and retraining programs for those dislocated by the lowering of barriers to trade is the key to dealing with this problem. Literacy skills should be provided to those who need them. Both kinds of programs should be provided to all members of the family.

A more ambitious program for dealing with the adjustment problem would be to help families relocate to alternative locations for employment. In some cases subsidized credit or grants to assist in relocation and provide temporary sustenance until alternative employment is obtained would be desirable.

Science and Technology Policy

A proper science and technology policy for agriculture can be an important means of dealing with expected adjustment problems, and can complement the kind of adjustment policies discussed above. Productivity-enhancing new production technology is the key to remaining competitive with other countries.

Agricultural research efforts should be directed to making U.S. producers more competitive in commodities for which there is head-to-head competition. Research efforts should also be directed to identifying and improving the competitiveness of commodities which might replace those that cannot remain competitive. The Extension Services should mount special efforts to assist producers experiencing serious competitive pressures from the lowering of trade barriers.

The Rest of Latin America?

The incentives for other countries in the region to join the NAFTA will be quite strong. Countries such as Argentina, Brazil, and Colombia are not likely to sit idly by while Mexico has special access to the large U.S. market. The participants in the NAFTA have reached agreement on the conditions other countries need to meet to become a member. Those conditions will not be met over night, but the attractiveness of the U.S. market will be such as to provide these governments strong incentives to undertake the needed reforms in their policies. Thus, over the longer term the NAFTA can be a positive means for bringing about policy reform in the region.

Side Agreements

Emerging concerns about environmental issues, labor standards, and potential surges of sugar exports to the United States have caused the Clinton Administration to propose the signing of side agreements to the negotiated agreement that provide additional means of dealing with these issues. Although it is not clear such side agreements are needed, well-structured side agreements might make the agreement more palatable to those who currently oppose it.

Concluding Comments

The members of the CAST task force believe many of the fears of the NAFTA are not well founded. On the issue of the loss of jobs to Mexico, the United States should not want to compete with workers at the low end of the wage distribution, which seems to be the main concern. Instead, it should want to compete at the high end of the wage structure, and this requires continued investment in training and education programs. In addition, the United States faces strong competition from Germany, Japan, and the newly industrialized countries. This nation will not be able to remain competitive if it does not avail itself of the benefits of freer trade so it has as low a cost structure as possible. Protecting our productive sectors from these competitive forces is not the way to defend our standard of living. **The only way to assure that our standard of living continues to grow is to seek to make ourselves more competitive, not to protect our economy.**

Introduction

The United States and Canada signed a Free Trade Agreement in 1988, which is now being implemented. In June 1990, President George Bush and Mexican President Carlos Salinas de Gortari proposed a U.S.–Mexican Free Trade Agreement. Canada subsequently asked to participate in the negotiations. The three countries began negotiations in July 1991 for the establishment of a North American Free Trade Agreement (NAFTA), and agreement was reached in late 1992. The Prime Minister of Canada and the Presidents of Mexico and the United States have since initialed the agreement. The agreement must be ratified by the legislative bodies of the three countries before taking effect. If so approved, the NAFTA will become the world's largest free trade area—360 million people annually producing $6.2 trillion of goods and services and exporting and importing more than $1 trillion worth of goods.

Trade agreements of this scale tend to be controversial, and largely because there tend to be both winners and losers from the liberalization of trade. For agriculture, proponents argue that the NAFTA will open the door to large new markets for exports of U.S. agricultural and food products, especially feedgrains, beef, and processed foods to Mexico. Critics claim that the agreement will stimulate farm production and exports to the United States, and even the relocation of U.S. production and processing to Mexico. More generally, both agricultural and other interests are concerned about the disparity in environmental regulations between the two countries and the differences in wage rates, which they feel will give an advantage to Mexican producers. A significant feature of the agreement is that it proposes to lower trade barriers between a low income, developing country and two developed or high income countries.

The objective of this report by the CAST task force is to clarify, with special emphasis on agriculture, the issues involved in liberalizing trade by means of such a trade agreement. The premise of the report is that citizens well informed on expected costs and benefits of the agreement will be able to express their views to their elected representatives in an informed and intelligent manner, and thus in the best interests of themselves and their nation. The report also may be of direct value to policymakers.

The issues surrounding trade liberalization often are subtle and go far beyond either the expansion of markets or the direct head-to-head competition that may emerge. Moreover, making "hard" forecasts of the consequences of such a significant change in policies is difficult when so little is known about the underlying relationships governing trade and so little time has passed to develop tested models to make such predictions. Thus, an important part of this report addresses the underlying principles likely to be important as the future unfolds.

The report is divided into six parts: (1) a brief description of the setting for the agreement, (2) a discussion of general issues in international trade and trade liberalization, (3) a description of agricultural trade patterns on the North American continent, (4) a discussion of agriculture in the North American Free Trade Agreement, (5) an analysis of the overall NAFTA impacts on the agricultural sector, and (6) a discussion of some special issues. Concluding comments are in Chapter 7.

1 The Setting

Since the end of World War II, the United States has provided global leadership to lower international barriers to trade. Politically, this was relatively easy to do in the first couple of decades after that war, because the United States had by far the dominant economy. Although the United States was never quite as free-trade oriented as it liked to believe it was, it still viewed the reduction of trade barriers and the fuller integration of national economies as the means to promote general global prosperity and a peaceful international community.

As its relative standing in the international economy has declined and other countries have gained competitive edges in some sectors, this free trade stance has been more difficult to sustain. The United States has participated in a number of international agreements designed to limit the free flow of goods and services and has negotiated voluntary export agreements with other countries to reduce the competitive pressures on specific domestic sectors. The voluntary export agreement with Japan to limit the inflow of automobiles from that country is an important example of the latter kind of agreement.

Despite these caveats, the United States has provided much of the leadership for the current round of multilateral trade negotiations and, in that round, has argued forcefully for a reduction in barriers to trade in agricultural products. It also provided strong leadership for the development of the Canada–United States Free Trade Agreement, which is lowering the barriers to trade on the border across which passes the largest volume of international trade in the world. Moreover, with the exception of agriculture, the United States probably has the lowest barriers to trade of any country in the world.

A number of factors has caused some groups in the United States to become more protectionist, or to lobby for protection of their vested interests. The first, and perhaps most pervasive, is the slower growth rate the U.S. economy has experienced over the last several decades and the tendency of per capita incomes to rise at a slower pace than they did in earlier decades.

The second is the perception that other countries, especially the newly industrialized countries of Asia (Hong Kong, Singapore, South Korea, Taiwan) and, to a lesser extent, Brazil and other middle-income semi-industrialized counties, have gained a competitive edge on the United States by virtue of their low wage rates. This has become an especially sensitive issue since Mexico has agreed to lower its barriers to U.S. capital. U.S. labor interests are concerned that their jobs will be exported to Mexico.

The third is the growing recognition that increasingly important regulations in this country to protect the environment may give our producers and workers a disadvantage in trading compared to other countries with lower standards. Finally, the general perception that international trade is often unfair, with the governments of other countries providing to their productive sectors assistance that is not available to U.S. producers, has caused many to wonder whether we are being taken advantage of by others.

The stance and trends Mexico has taken towards international trade has, in many respects, been just the opposite of that of the United States. In the period following World War II, Mexico tried to develop by pursuing import-substitution industrialization policies.[1] The protectionism this approach required was part of more general policies that covered foreign investment, industrial policy, and labor—all intended to promote economic justice and independence from the U.S. economy. By the 1980s, these policies, combined with two boom-bust cycles in the petroleum market, had left Mexico with a crushing foreign debt, triple-digit inflation, antiquated industries, a stagnating agriculture, and a collapsing infrastructure.

President Miguel de la Madrid, starting in 1985, began the painful process of restoring fiscal discipline to the country. His successor, Carlos Salinas de Gortari, has been changing the institutional arrangements associated with the old policies and opening Mexico to foreign capital and modern business prac-

[1]Material in the following paragraphs is drawn from Morici, P. February 1993. Grasping the benefits of NAFTA. *Current History* 92(571):49–50.

tices. Average tariffs have been slashed from 29 to 10%, and import licenses, once required for virtually all products, now apply to fewer than 5%. Price controls and product standards favoring domestic suppliers and cartels have been relaxed or eliminated. Limits on foreign participation in petrochemicals, finance, and manufacturing have been eased, and protectionist industrial policies for automobiles, computers, and pharmaceuticals have been liberalized.

About 80% of the 1,155 state-owned industries formerly in Mexico have been sold, merged, or closed. The government also has sold holdings in food processing, fishing, automotive products, textiles, petrochemicals, paper products, and construction materials. The power of corrupt union leadership was attacked and greatly reduced or eliminated in vital industries such as petroleum.

These reforms are exposing Mexican business to the rigors of international competition and have induced improvements in productivity, growth in exports, and a four-year economic recovery. Foreign investment has financed current account deficits, which largely reflect imports of capital goods needed for modernization.

The challenge policymakers in Mexico face is to *sustain* these reforms. There are powerful domestic forces against them. Unless they are brought to full fruition, economic recovery could falter, and the progress of the Salinas years could unravel. This is where the NAFTA has an important role to play.

The NAFTA will phase out 90% of all tariffs among the three countries over 10 years and eliminate remaining tariffs on politically sensitive products over 15 years. Virtually all import quotas and licensing requirements will be eliminated, and the NAFTA commits the United States to give Mexican agricultural products equal treatment when establishing marketing orders. These provisions will end most United States restrictions on imports of apparel and Mexican limits on imported cars and trucks. They will create bilateral free trade in corn, beans, fruits, vegetables, and other farm products.

Historically, the most important barriers to American-made products in Mexico have been import quotas and licensing schemes, arcane product standards, discriminatory procurement by government agencies and parastatals (state-owned and operated companies), domestic sourcing and additional performance requirements imposed on foreign subsidiaries, and poor patent and copyright protection. The NAFTA addresses these forms of protectionism. It establishes guidelines and disciplines for setting product standards and testing requirements. It widens opportunities for American businesses to sell goods and services to federal agencies and state-owned industries in Mexico and vice versa. It strengthens the protection of intellectual property rights and pledges each country to the enforcement of modern antitrust laws. Finally, the NAFTA provides binding dispute resolution to ensure the fair application of trade laws.

The NAFTA essentially will open most of Mexico's economy to investment from the United States and will guarantee American subsidiaries south of the border treatment no less favorable than that for their Mexican competition. These, together with the reduction in trade barriers, are substantial gains for the U.S. economy. More importantly, however, the NAFTA locks in the reforms Mexico has undertaken to date and commits the country to timetables for dismantling most remaining interventionist policies from the past. In areas such as investment, antitrust, and intellectual property, the NAFTA binds Mexico to legal standards comparable to those in the United States and Western Europe. In exchange, Mexico achieves for its agricultural and manufactured products access to United States markets unrivaled by any other developing country.

In conclusion, the NAFTA offers a historic opportunity for Mexico and the United States to forge a new relationship. Relations in the past often have been strained. The NAFTA provides the means for economic cooperation that has not been available in the past. With formal mechanisms for dispute settlement, whatever tensions may emerge as the barriers to trade are lowered should be resolved without erupting into larger confrontations. The challenge for policymakers on both sides of the border will be to find the means to address the problems of those who might be harmed by the reduction in trade barriers so the larger good from trade liberalization can be realized.

2 General Issues in International Trade

This section is devoted to a discussion of the general issues involved in any reduction of the barriers to international trade, thereby providing the general background against which the more specific issues discussed later in the paper can be understood. The topics to be covered include (1) the meaning of the "fast track" provision of trade agreements, (2) an overview of the politics of trade liberalization, (3) a discussion of the basis of the general expansion of international trade in the post-World War II period, (4) increased trade as an engine of economic growth, (5) increases in per capita income as the basis for expansion of trade, (6) a discussion of the issues shaping competitiveness, and (7) a discussion of the extent to which protectionist measures engender more protection.

The Meaning of the Fast Track Provision

A puzzling issue for many American citizens is that the agreement has to be ratified on the basis of what is referred to as a "fast track" provision. That label is in part a misnomer. The essential feature of the provision is that Congress has the right only to vote the agreement up or down. It cannot amend the agreement or make changes in it. The reason for this requirement is rooted in the U.S. presidential form of government. The president has the right to negotiate treaties with other countries. The Congress must approve such treaties when they have an impact on the provisions of domestic legislation. Congress is consulted by the executive branch during the negotiation process. Moreover, as a practical matter, if Congress were permitted to amend a trade agreement it would be very difficult to negotiate such an agreement with other countries.

There is one sense in which the label "fast track" is appropriate. The Congress is given 90 calendar days followed by 90 session days from the time the agreement is signed to vote on it. The reasons for such a provision are obvious. Without such a time limit, Congress would be able to procrastinate until the agreement eventually died without being enacted.

The fact that the Congress has an opportunity only to vote an agreement up or down does not mean the process by which the agreement is reached is any less democratic. The government's trade representative is advised by a series of technical advisory committees as the negotiations over the proposed agreement proceed. The trade representative would be foolish to ignore the advice received from these committees.

The Politics of Trade Liberalization

Barriers to international trade take a variety of forms. Those most easily recognized are tariffs, which literally amount to a tax on goods and services coming into a country. Such tariffs can be a percentage of the value of the good (ad valorum), a fixed amount per unit, or can vary with the price in international markets (variable levies). Less easily recognized, but far more pervasive, are nontariff barriers. These include quotas and embargoes on imports, health and sanitary requirements, environmental rules, and licensing requirements. Some of these are often imposed for perfectly legitimate reasons, such as health and sanitary requirements. In other cases they are, or become, artificial means of protecting a domestic industry.

Barriers to trade are usually put in place either when an economic sector is experiencing economic distress, or when a government decides to turn inward with its economic policies and tries to promote economic growth by replacing imports with domestic production. In both cases, the usual expectation is that the protectionist measures will be short-lived. The period of stress is expected to pass soon, or infant-industry arguments are used as the basis for import-substitution protection. Unfortunately, that is not what usually occurs. Instead, it is easy to become complacent behind protectionist measures. As a result efficiency falters and the values of the benefits or protection get capitalized into the value of fixed assets such as land in the case of agriculture. Under these circumstances it becomes difficult to change the policies.

Trade liberalization as envisaged in the NAFTA can make important contributions to the economies of all three countries. At the same time, the challenges faced in bringing the agreement into being are great. Exercises in trade liberalization tend to impose costs on, or have negative consequences for, particular groups in society—especially those who have benefitted from protection in the past. In contrast, the benefits tend to be widely diffused, with individual citizens (especially consumers) tending to receive relatively small benefits in an absolute sense.

The politics of this particular distribution of costs and benefits make it difficult to bring about trade liberalization. Those who suffer the negative consequences have an incentive to organize themselves and to lobby their case. Moreover, since they tend to be groups with common interests, it is easy for them to become organized. In contrast, the beneficiaries of freer trade tend to be consumers, who realize those benefits in the form of lower prices for particular goods and services. The absolute amount of their increase in real income thus tends to be relatively small and not sufficient to motivate them to organize. Hence, although the overall amount of the benefits from trade liberalization may be larger than the costs imposed on the losers, lobbying pressures favoring free trade tend not to emerge.

As agricultural interests think about whether they want to support the agreement or not, they need to focus on the larger sense in which they will benefit. If they do not, they may see an initiative that is very much in their longer-run interests be rejected, primarily because of failing to recognize the potentially important benefits.

The Growing Scope for International Trade

There has been a remarkable expansion of international trade since the end of World War II, despite the prevalence of trade pessimism at the end of that war and the continuing pressures for protection both here and abroad. In all years except for those of serious global economic recession, international trade has grown at a faster pace than global GNP. In fact, the growth in trade has been substantially higher than the growth rate for global GNP. That suggests that there are powerful forces driving the expansion of trade.

This growth in trade is rooted in significant technological breakthroughs in the transportation, communication, and computer sectors. The breakthroughs in the transportation sector include more efficient internal combustion engines and the development of huge ships that can transport large quantities of goods. They also include improvements in the physical infrastructure such as local roads, storage facilities, and refrigeration for fresh produce. These developments have been complemented by declines in the real price of energy and the expansion of modern highways in many countries. Thus, the real cost of transportation services has declined for many parts of the world.

In the communication sector, perhaps the most important development has been the hoisting of satellites in stable orbits around the earth, making communication accessible to parts of the world that at one time were available only with considerable effort and great difficulty. Within the communication sector itself, there have been major technological breakthroughs as well. These developments have substantially lowered the cost of communication services. At the beginning of the 1930s, for example, the cost of a three-minute telephone call between Los Angeles and the Twin Cities was $130 in 1990 dollars. In 1990, the cost was only $1.30. Moreover, the quality of the communication also had improved dramatically.

Finally, there has been the computer revolution. This revolution has made possible many of the breakthroughs in the transportation and communication sectors. Equally as important, the computer makes it possible to mobilize and analyze large quantities of data. This facilitates the use of markets on a global scale.

In summary, these technological breakthroughs have made it possible to conduct market transactions between almost any two countries at almost any time of the day. They have in a very real sense greatly expanded the scope of markets and made it possible for nations to realize their respective comparative advantages vis-a-vis other countries on a much greater scale than ever before. These developments have been especially important for agriculture, since it is a widely dispersed economic activity that is heavily dependent on transportation services.

It is important to recognize that these three technological developments are far from being fully exploited in expanding international trade. Most of the developing countries, where most of the world's population resides, as well as large parts of the previously centrally planned economies, have only begun to take advantage of them. Thus, there is considerable potential for significant increases in international trade once the artificial barriers to trade are reduced. Similarly, there is considerable scope for international trade to be the basis of trade-driven increases in per capita incomes, an issue we will discuss below.

Increased Trade as an Engine of Economic Growth

Expansion of international trade can be a powerful source of economic growth. The reasons for that are well known, although this issue is seldom given its due importance in discussions of trade liberalization. First, as trade is liberalized, nations participating in the liberalization make more efficient use of their collective resources. That is the well-known comparative advantage issue in which individual countries ultimately produce what they produce best and trade with others for what they produce less well. Freer trade makes it possible for individual countries to make fuller use of their particular resource endowments.

Second, the specialization in production and the division of labor that a reduction in barriers to trade makes possible leads to additional significant economies in the production of individual goods and services. We refer here not to the familiar economies of scale within individual firms, which tend to be exaggerated, but to the economies inherent in the expansion of particular sectors of the economy. A larger market makes it possible to have greater specialization in the production of inputs for the expanding sector, and this leads to a reduction in the costs of those inputs. These "economies" are external to the individual firm and to the individual product sector. However, they can be large and widely diffused in the economy. Although they are often neglected when assessing the benefits of trade liberalization, they derive ultimately from the expansion of markets that trade liberalization makes possible.

Still a third source of economic growth comes from the increased competition freer trade makes possible. Competition from abroad causes domestic producers to be more efficient, and these efficiency gains benefit consumers in the form of lower prices. One needs to think no further than the U.S. automobile industry to realize how foreign competition shocked a large moribund industry out of complacency, not only to improve the quality of its product, but also to lower the cost of production as well. The benefits to the American economy have been substantial.

Interestingly enough, even though it would have taken economic foresight and fortitude of a high order for the automobile industry to invite this competition on itself, it has been in its own interest as well. By becoming more competitive and productive in the domestic economy, these firms have become a more attractive place for investment. Moreover, by being more efficient and producing higher quality products, they are now well positioned to compete in other international markets. U.S. agricultural producers should keep this in mind as they think about their future in international markets.

What we have outlined above are the dynamic effects associated with the liberalization of trade. Economists have recently integrated these effects into a modern theory of economic growth in which the incentives for growth come from conditions within the economy. The realization of comparative advantage, the exploitation of increasing returns, and the efficiencies driven by international competition make the economy an attractive place to invest. This increase in investment brings with it new technology imbedded in the investment, whether it be in the human or the physical capital. And this increased flow of capital funds provides the motive force for the expansion of the economy.

Kehoe (1992) has recently argued that when assessed in a proper model that can take account of them, these dynamic effects literally swamp the narrower static benefits and costs of trade liberalization. This means that the benefits of trade liberalization tend to be much larger than those found by the usual focus on the static effects alone.

Increases in Per Capita Income as the Basis for Expansion of Markets

This issue follows directly from the previous topic and is especially important in considering the consequences of a reduction in the barriers to trade between Mexico and the United States. The consumption of food and agricultural commodities in the United States is at such levels that further increases in per capita income have only a weak effect on increasing demand. That is not the case for Mexico. For that reason, future growth in markets for U.S. agricultural output is likely to be in the low-income developing countries such as Mexico. U.S. producers as a whole should be willing to make substantial concessions to gain access to those potentially important markets.

Mexico is an especially important case in point. It has experienced almost a decade of economic stagnation, with significant declines in per capita incomes. By means of its own economic reforms, and especially the very substantial reduction in its own barriers to trade, it is poised for a period of rapid and significant economic growth and recovery. These demand effects from their own economic growth will probably swamp the effects of the proposed NAFTA, although that agreement can certainly contribute to sustaining economic growth in Mexico. In any case, trade liberalization creates fewer adjustment problems in a period of growing demand than when demand is stagnant or declining.

Mexico continues to have a high rate of population growth. When the effects of that growth in population are combined with the effects of increases in per capita income on the order of 3 to 5% per year—which are entirely feasible—the demand for food in the Mexican economy may well expand over the next decade at rates of 4 to 6% a year. Very few countries have been able to expand their production of food at that rate on a sustained basis. It is most unlikely that Mexico will be able to do so. Thus, the import demand for food in Mexico is likely to be strong at least into the next decade.

An important feature of these expected increases in per capita incomes in Mexico is that they will bring with them an upgrading in diets. Consumers can be expected to move up from a diet based heavily on maize and beans to one that will be increasingly dependent on fruits, vegetables, and livestock products. In the case of fruits and vegetables, growth in the domestic market will reduce the pressures to export and thus to compete with U.S. producers. In fact, California producers have begun to ship cauliflower into Mexico City in response to recent increases in per capita income. More generally, increased demand for livestock and livestock products will increase the demand for feed grains and oilseeds from the United States, while reducing the competitive pressures from feeder cattle.

An increase in demand for quality products also is associated with increases in per capita income. Market niches for high quality U.S. specialty products are likely to emerge in Mexico, made possible in part by the rapid changes in the supermarket system. Supermarkets are in large part a consequence of increases in per capita income.

To conclude this section, increases in per capita incomes in Mexico in the years ahead can be expected to reduce the competitive pressures from Mexican agriculture, while at the same time expanding the markets for U.S. agricultural output. This important feature of economic growth, whether from trade liberalization or from policy reform, generates important opportunities for trade expansion. The benefits now appearing from Mexico's past economic reforms make this an especially propitious time for an agreement devoted to reducing barriers to trade.

The Competitiveness Issue

The fear of trade liberalization is largely rooted in a concern that domestic producers, and by implication—workers, will not be able to compete with producers and workers in other countries. This is of special concern in the case of the opening of trade between the United States and Mexico, given the large disparities in per capita income and wage rates between the two countries. While this is a legitimate concern, it is important that the key issues be kept in their proper perspective.

For example, the low wages of labor in Mexico, which is of concern to many observers, can be very misleading. The fact that labor in Mexico tends to receive a lower wage rate than does labor in the United States does not necessarily mean it is "cheap" labor. Moreover, the issue is not the difference in wage rates per se between the two countries, but rather the difference in the *cost* of labor services that matters; low-wage labor need not necessarily be low-*cost* labor. In fact, low-wage labor may well be high-cost labor. It all depends on the *productivity* of that labor. High-wage labor, as we tend to have in the United States, can well be low-cost labor if its productivity is high enough.

In the case of agriculture, the quality of labor in Mexico needs to be compared with the quality of labor available to U.S. producers. Many observers believe the worker available to the latter is significantly more productive than that available to the Mexican producer. This is feasible even when the U.S. producer employs Mexican migrants since it may be that it is the more productive worker who migrates.

More generally, the United States traditionally has tended to export goods and services that require a relatively large share of labor to produce, and to import goods and services that require a relatively large share of capital. It did this despite the fact that the United States has been a high-wage country and one with an abundant supply of capital—factors that on the surface would suggest that our trade patterns with the rest of the world should have been just the opposite of what they in fact were. For a long time this was known as a paradox—the Leontief paradox—after the Nobel Laureate in economics who first discovered it.

We know today that the observed trade pattern is not paradoxical at all. Instead, it is rooted in the tendency of the United States to invest in new technology, in the education and training of its labor force, and in other forms of human capital. These investments raise the productivity of the labor force and enable it to compete with lower-wage labor in other countries.

This clarifies what the United States needs to do if it is to remain competitive with foreign producers and workers. Rather than to sacrifice economic growth and increases in per capita incomes by erecting new protectionist barriers or maintaining old ones, the United States needs to sustain and increase its investments in agricultural research and, at the same time, sustain and increase its investment in the education and training of rural people. These investments are the key to the economic growth of this country since they increase the productivity of our land and labor. They need to receive more attention if we are to maintain our competitiveness abroad.

Other important factors influencing U.S. competitiveness abroad include this nation's physical infrastructure, the efficiency of its distribution system, and the entrepreneurial talents of its producing sectors. Although we have tended to neglect our physical infrastructure in recent years, compared to most other countries this nation still does quite well. As we emerge into an increasingly competitive international economy, however, we must revitalize our investments in this physical infrastructure and make use of the latest in new technology. Moreover, the physical infrastructure should be designed more efficiently for international trade. In the past, the U.S. economy was oriented for the most part to domestic markets. The physical infrastructure tends to reflect that orientation, while at the same time reflecting military and defense interests. Giving the infrastructure an orientation that emphasizes foreign markets may help sustain our competitiveness.

To cite a specific example, the border crossing at Nogales has become an important barrier to trade in fruits and vegetables. The near-monopoly position the brokers have at this exchange point makes it possible for them to charge more for their services than the value of the tariffs. Larger, more open facilities, together with other points of entry, would create more competitive conditions.

Finally, there is the issue of the value of our nation's currency in foreign exchange markets, especially the peso/U.S. dollar exchange rate. The value of the U.S. dollar compared to the value of the currencies of other countries with which the United States trades is as important as relative productivity for determining how competitive we are in international markets.

Foreign currency exchange rates and exchange rate policies have pervasive and powerful effects on the economy. The relative importance of this factor can be seen in the performance of the U.S. agricultural sector over the last several decades. For example, two successive devaluations of the U.S. dollar in 1971 and 1973 and further declines near the end of that decade, together with rapid economic growth in the developing countries, created an unprecedented export boom for the United States during the 1970s. By the end of that decade, U.S. agriculture thought it could compete with almost anyone anywhere in the world. A reversal in monetary policy in 1979 and an unprecedented rise in the value of the U.S. dollar through May 1985, together with the unfortunate rise in domestic support levels for U.S. agriculture in the aftermath of the embargo on sales to the Soviet Union, choked off the competitive edge enjoyed by U.S. producers. By the mid-1980s, U.S. farmers came to believe they could not compete with anyone.

These developments illustrate another important point. With today's bloc-flexible exchange rate system and a well-integrated international capital market, the effects of changes in monetary and fiscal policies are transmitted in large part through realignments in the values of national currencies and through adjustments in the export and import-competing sectors. This is important because agriculture at one time was largely isolated from the effects of changes in monetary and fiscal policies. In today's world, it has to bear an important part of the adjustment to changes in these policies. Unstable monetary and fiscal policies create unstable commodity markets.

The size of the international capital market is a related issue. In today's world, international financial flows tend to dominate foreign exchange markets. Thus, shifts into and out of U.S. dollar assets can have an important effect on how competitive U.S. producers are in international markets.

This situation raises still another issue. The wide swings in the value of national currencies in foreign exchange markets are a powerful source of protectionist pressures. For example, the United States experienced some of the strongest pressures for protection of the domestic economy within memory during the first half of the 1980s, when the dollar was experiencing an unprecedented rise. When the dollar falls, on the other hand, protectionist pressures tend to emerge in other countries. Thus stable and sound monetary and fiscal policies can play an important role in restraining protectionist sentiments.

The persistence of large deficits in the budget of the U.S. government has created serious trade problems for U.S. producers. So long as the Federal Reserve declines to print money to finance that deficit, the U.S. Treasury has to go to the capital market to finance it. Given the notoriously low rate of saving in this country, borrowing by the Treasury raises real interest rates in the domestic economy. Increasing interest rates induce an inflow of capital from abroad, which in turn raises the value of the U.S. dollar relative to the values of other countries. A strong dollar is akin to a tax on U.S. exports and a subsidy for imports. U.S. agriculture and other tradeable sectors of the economy are in turn less competitive than they would otherwise be when these conditions prevail.

Something similar to this has been happening in Mexico in recent years. The reforms of the Mexican economy have encouraged the repatriation of Mexican capital that had been held abroad, while at the same time attracting an inflow of foreign capital from Japan, Canada, and the United States. Inflows of capital have made the peso stronger than it would otherwise be in foreign exchange markets, which in turn has made the Mexican economy less competitive than it would otherwise have been from a trade perspective. Imports from other countries also come into the country at a lower price in terms of the domestic currency than would otherwise be the case and, thus, imports tend to increase.

In recent years the U.S. dollar has been relatively weak in foreign exchange markets. A weak U.S. dollar reflects in part the accumulation of a large international debt on the part of the United States and a decline in the confidence of asset holders that the United States will manage its economy well in the future. Should the United States succeed in balancing its budget, foreign exchange markets would face conflicting forces. On the one hand, the United States would need to borrow less from abroad to finance its deficit. On the other hand, the U.S. economy might become a more attractive place for foreign investment, and thus experience a continuous inflow of capital. How these tendencies will work themselves out is not clear at this time. The important issue is that developments in the international capital market, through their impact on exchange rates, will have a significant influence on trade flows and the ability of Mexican, Canadian, and U.S. producers to compete with each other.

Protectionism Engenders More Protectionism

Modern economies are highly interdependent. For that reason, protectionist measures tend to engender pressures for more protection. This can be seen in a number of ways. For example, protection of the steel industry raises the domestic price of that product, which is an important cost item in many products in the U.S. economy. By raising the cost of products that use steel in their manufacture, these protectionist measures give rise to pressures for protection of these additional sectors.

The benefits of protection also tend to be short-lived and tend to be realized relatively soon after protectionist measures have been put in place. These higher returns attract additional resources to the sector and soon the rate of return is equivalent to what it was before, or what it is in other sectors. In the case of agriculture, the benefits of protection tend to be capitalized into the value of land and other fixed assets. This raises the cost structure and it is by this means that the rate of return declines. In either case, trade liberalization imposes losses on those in the sector. In many cases these will be different people than those who realized the earlier benefits.

Agriculture and the price of food are an important special case in understanding the pervasiveness of protectionist measures. Food is a wage good in the sense that it makes up a large part of the budget of laborers. If the price of food should be high because of domestic commodity programs, for example, nominal wages will have to be higher to establish real wages equivalent to those in other countries. This in turn can affect how competitive the nation's economy will be in international markets.

U.S. agriculture tends to benefit from a wide range of protectionist measures. These measures generate pressures for further protectionism both here and abroad. High support levels for the dairy sector, target prices for wheat and maize above what would otherwise be market-clearing levels, and marketing orders that limit the market supply of specialty products such as fruits and nuts, all have an impact on the value of land specialized in the production of these commodities and thus raise the cost of production. The same applies to the tariffs, fees, and tariff quotas for sugar. These increased costs generate political pressures for more protection in a spiral that goes on and on. The use of producer payments, which under existing conditions amount to an implicit export subsidy, together with explicit export subsidies, engender protectionist measures in other countries.

To conclude, the search for protection as a means to enhance the returns of resource owners is counterproductive. The United States, like the European Community and Japan, has been highly protective of its agricultural sector. This has not notably increased the income of farm families. It has, however, helped decimate rural America. The means to improve the welfare of farm people must be sought elsewhere, through investments in agricultural research, through increased investments in schooling and vocational training for rural people, and through improvements in the infrastructure that serves agriculture and rural America.

3 Agricultural Trade on the North American Continent[2]

The United States is already the dominant supplier of agricultural imports to Mexico. A free trade agreement would tend to strengthen its position because it would lead to preferential reductions in some barriers to trade.

Mexico

In 1989, Mexico imported approximately $2.7 billion of U.S. agricultural goods. At the same time, Mexico exported nearly $2.3 billion of agricultural goods to the United States. Thus, in that year the trade balance was slightly in favor of the United States. The balance has favored the United States throughout the decade of the 1980s, although it was in the opposite direction during the 1960s and 1970s.

Returning to 1989 again, the United States accounted for an estimated 90% of Mexican exports and supplied three-fourths of Mexico's agricultural imports. Total U.S. agricultural trade tends to be more geographically diversified than that of Mexico. Thus, although a major agricultural trade partner, Mexico accounted for less than 7% of U.S. agricultural imports and 11% of U.S. agricultural exports in 1989.

Mexico's principal exports to the United States are coffee, fruits and vegetables, and live cattle. Mexico's processed agricultural exports to the United States have become increasingly important. These exports include frozen and canned vegetables, fruit juices, and beer. The main farm exports from the United States to Mexico have been feed grains, oilseeds, live animals, meat, and dairy products.

The most important commodities imported by Mexico from the United States enter duty-free, including corn, sorghum, and some dried-milk products. Mexico imposes a 10% tariff on many other valuable categories of imports from the United States, including poultry meat and oilseed products.

Mexico also has liberalized its import licensing requirements. Import licenses, which formerly had been applied to all imports, have been retained only for selected commodities. However most of these are agricultural items, including corn, wheat, most nonfat dry milk, cheese, eggs, poultry meat, apples, and certain other horticultural products. Since 1988, license requirements were eliminated for sorghum, soybeans and soy products, and some dried-milk products.

As the use of licensing requirements for agricultural imports decreased between 1988 and 1990, Mexico tended to increase tariffs. For soybeans and soy products, tariffs were increased when licensing requirements were removed. Meat tariffs were imposed in 1990 to help raise declining domestic prices. For some grains, evaporated milk, and poultry products, tariffs rose between 1988 and 1990 without an accompanying removal of licensing requirements. Mexican licensing requirements apply to about 40% of U.S. agricultural exports to Mexico, but to only about 28% of total Mexican agricultural imports.

United States

For the United States, the average U.S. tariff on agricultural imports from Mexico is 6%. U.S. tariffs on Mexico differ from U.S. average global tariffs, reflecting the fact that some Mexican products benefit from the Generalized System of Preferences (GSP). The GSP permits preferential tariff treatment for selected developing countries for some products, provided that the developing country does not account for over 50% of U.S. imports of the particular product. Thus, Mexico is no longer eligible for GSP treatment for some agricultural products, including winter tomatoes, cauliflower, brussels sprouts, guavas, mangoes, and melons.

Although the average U.S. tariff is relatively low, there are wide differences in tariff rates. For example, tariff rates of 35% are applied to dried onions and

[2]Much of the material in this section is taken from U.S. Department of Agriculture. April 1991. *Agriculture in a North American Free Trade Agreement: An Interim Review*. U.S. Department of Agriculture, Washington, D.C. This report is the most detailed and comprehensive collection of information available on the agricultural dimension of the proposed NAFTA.

garlic, and to fresh cantaloupes and melons during the height of the U.S. marketing period. Many fresh vegetables that compete with U.S. production are subject to a 25% tariff, including brussels sprouts, artichokes, and seasonal asparagus. Most processed horticultural items are subject to a tariff of 17.5%. The United States has no tariffs on coffee, the largest single category of agricultural imports from Mexico. U.S. tariffs tend to escalate according to degree of processing. Tariffs on processed fruits and vegetables are higher than those on fresh items.

Canada

Canada's agricultural trade with Mexico accounts for less than 2% each of Canada's total agricultural exports and imports. Wheat, canola (rapeseed), and dairy products dominate Canada's agricultural exports to Mexico. Wheat exports to Mexico are made by the Canadian Wheat Board (CWB); sales also have benefitted from government-backed credit. Canola exports are made by private traders, but have benefitted from subsidized rail freight rates and government-backed credit and other government export promotion programs. Canada's dairy product exports, mainly nonfat dry milk, result from surplus production generated by that country's high internal support prices and are exported with subsidies financed by producer levies. Fruits and vegetables are Canada's main agricultural imports from Mexico and are subject to seasonal tariffs.

Wheat, barley, and canola are the most important crops in terms of both cash and export receipts. Canada has been the world's second leading wheat exporter over the past decade, although it averaged only 5% of world wheat production. Barley is the most important coarse grain produced, and Canada is a leading world exporter. But over the past decade, corn production in eastern Canada has been increasing at a faster rate than barley. Canola acreage has increased during the 1980s at the expense of wheat; almost all exports are shipped to Japan. Canada both imports and exports beef; most of this trade is with the United States. Pork exports are significant, equaling about one-fourth of production in recent years.

The provinces of Ontario and Quebec account for most of the poultry and dairy production. The poultry and dairy sectors are regulated by supply management systems, under which marketing boards attempt to limit production to domestic requirements, set domestic prices, and control imports through quotas and licenses.

Canada's cold climate means many agricultural products cannot be produced domestically. Major imports are fruits and vegetables, tropical products, rice, and cotton, equaling over half of Canada's total agricultural imports. For many of these products, imports equal three-quarters or more of domestic consumption. The United States is the main agricultural supplier.

The United States has become an increasingly important market for Canada and receives over one-third of Canada's agricultural exports. As Canada's crop exports have been buffeted by low world prices and bad weather, exports of animal products and other high-valued products have increased. Animal product exports—mainly live animals, pork, and beef—account for about 40% of Canada's exports to the United States.

Canada's agricultural imports grew faster than agricultural exports in the 1980s, resulting in a shrinking trade surplus since 1983. The United States is by far Canada's dominant supplier of agricultural imports, although its share of total imports in the 1980s remained constant at between 55 to 60%. Fruits and vegetables and related products account for about one-half of Canada's imports from the United States. U.S. fruit and vegetable exports to Canada continued to rise in the 1980s. In 1989, the United States accounted for 91% of Canada's fresh vegetable imports and 74% of fresh fruit imports, down slightly from the early 1980s.

The Canada–U.S. Free Trade Agreement went into effect on January 1, 1989. Tariffs on most agricultural products came down 30% as of January 1, 1991. Tariffs on some agricultural products have already fallen to zero under the accelerated tariff reduction provisions. Canada used the tariff snap-back provision to protect its asparagus industry in May 1990.

Turning to Canadian–Mexican trade, two-way trade between these two countries for all products was only $2 billion in 1989, compared with $52 billion for U.S.–Mexican trade. Canada was a net importer of Mexican goods, with exports of $524 million and imports of $1.4 billion.

Canadian–Mexican agricultural trade is small compared with U.S.–Canadian agricultural trade. Canadian agricultural exports to Mexico in 1989 were only $127 million and agricultural imports from Mexico equaled just $104 million. Except for 1986, Canada was a net exporter during the 1980s. Canada's main agricultural exports are wheat, canola, and dairy products. Imports from Mexico are more diverse and include tomatoes, peppers, cucumbers, frozen strawberries, melons, coffee, cotton, and beer and other alcoholic beverages.

4 Agriculture in the NAFTA Agreement[3]

The detailed provisions of the NAFTA entail a rather sizeable volume of fine print. The material presented in this chapter covers the main provisions pertinent to its understanding by informed laypeople. Those interested in more detail can find it in the paper by Josling and Barichello (1992), on which this section draws for some of its detail, or in the original agreement.

This section begins with some background on alternative mechanisms by which barriers to trade can be reduced. Then, three sets of provisions of the NAFTA are covered in the sections that follow. These include (1) general provisions of the agreement that have a bearing on the agriculture sectors of the three countries, (2) sanitary and phytosanitary regulations, and (3) environmental provisions.

Background

Barriers to trade can be reduced by a number of means. The most comprehensive institutions for discussing the reductions in such barriers are the General Agreement on Tariffs and Trade (GATT) and the periodic Multilateral Trade Negotiations (MTN) it sponsors. The GATT was established at the end of World War II when the U.S. Congress failed to ratify the treaty that would have established an International Trade Organization (ITO). The ITO, if it had been established, would have addressed issues of both international trade and investment policy. It also would have had an enforcement mechanism.

The GATT was cobbled together as an informal agreement among the then industrialized countries, with the goal of reducing tariffs protective of the manufacturing sectors of those countries. Its membership has since grown to include over 150 countries, and the forms of protection it now considers have grown substantially.

The periodic Multilateral Trade Negotiations, as its name implies, tries to obtain simultaneous reductions in barriers to trade among the members of the organization, with systematic implementation of the most favored nation principle. The current round of MTNs, referred to as the Uruguay Round, is the eighth such set of negotiations in the period since the GATT was established. The previous round, referred to as the Tokyo Round, ended in 1979.

An important issue in taking stock of the NAFTA is that it has been negotiated at the same time the Uruguay Round negotiations have been taking place. Provision is made in the NAFTA for whatever agreements, if any, might be reached in the ongoing GATT negotiations.

Other vehicles for lowering barriers to trade are the various exercises in regional economic integration, such as European Community–92 (EC–92), the Canada–United States Free Trade Agreement, the NAFTA itself, and Mercado Común del Sur (MERCOSUR)—the proposal to further economic integration among Argentina, Brazil, Paraguay, and Uruguay. These formal attempts at obtaining systematic economic integration vary a great deal, although there are basically two types. The first is the attempt to establish a common market. Examples of this kind of economic integration include the European Economic Community (EEC) and the Central American Common Market (CACM). Efforts to create a common market typically include the erection of common barriers to trade for the members of the participating countries, together with a reduction in the barriers to trade among the participating countries.

Such agreements tend to be trade diverting in the sense that they reduce trade of the member countries with the rest of the world. They tend to create suspicion among those who favor freer trade in general and among those who might be affected in a negative way. A common concern about the NAFTA, for example, is that it can lead to a world of trading blocs and eventually to trade "wars."

The experience with the EEC illustrates how such arrangements can vary in degree. In its early stag-

[3]This section draws, although not exclusively, on a paper by Josling, T. and R. Barichello. December 1992. Agriculture in the NAFTA: A preliminary assessment. *C. D. Howe Symposium on the North American Free Trade Agreement*, December 5–6, 1992, Toronto, Canada.

es, barriers to trade were reduced within the EEC, but barriers to resource mobility across national boundaries, and especially for labor, remained in place. Each country maintained its own currency and its own independent central bank. The goal of EC–92, however, has been to reduce all barriers to trade in goods and services and to permit free mobility of labor and capital. The goal of the Maastricht Treaty was to establish a common currency for the EEC, with a common exchange rate vis-a-vis the rest of the world. The establishment of a common currency implied the establishment of a common central bank and fiscal policy and, eventually, political union.

The second kind of economic integration is the establishment of a free trade agreement. Examples include the Canada-United States Free Trade Agreement and the NAFTA. In these cases, there is no attempt to raise protectionist barriers against the outside world. However, the reduction of barriers to trade among the participating countries can still be trade-diverting, although typically less so than with the establishment of common markets. Free trade agreements also permit the continuation of independent monetary systems and typically do not envisage free mobility of labor, although they do envisage free mobility of capital.

The third vehicle for the liberalization of trade is for countries to do so unilaterally. From this perspective, individual countries perceive that freer trade is its own reward and undertake trade liberalization without extracting concessions from trading partners. The significant reduction in barriers to trade on the part of Mexico in recent years is an example of such unilateral reduction in barriers to trade.

There are a number of other issues worth considering before beginning a discussion of the provisions of the NAFTA. The first is that lowering barriers to trade can take the form of increasing access to markets by the lowering of tariffs and nontariff barriers to trade. This is the kind of protectionist barrier that is generally considered in trade negotiations. The goal is to broaden markets by increasing the access to domestic markets by foreign producers.

An alternative barrier to trade includes those measures that limit the access of domestic producers to the international market. Such barriers include overvalued exchange rates, export taxes, and export licenses that limit the amount of exports. This kind of barrier is important in the case of agriculture in the developing countries. In fact, as a distortion to trade, it may empirically be much more important than barriers that limit access to domestic markets. However, such barriers to trade are seldom considered in trade negotiations. This is an important oversight and could be significant in the NAFTA should Mexico return to discriminating against its agriculture, as it has done in the past. Such barriers to trade are important in terms of attaining global efficiency in the use of global resources.

Still another important barrier to trade that is generally ignored in trade negotiations is distortions in exchange rates. For example, an overvalued currency—one that is worth more than markets would imply, is at one and the same time an implicit tax on exports and an implicit subsidy on imports. An undervalued currency, in contrast, is an implicit export subsidy and an implicit tariff. As in the case of protectionist measures, which limit the access of domestic producers to international markets, these forms of protection are empirically very important. However, they are not usually on the agenda for trade negotiations. An important exception is the pressure the United States applied on Japan to have the latter stop undervaluing its currency and, thus, to reduce its export subsidies.

Finally, there is the whole set of domestic policies that can under certain circumstances be barriers to trade. Domestic commodity programs are an important example. The use of subsidized credit is another. To further illustrate, domestic commodity programs based on producer payments can be an important form of export subsidy if the target price is set above what would otherwise be market clearing levels and the domestic price is permitted to fall to its market clearing levels. This describes the wheat program in the United States. Domestic marketing orders also can be an important form of a nontariff barrier to trade. Judicious choice of the characteristics that define the marketability of a commodity can effectively preclude foreign products from the market.

General Trade Provisions

In turning to the general provisions of the NAFTA that have implications for agriculture, these include those that clarify and streamline the customs administration procedures; those that attempt a clear statement of principles to govern the operation of national standards, which affect trade; those that aim to improve the dispute settlement provisions of the Canada–United States Free Trade Agreement; and the addition of a permanent commission and secretariat to offer a degree of institutional support and continuity to the agreement. There also are implications for agriculture of the decisions on intellectual property rights and on investment in Mexico.

Two features of the general provisions of the agreement are important. The first is the general tendency to replace nontariff barriers to trade with tariffs. This is generally viewed as a positive accomplishment. The disadvantage of nontariff barriers is that producers in the international economy cannot get over them even if they are more efficient producers. With tariffs, however, the foreign producers can, in principle, get over the tariffs. In general, this will stimulate more efficiency in the domestic economy.

The second feature is the general tendency to phase out current levels of protection over a period of years. The advantage of such a procedure is that it allows producer and labor groups to adjust to the new conditions envisaged by the agreement. This provides for a more orderly adjustment and transition to the new conditions and makes it less necessary to deal directly with the adjustment problem.

On the issue of nontariff barriers to access, no nontariff barriers are to remain from the date of entry into force of the treaty, except for those specifically allowed by the GATT or by the NAFTA text. Existing nontariff barriers are to be converted into tariffs (often referred to as tariffication), with tariff-rate quotas as agreed to in the negotiations.

On the issue of tariffs, all of those on agriculture are, in principle, subject to elimination on the schedules agreed to in Chapter Three of the accord. However, a number of agricultural tariffs are scheduled for immediate reduction, while a few that are politically sensitive have relatively slow reduction schedules.

These categories are illustrated in Table 4.1, which is taken from Josling and Barichello (1992). Some generalizations on the pace of tariff reduction are as follows:

1. Canada and the United States will remove tariffs on most livestock commodities upon the entry into force of the treaty. Mexico already has duty-free entry for beef, but will phase out other meat tariffs over a decade.
2. Canada has scheduled tariff reductions on imports from Mexico of many fresh and processed fruits and vegetables on a 5-year schedule, starting from the level reached on imports from the United States under the Canada–United States Free Trade Agreement.
3. Cereal trade barriers into Canada also will be eliminated over 5 years. Many other agricultural products already enter into Canada duty-free. With the exception of the dairy, eggs, and poultry sectors, which are scheduled for tariff reductions, tariffs will cease to be major barriers to sales of agricultural products to Canada after 1998.
4. The United States has chosen a 10-year reduction period for several tariffs on fruits and vegetables and 15 years for a few of the more sensitive crops. However, the United States will reduce poultry, egg, flower, nut, cereals, and oilseed tariffs to zero from the start of the period.
5. Mexico will remove tariffs at once on several vegetables, as well as on flowers and nuts. However, it will use a 5-year reduction period for some tree-fruits and a 10-year period for the reduction of tariffs on other fruits, cereals, and potatoes. Mexico also is granted 15 years to reduce tariffs on corn and dried beans.

To summarize, the complete elimination of barriers that limit access is still some distance in the future. Canada has chosen to maintain protection on its most sensitive items, but allowed the pace of the Canada–United States Free Trade Agreement to determine the opening of the market to Mexican goods. The United States has chosen to remove more tariffs immediately, but to shelter a few sectors for 10 to 15 years. Mexico has followed the U.S. strategy of having long periods for tariff reductions for sensitive commodities, but also has made parallel exclusions from tariff reductions of the commodities most sensitive to Canada.

One way of thinking about the agricultural component of the NAFTA is to view it as a trilateral agreement that covers a range of agricultural trade issues, together with two new bilateral agreements between Mexico and the United States and between Canada and Mexico. These, when combined with the Canada–United States Free Trade Agreement, constitute a network of agreements on market access (and only on market access). In addition, each country has been granted a set of self-declared exceptions to the provisions of the NAFTA.

Table 4.2, taken from Josling and Barichello (1992), summarizes the trilateral component of the agricultural part of the NAFTA text. It indicates that the trilateral component of the agreement is relatively modest and relies heavily on the existence of a GATT agreement in the Uruguay Round, which covers the same areas of trade policy. Among other things it includes a general statement that encourages the parties to the agreement to work together to lower trade barriers so as to improve access to their respective markets, while leaving the main action to the bilateral accords. It also allows the participating

Table 4.1. Tariff reduction schedules for agricultural products under the North American Free Trade Agreement (NAFTA) (NAFTA tariff phasing, preliminary draft, 9/3/92)

Category	Canada	USA	Mexico
(A) Tariffs reduced to zero on 1/1/94	Beef Sheep meat Honey Beans	Beef Pig meat Sheep meat Poultry meat Milk Oilseeds Oilseed cake Flowers Nuts Grapes Wheat Flour Eggs Beans	Honey Tomatoes Onions/garlic Cocoa Flowers Orange juice Most vegetables Fruit Coffee Spices Nuts
(B) Tariff reduced to zero in 5 stages to 1998	Potatoes Tomatoes Onions Apples Flour Most vegetables Processed vegetables Fruit Wheat Barley Maize		Horse meat Offal (except beef, pigs) Apricots Plums
(C) Tariffs reduced to zero in 10 stages to 2003		Honey Tomatoes[a] Citrus fruit	Pig meat[a] Sheep meat Wheat Potatoes[b] Apples[a] Peaches Strawberries Offal (beef, pigs) Oilseed cake Rice Flour Grapes Barley
(C+) Tariffs reduced to zero in 15 stages to 2008		Onions Peanuts Avocados Orange juice Asparagus Melons	Maize[c] Dried beans[c]
(D) MFN free tariff at present	Live cattle Pig meat Offal Coffee Soybeans Oilseed cakes Other oilseeds Orange juice Nuts Fruit Grapes	Live cattle Pig meat Offal Soybeans Apples Coffee Spices	Live cattle Beef Soybeans Other oilseeds
Exclusions	Poultry Eggs Milk		Poultry Eggs Milk

[a] Tariff rate quota accompanying the tariffs over the ten-year period.
[b] Uneven ten-year reduction with major reductions starting in seventh year.
[c] To zero in 15 years with major reductions starting in the seventh year.
Note: Commodities are characterized in this table by the phasing schedule operative for most of the tariff subheadings for that commodity. A number of exceptions appear in the schedules of all three countries. More detailed schedules should be consulted for these details.

Table 4.2. Trilateral components in the North American Free Trade Agreement (NAFTA) agriculture chapter (articles 703-707, NAFTA draft, 10/3/92)

Area	Provision
Market access	To work together for improved access Safeguards allowed on listed commodities
Domestic support	Work toward minimal distortions to trade
Export subsidies	Cooperate in GATT for elimination Match third country subsidies in importing Internal export subsidies allowable if both parties agree
Institutions	Set up Committee on Agricultural Trade Set up Advisory Committee on Disputes

Table 4.3. Agricultural products under special safeguard provisions of the North American Free Trade Agreement (NAFTA) (Annex 7033, NAFTA draft 10/7/92)

Canada	Mexico	USA
Broccoli	Apples	Chili peppers
Cucumbers	Live pigs	Eggplant
Cut flowers	Pig meat	Onions
Onions	Potatoes	Squash
Strawberries		Tomatoes
Tomatoes		Watermelon

Note: Safeguards often apply only to imports at certain periods of the year.

countries to invoke "special" safeguards for selected (national) lists of commodities that represent the items judged to be most import-sensitive (Table 4.3). Safeguards involve the temporary reimposition of protective measures to restrain what are judged to be unusual flows of imports.

The following is a brief description of some of the important provisions of the trilateral component of the agreement:

1. On **domestic support**, there is little more than an injunction to work together toward domestic support measures that have minimal trade distorting effects, while recognizing the right of participating countries to change support measures subject to GATT obligations. While avoiding the discussion of a contentious issue, this approach glosses over the fact that trade agreements almost inevitably influence domestic policy.
2. On **export subsidies**, the agreement states that the participating countries share the multilateral elimination of such distortions to trade. However, it allows participants to use subsidies to match subsidies provided by a country outside the agreement. Moreover, it allows their use if the importing and exporting countries agree to their use. Josling and Barichello (1992) speculate that this provision was included to enable Mexico to continue to take advantage of the agricultural export assistance programs of the United States.
3. On **institutional mechanisms** for administering the arrangements, a Committee on Agricultural Trade is established, as is an Advisory Committee on Private Commercial Disputes Regarding Agricultural Goods for dealing with disputes.

The bilateral components of the arrangement, of course, contain most of the details that will determine whether the NAFTA makes a real impact on the agriculture of the region (Table 4.4). Some complementary comments are as follows:

1. The U.S.–Canada bilateral element is essentially the agricultural provisions of the Canada–United States Free Trade Agreement.
2. It is the U.S.–Mexico bilateral that breaks new ground. An important element of this agreement is a waiver of rights to impose quantitative restrictions (permitted by the GATT) when imports disrupt domestic supply control programs, as well as those applied under Section 22 of the U.S. Agricultural Adjustment Act when domestic programs are threatened by imports. In principle this is a significant concession on the part of the United States, and presumably represents a judgment on the part of the negotiators that Mexican supplies are not likely to cause significant harm to U.S. farm programs.
3. On **sugar**, a particularly contentious issue from the U.S. side, the United States and Mexico have negotiated a complicated path toward free access into the U.S. market *by the end of 15 years*. Mexico retains its present quota of 7,258 tons of raw sugar. If Mexico should produce a surplus of exports over imports, a fixed amount of sugar, set at 25,000 tons, can enter the U.S. duty-free for each of the first 6 years. Thereafter, the quantity increases annually, jumping to 150,000 tons in the 7th year and rising by 10% thereafter. If, however, Mexico should become a consistent net exporter of sugar, then the quantitative restrictions are removed after the 6th year.

Table 4.4. Bilateral provisions of the North American Free Trade Agreement (NAFTA) agriculture chapter (Annex 703.2, NAFTA draft, 10/3/02)

United States–Mexico	Canada–Mexico
Each party waives rights under Article XI:2(c) of General Agreement on Tariffs and Trade (GATT)	Rights under Article XI:2(c) Tariffs and Trade (GATT) incorporated in NAFTA for dairy, poultry, and egg goods
Each party waives rights if GATT bindings are broken by NAFTA schedules	Each party waives rights if GATT bindings are broken by NAFTA schedules
United States will not impose Section 22 fees	
No VERs necessary for meat	No VERs on agricultural goods
Limits on duty drawbacks	
Free access to U.S. sugar market after 15 years, with opening quota for Mexico, expanded after six years. If Mexico is a net sugar exporter, quotas removed after six years	Mexico applies Most Favored Nation (MFN) tariff to sugar from Canada Canada applies same tariff to Mexican sugar
Mexico applies U.S. MFN tariff on sugar after 6 years	
Grading standards applied on a "national treatment" basis	
Working party for grading and standards	Working party for grading and standards

Note: U.S.–Canada bilateral arrangements under FTA are incorporated in the NAFTA.
VERs = Voluntary Export Restraints.

4. On **marketing orders**, a concern of Mexico, the NAFTA text ensures "domestic treatment," which means no discrimination against Mexican products. It also sets up a U.S.–Mexican Committee to deal with these problems.
5. The bilateral agreement between Mexico and Canada stands in sharp contrast to that between the United States and Mexico. For example, the GATT-permitted right to impose quantitative restrictions when imports disrupt supply control programs is specifically retained with respect to dairy, poultry, and eggs. Canada, thus, keeps its quantitative import restrictions that are tied to the market control policies of its marketing boards for these commodities. Mexico also is allowed to impose quantitative restrictions on such goods coming from Canada, although it is not clear what that means so long as there are not similar restrictions permitted on goods coming in from the United States. Canada does agree not to require voluntary restraint agreements on Mexican exports of agricultural goods.
6. For **sugar**, Canada does not enter the more open market between the United States and Mexico. Canada and Mexico will impose and retain Most Favored Nation (MFN) tariffs on sugar in bilateral trade.
7. Canada and Mexico have agreed to institute similar arrangements on **grading and standards** to deal with problems that might arise.

Sanitary and Phytosanitary Regulations

Sanitary and phytosanitary (SPS) regulations often are used as disguised barriers to trade. An example is a U.S. regulation that says any commodity that comes into the country with soil on it is prohibited. Although such a requirement eliminates a potential threat, it also increases the costs of commodities to U.S. consumers.

The NAFTA gives considerable attention to sanitary and phytosanitary regulations, in contrast to the Canada–United States Agreement, which largely deferred a discussion of them to the future. A great deal of the extra detail in the agreement is drawn from the Dunkel text of the Uruguay Round and is compatible with a possible GATT agreement. The provisions leave individual countries a great deal of latitude to set their own standards. However, they are constrained to offering national treatment to imports and equal treatment to countries with similar conditions.

On the negative side, the language of the agreement still is heavily laden with "shoulds" and "mays." There are few enforcement mechanisms to assure that these measures do not become barriers to trade. Nevertheless, a clear statement of principles is enunciated, even if enforcement mechanisms are lacking. In conjunction with the dispute settlement procedures, the statement of principles should be helpful.

Chapter Nine of the agreement deals with standards-related measures and invokes four main themes:

1. The independence of each country in taking its own standards-related measures, including the level of protection it deems appropriate, is affirmed. This includes the right to prohibit the importation of another country's goods that fail to comply with the requirements of these measures.
2. The measures taken must be applied in a nondiscriminatory fashion to all goods, whether domestic, imported from a NAFTA partner, or imported from another country.
3. The application of these measures must include no unnecessary obstacles to trade.
4. In the design and implementation of these measures, international standards should be used whenever possible (although tougher standards can be imposed), with the goal of making standards compatible across the NAFTA countries and demonstrating equivalence in these standards whenever possible.

The chapter on agriculture in the agreement covers a set of topics with generally greater detail on the types of problem areas and associated remedy measures. The section that deals with these issues starts with a definition of SPS regulations. They are defined as any measure adopted, maintained, or applied to (1) protect animal or plant life or health from risks arising from pest or disease; (2) protect human or animal life or health from risks from presence of additive, contaminant, toxin or disease-causing organisms in food, beverage, or feedstuff; (3) protect human life or health from risks from disease-causing organisms or pests carried by animal, plant, or product thereof; and (4) prevent or limit damage from introduction, establishment, or spread of a pest.

The choice of SPS measures is more constrained than in Chapter Nine. First, they are to be science-based and not maintained when there is no longer a scientific basis for them. Second, they must be based on appropriate risk assessment. Third, these measures should be applied only to the extent necessary to achieve the appropriate level of protection and should not include measures that attempt to create or have the effect of creating disguised restrictions on trade.

The agricultural chapter also contains a stronger statement on harmonizing SPS measures among the participating countries than is found in Chapter Nine. The statement on using scientific evidence to justify the measures also is stronger in the chapter on agriculture.

The section on risk assessment also is more specific than in Chapter Nine. One element of this greater detail is the role ascribed to economic factors in making risk assessments. Greater attention also is given to the issue of adapting SPS measures to local or regional conditions.

Food safety is a special concern in the United States and consumers want to be assured that imported food will not be a health hazard. Microbiological contaminants were discussed earlier in this section, but chemical residues also are an issue. Current standards that define what is excessive for chemical residues are at extremely low levels. Recent developments in biotechnology raise further food safety issues, as in the case of the bovine somatotropin (BST) growth hormones for dairy cattle and possibly other animals. This is an issue that is yet to be resolved even in the United States, where such hormones are close to being released for general use.

The challenge in applying the codes of the agreement on the above issues will be to establish realistic standards that do in fact protect consumers while at the same time not acting as barriers to trade. Economic considerations—comparisons of costs with benefits—should be given more attention in such considerations. The use of scientific sampling techniques for the collection of data also should be given more emphasis.

Environmental Provisions

Environmental concerns have been a controversial issue for agricultural producers in the United States. They fear that environmental regulations in this country impose costs on producers that their competitors in Mexico, in particular, do not have to face.

The provisions on SPS standards entail many of the environmental issues and should provide ample protection in principle against discriminatory practices. Moreover, the environmental provisions of the agreement attempt to establish the same standards for Mexico as prevail in the United States. The difficulty is in the disparity in enforcement capabilities between the two countries, with Mexico having much less capacity for enforcement than the United States.

President Clinton has proposed that there be a side agreement to the NAFTA that will provide stronger provisions than in the agreement itself. Both the Canadian and Mexican governments have objected to such side agreements. It is not clear at this writing how the U.S. Congress will view such objections, or what will eventually be worked out. As of this writing, all but one of the major environmental groups have agreed to support the agreement, presumably because they think an agreement with some restrictions in it is better than none. It seems likely that many of the environmental issues will be worked out as the agreement is implemented should the treaty be ratified.

In assessing the significance of the environmental issue, a number of points are worth emphasizing. First, although it still is not equal to U.S. standards, Mexico has made some remarkable progress in the past five years in improving its environment.

Second, the environmental conditions demanded in the United States are much different than the environmental issues that challenge Mexico. Mexico is concerned with polluted air and water and unsafe sewage disposal, all of which have important health consequences for its population. With its limited resources it is likely to focus on these issues, so critical to the health of its citizens, before it embarks on issues more familiar and of more concern to U.S. citizens.

Third, there is a body of accumulated evidence that a cleaner environment is a normal or superior good. That is, as per capita incomes rise, citizens demand and are willing to increase payments for a cleaner environment. U.S. citizens have demanded a cleaner environment as their levels of per capita incomes have risen over time. The same can be expected for Mexico. The challenge in negotiating this agreement has been to establish nondiscriminating standards across countries with such disparate levels of per capita incomes.

Finally, a free trade agreement with Mexico will help institutionalize the very significant reforms Mexico has made in its economic policy. This agreement will help assure that Mexico enters a period of sustained economic growth, which will not only give it the resources it needs to clean up the environment, but also will increase the domestic demand for a cleaner environment.

5 Projected NAFTA Effects on U.S. Agriculture

In this section we attempt to pull together in a summary fashion the projected effects of the NAFTA on U.S. agriculture. These effects are discussed at the following levels: (1) economy-wide, (2) sectoral, (3) commodity-specific, (4) processed foods, and (5) regional effects.

There have been a relatively large number of attempts to make estimates of the expected impact of trade liberalization under the NAFTA. Most of these have been done through the use of empirical models of the agricultural sector or of its individual subsectors. Unfortunately, there is considerable variation in the size of the predicted effects, based in large part on differences in approaches and in the assumptions on which the models are based. Fortunately, there is considerable consistency in the direction of the expected effects. Thus, we will tend to discuss the projected effects in general terms, rather than to report point estimates.

Prior to entering a discussion of these effects, it is useful to provide a brief review of the state of existing trade patterns and to discuss developments in the Mexican agricultural sector, where substantial reform already is taking place. These reforms further complicate the development of consistent estimates of the effects of liberalization under the agreement.

Background

Mexico is the third largest trading partner of the United States, after Canada and Japan, with bilateral trade amounting to $59 billion in 1990. U.S.–Mexican bilateral trade in agricultural products reached a record level of $5.1 billion in that same year, which was about $1 billion higher than in 1988. Mexico was the fourth largest single market for U.S. farm exports, after Japan, Canada, and Korea, and fifth if the EC is included as a group. U.S. farm exports to Mexico attained a record high of $2.55 billion in 1990. As a source of products, Mexico was this nation's second largest supplier of agricultural imports after Canada, with total Mexican shipments of a record $2.6 billion in 1990.[4]

Agricultural trade relative to agricultural gross domestic product is far more important to Mexico than it is to the United States. In addition, much of the United States and Mexican agricultural trade tends to be complementary in the sense that each country exports products that the other country produces in limited quantities. For example, the major U.S. agricultural imports from Mexico in 1990 were fresh vegetables, live cattle, coffee, fresh noncitrus fruits, and fresh melons. The major U.S. agricultural exports to Mexico in 1990 were corn, grain sorghum, soybeans and soybean products, sugar, dried beans, seeds, beef and veal, animal fats and oils, cattle hides, dairy products, poultry meat, live cattle, and wheat.

Horticultural products now make up a major part of U.S. agricultural imports from Mexico and have grown more rapidly than other agricultural imports from that country. In recent years, Mexico also has become an important U.S. supplier of processed foods, including tomato paste and beverages, such as fruit juices and beer. From the U.S. side, grains have typically been the largest export item. Exports of dairy, livestock, and poultry products have grown the most rapidly in recent years.

In assessing the expected effects of the NAFTA, it is important to note that Mexico has been engaged in a substantial process of policy reform. It substantially devalued its currency in real terms for a period of time, which has reduced the discrimination against its agricultural sector. Imports of agricultural commodities no longer enter with an implicit subsidy from an overvalued currency, although Mexico continues to receive modest amounts of food aid that discriminate against its producers. The United State's export enhancement program has similar deleterious effects on Mexican producers.

[4]The data in this paragraph and others that follow, are from U.S. Department of Agriculture, Economic Research Service. 1992. *Agriculture in a North American Free Trade Agreement: Analysis of Liberalizing Trade Between the United States and Mexico.* Economic Research Service, U.S. Department of Agriculture, Washington, D.C.

Mexico has acted to further shift its internal terms of trade in favor of the agricultural sector by unilaterally reducing the protection of its manufacturing sector. This shift to more favorable domestic terms of trade makes agriculture a more profitable sector in which to invest.

Recently, Mexico has undertaken significant reforms of its agricultural sector per se. The communal system of owning land, imbedded in the *ejido* system, is being phased out and the land transferred to private ownership. This reform will reduce the incentives of many rural people to remain on the land and probably result in a significant migratory flow to urban areas in which significant increases in employment will be needed to absorb them. A significant increase in resource efficiency within the agricultural sector also is likely. Increased efficiency can have important trade effects.

Mexico also has taken steps to reform its food distribution system. CONASUPO, the parastatal that spans a significant part of the food distribution system, is being phased out and the food distribution system is being privatized. This should increase the efficiency of the food distribution system. This privatization of both the production and distribution sectors will not take place immediately, however, and may result in some disruption in the short term. In the longer term it should lead to a more efficient and competitive food and agriculture sector.

Finally, the banking and financial system of Mexico also is experiencing significant privatization. If this process should continue to the point at which true financial intermediaries are developed for the agricultural sector, it, too, should contribute to a more vital and productive agricultural sector.

Economy-Wide Impacts of Trade Liberalization

As noted earlier in this report, most estimates of the effects of trade liberalization are based on static models. Most of those to be reported below suffer from this same defect.

As Kehoe (1992) has noted, the dynamic effects of trade liberalization, through their induced effects on investment and the adoption of new production technology, can be expected to swamp the static effects. For that reason, it is worth trying to make judgments about just how large these dynamic effects might be.

The starting point for such an analysis is to note that in 1985 Mexico was one of the most closed economies in the world. Tariffs were as high as 100%, licenses were required to import all goods, and laws prohibited foreigners from investing in the stock market or, with a few exceptions, from owning more than 49% of any business or private property (Kehoe, 1992).

Trade liberalization and the reduction of restrictions in the capital market have resulted in a substantial flow of capital to Mexico, much of it the return of Mexican capital that left the country in the 1960s and 1970s. This flow of capital is important in its own right. However, it also has an important related effect. It bids up the real value of the peso relative to the U.S. dollar. From an index of 100 in 1980, the real value of the peso relative to the U.S. dollar fell to an index of 181 by the end of 1987. It has since risen very significantly, to a level of 107 toward the end of 1991. This rise in the value of the peso could swamp the effects of the reduction in trade barriers. This is important in assessing the effects of the NAFTA. A rise in the real value of the peso is a disincentive to Mexican exports, while it is a boost to imports. Thus, the effects of the trade liberalization may be significantly more favorable to U.S. producers than the static estimates suggest.

Foreign direct investment in Mexico has increased dramatically in recent years. Although these flows cannot be expected to solve all of Mexico's problems, they can contribute mightily to an increase in labor productivity and to the expansion of the economy. Kehoe (1992) shows that if these flows could lower the real interest rate from its present level of 28% to about 5%, the capital-labor ratio in Mexico would increase by a factor of about 5.5. He further estimates that this would increase Mexican output per worker to about $24,300, which would close the current gap with the U.S. level by about 42%. Such increases in productivity are the basis of significant increases in per capita incomes, and increases in per capita incomes are the basis of expanding markets.

Such increases in productivity have a number of spillover effects which Kehoe (1992) discusses. For example, they would create a more stable economic environment in Mexico and thus encourage more private investment in the economy. This would help lock the Mexican government into the liberal policies it has undertaken unilaterally. It also would reduce the protectionist pressures from the United States that are rooted in the low wages in Mexico.

This increase in productivity in Mexico and the implied rise in wage rates also would reduce the incentives for Mexican workers to migrate to the United States. This would be viewed with favor by some in the United States. It might be viewed with less favor by the agricultural sector, especially those that depend on migratory labor for the production of labor-intensive commodities.

The increased openness of the NAFTA would promote economic growth in other ways as well. For example, it would enable Mexico to specialize in certain product lines and attain more experience in these industries (Kehoe, 1992). Increased openness also allows a country to import more specialized inputs for the production process. Moreover, trade allows a country to import these inputs without developing them itself. In effect, by importing these products a relatively small country such as Mexico can grow as fast as a large one.

Kehoe (1992) summarizes his analysis of these dynamic effects by observing that Mexico has more to gain from free trade than do Canada or the United States. Both of the latter two countries already are fairly open economies, and the United States is big enough to exploit its dynamic scale economies. Mexico, however, has a smaller internal market. To follow an export-led growth strategy, Mexico must look to the United States.

In conclusion, U.S. agricultural interests have much to gain from the dynamic growth effects freer trade is expected to bring to Mexico. The competitive pressures from Mexico are likely to be much less than expected simply because the domestic market for commodities that compete with U.S. producers will be large and perhaps larger than domestic suppliers can supply. At the same time, the Mexican market for commodities the United States producers can be expected to supply is likely to be stronger than expected from the static models whose results will be reported below.

Agricultural Sector Impacts

Three conceptually different approaches have been taken to the estimation of the effects of the NAFTA on agriculture. These include the use of computable general equilibrium (CGE) models that encompass entire national economies, partial (sectoral) models that nonetheless treat a broad range of products, and specific commodity studies. As Josling (1992) points out in his review of virtually all of the studies, the CGE approach is most satisfactory on conceptual grounds given the complex economy-wide adjustments that both Mexican unilateral liberalization and the NAFTA imply. Unfortunately, existing models almost necessarily drastically simplify complex intra and intercommodity situations within agriculture. Moreover, existing CGE models, despite their nominal comprehensiveness, fail to treat satisfactorily the crucial dynamic effects discussed in the previous section. Thus, CGE results are most interesting when used in comparison with forecasts developed using more detailed sectoral information.

Given the short period of time since the conclusion of the negotiation of the NAFTA, it has not been possible to develop comprehensive models to analyze the effects of the agreement and test them thoroughly. As noted, different approaches also are useful for different purposes. Despite these caveats, it seemed useful to present the results of some of these attempts at estimating the effects of the agreement so the reader has an appreciation of at least the relative effects that formal modeling efforts suggest.

The U.S. Department of Agriculture's (USDA) Economic Research Service (ERS) has developed estimates of the sectoral effects of trade liberalization for both Mexico and the United States. (These results are taken from Barichello and Josling, 1992.) The model suggests that U.S. exports of agricultural products to Mexico are expected to increase by $480 million under a preferential trade agreement, with some reduction in exports to the rest of the world. Mexican exports are increased by about $170 million if the United States agrees to give preferential access. U.S. farm income is projected to increase by $200 million under the agreement. Consumers are expected to pay somewhat higher prices due to higher exports and firmer markets, and the government, accordingly, saves some farm program costs. On balance, the U.S. economy gains about $300 million from the agreement.

Prospects for Mexican farmers are less positive if dynamic effects are ignored. There is a possible decline of $440 million in farm income if Mexico enters a NAFTA agreement. Because of significant gains to consumers through lower prices, net benefits to Mexico are positive, at about $100 million, somewhat less than the benefits to the United States. (These estimates ignore dynamic effects.) U.S. grain and oilseed exports would rise by $370 million, and Mexican horticultural exports would expand by $100 million. This model also predicts a gain in Mexican livestock exports of nearly $60 million, due to a substantial increase in feeder cattle exports to the United States. In summary, both the United States and Mexico gain from the mutual reduction in trade barriers, but Mexican farmers would be adversely affected under static conditions, while U.S. farmers would stand to benefit.

Based on the same study, estimates of the overall distribution of welfare by types of beneficiary and broad agricultural sector also have been developed (Table 5.1). The concepts of welfare used in this table are not the same as income, but they are somewhat similar. To further illustrate, the –260 for consumer welfare for grains and oilseeds in the United States column means that U.S. consumers will be worse off by the equivalent of $260 million as a consequence of the agreement. This is because U.S. farm prices are expected to rise as a consequence of the agreement. These estimates assume that full adjustment to the agreement has been reached.

Table 5.1. Impact of the North American Free Trade Agreement (NAFTA) on sectoral welfare by commodity group (millions of dollars)

Item	United States	Mexico
Producer welfare		
Grains and oilseeds	338	–392
Livestock, meats, and dairy	–89	1,472
Horticulture	–31	32
Consumer welfare		
Grains and oilseeds	–260	835
Livestock, meats, and dairy	72	–1,345
Horticulture	72	–12
Government costs		
Grains and oilseeds	–279	27
Livestock, meats and dairy	17	87
Horticulture	52	0
Net welfare		
Grains and oilseeds	357	28
Livestock, meats, and dairy	–35	40
Horticulture	–12	19

Source: Josling, T. E. 1992. NAFTA and agriculture: A review of economic impacts. P. 159. N. Lustig, B. P. Bosworth, and R. Z. Lawrence (Eds.). *North American Free Trade: Assessing the Impact.* The Brookings Institution, Washington, D.C. Citing work by Kissoff, B., L. Neff, and J. Sharples. January 1992. *Estimated Impact of a Potential U.S.-Mexico Preferential Trading Agreement for the Agricultural Sector.* Pp. 44, 45, 48. Economic Research Service, U.S. Department of Agriculture, Washington, D.C.

Commodity-Specific Studies

There are a number of issues to be discussed in this section. We draw on Barichello and Josling as a basis for the discussion, who in turn draw on a significant modelling exercise by the American Farm Bureau (1991).

The cereals sector is of special significance because it illustrates the difficulties Mexican political leaders will face under the proposed agreement. The Farm Bureau study (1991) confirms the magnitude of Mexican farm income losses due to a reduction in Mexican production because of increased imports. On the United States and Canadian side, Mexican deregulation will mean a slight strengthening of the cereals market, an increase in export sales, and an improvement in the terms of those sales.

Some of the difficulties faced by Mexican policymakers in deregulating their agricultural sector are illustrated by the attempt in 1989 to remove all trade restrictions on sorghum and to withdraw all state intervention in marketing. Policymakers had to back away from this effort at reform rather quickly. Barichello and Josling (1992) cite a study by Bivings (1992), which indicates that had policymakers allowed prices to play an equilibrating role, liberalized sorghum prices would have temporarily fallen far below their import parity levels at harvest time. The income loss to farmers would have been severe (over 20% in real terms) and immediate without reintroduction of support policies. Moreover, Bivings estimates that imports would have risen by almost 1 million tons. Barichello and Josling note that these prospects undoubtedly contributed to the government's decision to return to the sorghum market and purchase the entire 1990 summer crop to stabilize prices, and to delay the process of liberalization.

Barichello and Josling (1992) argue that this problem was caused by the lack of storage capacity in the private sector, the high cost of storage, and the lack of finance to support the carrying of stocks by the private sector. Weaknesses in the transportation infrastructure also contributed to the problem.

Another important finding from the Farm Bureau study (1991) is that U.S. exports of fruits to Mexico could actually increase, in addition to a more widely expected increase in Mexican vegetable exports. This is in contrast to the fears in both the United States and Canada that freer trade in this sector will result in substantial competitive pressures from Mexico. Moreover, it ignores the possible dynamic effects from the general liberalization of trade between the two countries.

As Josling (1992, 167) has reported, there is generally strong agreement among the various quantitative approaches when based on the same forecasting assumptions, and of these assessments with qualitative evaluations. There is generally a gain to U.S. producers of grain, oilseeds, and livestock, and losses for producers who compete with Mexican fruits and vegetables. U.S. corn sales to Mexico are forecast to increase in the range of 64 to 71%. Mexican exports of melons, cucumbers, green peppers, and tomatoes are expected to increase substantially. Avocados, currently much cheaper to produce in Mexico, will arrive in the United States when disease problems in Mexico are overcome. Frozen orange juice exports from Mexico will increase substantially. There is disagreement, however, over whether these imports will be at the expense of Brazil or Florida. To the extent there is a net increase in supply of orange juice, prices will decline. Consumers will benefit and producers will suffer income losses unless they become more efficient and lower their costs of production.

Food Processing

Substantial shifts in food processing are taking place in the North American market, some of which will be reinforced by the NAFTA. Because the restrictions on U.S. ownership of processing firms in Mexico has been recently lifted, U.S. investment in horticultural processing has been growing rapidly there. After falling 17% annually from 1983 to 1988, U.S. investment grew 81% in 1989 alone (USITC, 1991, 4–6). In the late 1980s, processed horticultural exports from Mexico were growing at 20% while other exports from the sector grew at 5%. Most of the major integrated fruit and vegetable producers now operate in both countries, and 12 of the 73 fruit and vegetable processing plants in Mexico in 1991 were owned or affiliated with U.S. firms (USITC, 1991, 4–6).

Although some new Mexican processing plants are as modern in design as those in the United States, observers have been cautious about forecasting a substantial movement of horticultural processing towards the source of Mexican imports. Carter (1992), for example, notes that labor productivity differences, the importance of labor as an input, ease of input substitution, transportation costs, and economies of scale can sometimes reverse apparent labor cost disadvantages. For what the evidence is worth, Canadian fears of a rapid loss of processing to the United States with the advent of the Canadian–U.S. Trade Agreement did not occur, although some consolidation of processing in the United States continued to take place, and Canada has no marked labor cost (or productivity) differences by comparison with the United States.

There seems much less likelihood that processing will shift to Mexico in response to increased exports of grain and oilseed products. The three principal processing industries (fats and oils, milled grain, and animal feed) are in highly concentrated, high technology, capital-intensive industries, and the larger U.S. firms are generally regarded as lower cost producers. Very considerable Mexican transportation and storage problems must be added to these advantages (USITC, 1991, 4–9).

In all of the sections in which food processing is important, sanitary and phytosanitary, as well as environmental, regulations are important in the same way they are important for the fresh products. Some of these regulations are necessary; others amount to artificial barriers to trade. To the extent these regulations are rationalized and made equivalent across the border, they should facilitate increased trade.

In summary, it is especially difficult to assess the full impact of the NAFTA on the food processing sector. Those in the trade seem to think that implementation of the NAFTA will make Mexico attractive as a place for investment in this sector. An important issue is whether this will involve primarily an expansion of the sector, or whether it will involve a relocation of plants from the United States to Mexico and, thus, a loss of jobs and markets for U.S. producers. The market for foods is growing rapidly in Mexico and within the foreseeable future may absorb whatever domestic increase in domestic supplies there may be. On the other hand, costs (including transportation and protective barriers) may be sufficiently low that a significant share of the sector may relocate. If that is what occurs, U.S. consumers, together with the processors, will be the net beneficiaries.

Regional Effects

As barriers to agricultural trade between Mexico and the United States are lowered or eliminated, the growth in trade will tend to be along existing lines. Existing barriers currently restrict the commodities that are already being traded. The fact that trade takes place despite these barriers suggests that they restrict trade in the commodities that have a comparative advantage.

Discussion of trade displacement usually takes place at the national level. In that sense, trade dislocation in the case of U.S. agriculture would be relatively small in the aggregate. However, these dislocations and benefits will tend to have strong regional dimensions. The fruit and vegetable producers in Florida, California, and Arizona will bear a significant share of the adjustment costs from trade liberalization. Most analysts believe these adjustments will tend to be concentrated in Florida. A major share of the producer benefits of freer trade will be realized in the midwest grain producing and livestock states, and possibly in dairy areas. Thus, the benefits will be realized in one part of the country, while the costs will be borne in another.

Some Final Thoughts on Expected Effects

There are two additional issues to consider in making a final assessment of the NAFTA on U.S. agriculture. The first is that the benefits to agriculture will go beyond the narrow subsector effects identified above. The effects of the NAFTA in the aggregate are to increase the demand for U.S. agricultural output. Although this increased demand will be reflected immediately in specific subsectors such as feedgrains, the increased demand will be beneficial for agriculture as a whole.

Second, the effects of the agreement will be spread out over time, although the United States has already benefitted from Mexico's lowering of trade barriers. Many of the positive benefits are still to be realized, however, especially those from the dynamic effects that will produce accelerated economic growth rates in Mexico. Thus, U.S. producers affected in a negative way can expect to have these effects spread out over time so they can make rational production adjustments. This also gives policymakers time to deal with the adjustment problem so the full benefits of the agreement can be realized.

6 Special Issues

In this chapter we discuss a number of special issues that follow from the material presented in the previous chapter. In some cases they involve "what if" questions about the future.

A Different Cuban Government

One of the issues that arose as preliminary drafts of this report were discussed was the implication of there being a change in government in Cuba that would bring with it a more market-oriented economy. This issue arose because Cuba has the potential to produce almost any of the fruits and vegetables that might be involved in trade among Mexico, Canada, and the United States. In fact, it has almost ideal conditions for producing some of those commodities. A potential problem arises because the United States would almost surely want to open trade with that country if political conditions should turn more favorable.

At least three issues seem important. First, the transition to a more democratic political system and a more market-oriented economy would not occur overnight. The experience in the countries of Eastern and Central Europe and in the former Soviet Union indicate that such transitions are difficult and that they take time. Thus, it is not likely that there would be a surge of exports from Cuba in the near future.

Second, one of the points made earlier would apply to this country. Economic reform will bring with it substantial increases in per capita income. These increases in income will cause Cuba itself to absorb a significant portion of the increased production that might arise from economic reform. That would help reduce export pressures. Nevertheless, for commodities for which Cuba has a distinct comparative advantage, such as sugar, increased exports could be possible if foreign capital was allowed to enter.

Finally, the United States could try to negotiate a trade agreement with Cuba, much as it has recently done with Canada and Mexico. In fact, it might be appropriate to try to bring Cuba into the NAFTA. If that were to be done, the pace at which trade would be liberalized could be spread out over time, much as is proposed in the present agreement.

Failure of the GATT Negotiations

This issue arises because the NAFTA has much of the proposed GATT agreement written into its text. If the GATT negotiations should indeed fail, these parts of the NAFTA would have to be negotiated independently. In effect, this would mean that the negotiations would have to be reopened.

It is difficult at this writing to say what will happen with the current GATT negotiations. It does not seem likely that they will be finalized during the period of the present extension. Whether the period to reach an agreement will then be extended again is an open question. Certainly, the United States has much to gain from a successful negotiation since what has already been agreed to is beneficial to U.S. interests. This suggests that Congress will likely agree to extend the period for the negotiations. If it were to do so, this might mean a delay in the implementation of the NAFTA.

Immigration Flows

The past decade has witnessed very sizeable flows of migrants from Mexico to the United States. There is considerable difference of opinion over whether a successful ratification of the NAFTA will increase or decrease that flow. The balance of opinion, however, suggests that the flow might well accelerate in the short term, but decline over the longer term (Vialet, 1993).

The members of this CAST task force tend to agree with that analysis of future developments. Two factors are likely to be important in the short run. First, Mexican farmers bear a major share of the burden of adjustment on the agricultural side of the agreement. The Mexican grain sector in particular is expected to suffer income losses in the short term. Second, the reform of the *ejido* system and the granting of private property rights to Mexican peasants reduces the incentive for them to remain squatters on their land to retain access to it. The combination of these two developments should provide ample incentives for the peasants to seek employment elsewhere. In the short term, employment in the United States may seem as attractive as employment in urban sectors in Mexico, depending on the relative growth rates of the two economies.

In the longer term, the economic forces are likely to work in the opposite direction. More rapid economic growth in Mexico, together with continued growth in the labor-intensive manufacturing sector, should not only narrow the wage and income gap between the United States and Mexico, it also should expand employment opportunities for semiskilled labor within Mexico. In fact, by locking in the economic reforms that Mexico has already undertaken, the NAFTA may do as much as anything over the longer term to reduce the flow of immigrants into the United States from Mexico.

Dealing with the Adjustment Problem

An economy as dynamic as that of the United States faces labor adjustment problems on an almost continuous basis. New jobs are always opening up, while old ones disappear. Periods of unemployment, such as the United States has experienced in recent years, complicate the process of adjusting the labor force from areas and sectors in which employment is declining to those in which it is expanding.

Trade liberalization, as proposed in the NAFTA, creates its own special adjustment problems. New employment opportunities open up, while others disappear. In this context, an important part of the adjustment implied by the NAFTA, especially in the nonfarm sector, has already occurred. Nevertheless, positive labor adjustment policies are needed to ease the burden of adjustment for those who experience dislocation from freer trade. Some of these will undoubtedly be in agriculture.

The key to dealing with the adjustment problem is to help those being dislocated to acquire skills for employment in alternative jobs. Thus, training and retraining programs are an important part of addressing this problem. These programs need to be offered in those regions in which labor is likely to be unemployed as a consequence of the NAFTA. That seems most likely to occur in Florida.

Another way of dealing with this problem is to provide literacy skills to those who need them. Many workers at the lower end of the wage structure are not literate. This includes many of the stoop workers and those who do harvesting work in the fruit and vegetable sector.

To be fully effective, both retraining programs and literacy programs should be made available to all members of the family who need it. Most families in today's world have multiple participants in the labor market.

A still more ambitious program for dealing with the labor adjustment problem would be to help employees and their families relocate to alternative locations for employment. The U.S. federal income tax system provides a means of providing subsidies for such geographic changes in employment. However, if families have very low incomes, they may not be able to benefit from this system. Moreover, even if they should, they may not have the financial resources to make a move possible. In those cases, subsidized credit or outright grants to assist in relocation and provide temporary sustenence until alternative employment is obtained would be desirable.

Finally, there is another kind of labor adjustment problem that may need attention. Given the expansion of trade opportunities the NAFTA envisages, there may be regions in which the problem may be *lack* of workers, not an excess or unemployment. In those cases, the same policies apply. Training programs that provide unemployed workers the needed skills should be provided, as well as the means to bring workers in from other regions. This problem of lack of qualified workers could become important if the U.S. economy continues to expand, and if the migratory stream from Mexico should decline in response to ratification of the treaty.

In any case, making a commitment to deal with the adjustment problem is an important part of gaining approval for the NAFTA, as well as other steps toward trade liberalization. Dealing with the adjustment problem also is the key to fully realizing the benefits of trade liberalization and of avoiding political backlashes as the agreement is implemented.

Science and Technology Policy

A proper science and technology policy for U.S. agriculture also can play an important role in helping this sector adjust to the new trading opportunities opened by the agreement. Productivity-enhancing new production technology is the key to remaining competitive not only with other states, but with other countries. Thus, the United States, and individual states, for that matter, should sustain their investments in agricultural research and in their respective

Extension Services. This can be an important way of dealing with expected adjustment problems, and complements the labor adjustment policies considered above.

There are a number of dimensions to such a policy. First, research efforts should be directed to making U.S. producers more competitive in commodities for which there is head-to-head competition. Second, research efforts also should be directed to identifying and improving the competitiveness of commodities which might replace those that cannot remain competitive. Finally, the Extension Services should mount special efforts to help producers experiencing serious competitive pressures from the lowering of trade barriers.

In seeking to compete by means of a stronger science and technology policy, the United States has an important competitive edge vis-a-vis Mexico. It has a well-developed agricultural research and Extension system that can mount vigorous programs that will help U.S. farmers. Mexico, on the other hand, has seen its agricultural research and Extension system decimated by the economic crisis of the 1980s. It has little capability in the short term to rebuild that capacity.

Unfortunately, the implementation of the NAFTA, if the treaty is ratified, will occur at a time when U.S. agricultural research and Extension programs are facing serious reductions in their budgets and questions about future funding. The potential impact of the NAFTA and the further competition from producers in other countries as trade expands generally is justification for continued and expanded support for U.S. agricultural research and extension.

The Rest of Latin America?

Many observers discuss the possibility of the rest of Latin American joining the NAFTA in a hemisphere-wide free trade zone. That seems like a real possibility, especially if the agreement should be successful in promoting economic growth. Chile already has asked to join, as has Venezuela. Moreover, extension of the economic integration that is now proposed for Canada, Mexico, and the United States may be the most effective way in the short term to further liberalize international trade on a more general scale.

The incentives to join the NAFTA will likely be quite strong. It is not likely that countries such as Argentina, Brazil, and Colombia will sit idly by while Mexico has special access to the large U.S. market.

The participants in the NAFTA already have reached agreement on the conditions other countries have to meet to become a member. These conditions include respect for human rights, economic policies consistent with those already in the agreement, and so on. Not all these conditions will be met overnight in many of the Latin American countries. However, the opportunities membership would entail should provide strong incentives for governments of potential members of an expanded agreement to undertake the needed reforms.

Side Agreements

Emerging concerns about environmental issues, labor standards, and potential surges of sugar exports to the United States have caused the Clinton Administration to propose the signing of side agreements to the negotiated agreement that provide additional means of dealing with these issues. Although it is not clear that such side agreements are needed, well-structured side agreements might make the agreement more palatable to those who oppose it. The status of such agreements, and their implications for the larger agreement, are not clear at the time of this writing. As noted above, both Canada and Mexico have opposed such agreements.

7 Concluding Comments

Many of those potentially negatively impacted by the NAFTA fear its consequences for this nation, and especially the potential shift of jobs from this country to Mexico. The members of this CAST Task Force believe most of these fears are not well founded. Moreover, they believe there are a number of reasons why these concerns are misplaced.

First, the United States, in the view of the task force, should not want to compete with those workers in Mexico most people seem to be concerned about. We should want to compete at the high end of the wage structure rather than the low end. The challenge is to transform the character of our market economy so it provides employment in the middle to upper range of the wage structure and to provide the education and training to our workers so they can obtain gainful employment in those same sectors. Policies devoted to that end are key to promoting this nation's longer-term economic growth.

Second, the United States faces serious competition from Germany, Japan, the newly industrialized countries, and others. This nation will not be able to remain competitive if it does not avail itself of the benefits of freer trade so it has as low a cost structure as possible. Protecting our productive sectors from these competitive forces is not the way to defend our standard of living. **The only way to assure that our standard of living continues to grow is to seek to make ourselves more competitive, not to protect our economy.**

Finally, to remain competitive internationally, this nation needs significant reforms of our educational systems, revitalized investments in science and technology, and policies that encourage a more efficient use of our national resources. These are things we need to do in our own best interest in any case.

Literature Cited

American Farm Bureau. 1991. *NAFTA: Effects on Agriculture*. 4 vol. American Farm Bureau Federation, Park Ridge, Illinois.

Bivings, L. 1992. Price seasonality and trade liberalization: A dynamic spatial model of the Mexican feedgrains sector. Ph.D. diss., Stanford University, Stanford, California.

Barichello, R. R. and T. E. Josling. September 1992. *A North American free trade area and agriculture: Issues and impacts*. Paper prepared for the Fraser Institute, Vancouver, British Columbia. (Processed)

Carter, C., H. Carter, and R. Coppock (Eds.). March 1992. *The North American Free Trade Agreement: Implications for California Agriculture*. University of California-Davis.

Josling, T. E. 1992. NAFTA and agriculture: A review of economic impacts. P. 159. N. Lustig, G. P. Bosworth, and R. Z. Lawrence (Eds.). *North American Free Trade: Assessing the Impact*. The Brookings Institution, Washington, D.C.

Josling, T. E. and R. R. Barichello. December 1992. Agriculture in the NAFTA: A preliminary assessment. *C. D. Howe Symposium on the Preliminary Assessment*. December 5–6, 1992, Toronto, Canada.

Kehoe, T. J. May 1992. *Assessing the economic impact of North American free trade*. Department of Economics, University of Minnesota, Minneapolis. (Processed)

Krissoff, B., L. Neff, and J. Sharples. 1992. *Estimated Impacts of a Potential U.S.–Mexico Preferential Trading Agreement for the Agricultural Sector*. Pp. 44, 45, 48. Economic Research Service, U.S. Department of Agriculture, Washington, D.C.

Morici, P. February 1993. Grasping the benefits of NATFA. Pp. 49–50. *Current History* 92:571.

North American Free Trade Agreement. September 3, 1992. Tariff phasing, preliminary draft.

North American Free Trade Agreement. October 3, 1992. Annex 703.2 from the NAFTA draft.

North American Free Trade Agreement. October 3, 1992. Articles 703–707 from the NAFTA draft.

North American Free Trade Agreement. October 7, 1992. Annex 703.3 from the NAFTA draft.

U.S. Department of Agriculture. April 1991. *Agriculture in a North American Free Trade Agreement: An Interim Review*. U.S. Department of Agriculture, Washington, D.C.

U.S. Department of Agriculture, Economic Research Service. 1992. *Agriculture in a North American Free Trade Agreement: Analysis of Liberalizing Trade Between the United States and Mexico*. Economic Research Service, U.S. Department of Agriculture, Washington, D.C.

U.S. International Trade Commission. February 1991. *The Likely Impact on the United States of a Free Trade Agreement with Mexico*. USITC Publication 2353, Investigation No. 332–297. U.S. International Trade Commission, Washington, D.C.

Vialet, J. C. January 1993. *A North American Free Trade Agreement and Immigration*. CRS report for Congress, Congressional Research Center, The Library of Congress, Washington, D.C.

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