Has NAFTA Changed North American Trade?

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Typically, the debate over NAFTA has focused on jobs. However, to really understand NAFTA's effects on employment or living standards, it is important to first answer the more fundamental question of what effect it has had on trade.

The North American Free Trade Agreement has been one of the most hotly debated trade accords in recent history. NAFTA's critics regard the expansion of free trade to a developing country like Mexico as a dangerous precedent. They envision U.S. jobs lost in a flood of goods from a country with an average wage one-fifth that of the United States. Others see NAFTA as a boon to U.S. employment and living standards through greater trade and investment opportunities.[1]

These opposing expectations for NAFTA have been largely matters of speculation and based on assessments of other trade accords. But now that NAFTA has been in operation for more than three years, the question is not what the trade accord is likely to do but what it has done.

Typically, the debate over NAFTA has focused on jobs. However, to really understand NAFTA's effects on employment or living standards, it is important to first answer the more fundamental question of what effect it has had on trade. Changes in trade patterns caused by a lowering of trade barriers are ultimately the mechanism by which jobs and living standards are influenced. This article examines how NAFTA, since its inception, has affected trade between the United States, Canada, and Mexico, holding constant other important factors that affect trade. Without controlling for these other factors, the effects of NAFTA are difficult to discern, which can lead to wrong or conflicting conclusions about the accord's effects on trade.

In the three years since NAFTA's implementation, both its supporters and opponents have used changes in the pattern of trade flows to justify their positions. Supporters have argued that during 1994, the year NAFTA took effect, U.S. trade with Mexico grew nearly 10 percent faster than the average of the previous five years (*Figure 1*). Opponents claim that any expansion in trade in NAFTA's first year was quickly reversed when expectations about its benefits fell to earth with the 1995 peso crisis. During 1995, U.S. imports from Mexico grew nearly 25 percent, but exports dropped 11 percent.

Since Mexico began to recover from its deep recession in late 1995, U.S. exports to Mexico have resumed rapid growth, but claiming the success or failure of NAFTA based on a superficial examination of the ups and downs of trade flows can be a mistake. The acccord's effects may be much more or less than a simple glance at these flows would suggest because NAFTA does not exist in an economic or policy vacuum.

Figure 1
U.S. Trade with Mexico
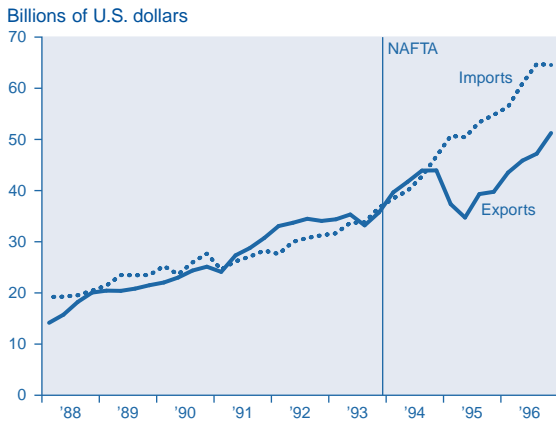
Billions of U.S. dollars

Worldwide economic changes that likely influenced bilateral trade within North America were already under way when NAFTA took effect. For example, U.S. real gross domestic product increased 3.5 percent in 1994, influencing the United States' supply and demand for imports and exports worldwide. As Figure 2 shows, U.S. trade with the world, excluding Mexico and Canada, grew faster in 1994 than in the previous six years. Likewise, Mexican real GDP increased 5.2 percent, and the real value of the peso was quite high in 1994, both factors that would have boosted U.S. exports to Mexico. As a result, it is unlikely that NAFTA and its lower trade barriers were the only influence on bilateral trade flows. To isolate the effects of NAFTA, one must account for the effects of changes in income, exchange rates, and trade with other countries; only then can NAFTA's impact on trade be ascertained.

In the first section of this article, I discuss previous analyses of NAFTA and compare them with my methodology. I next specify and estimate a model of the accord's effects on North American trade flows, and I assess how much trade has been influenced by NAFTA. I conclude by evaluating NAFTA's success.

DETERMINING NAFTA'S EFFECTS

Because most studies of how NAFTA affects jobs, trade, and incomes in North America were completed just before, or shortly after, the treaty's implementation, the majority of them are forward-looking. This contrasts with the backward-looking approach of more recent studies, including this one.[2] However, any assessment of NAFTA's effects, past or future, must use an economic model to judge how trade interacts with the larger economy.

The techniques used to determine NAFTA's future impact fall into two broad categories. First is the computable general equilibrium (CGE) modeling technique, in which analysts model a simplified economy and simulate what would happen to it if tariffs and nontariff barriers fall according to the NAFTA schedule.[3] Typically, CGE models are static— that is, the structure of the economy cannot vary over time in response to changing trade patterns. More recently, however, a model by Kouparitsas (1997) allows for changes in capital investment and its reallocation across economic sectors and countries over time. Allowing capital flows to change over time in response to NAFTA generates a much larger benefit to freer trade.

Although these two types of studies make different assumptions about the economy's structure and the degree of competition in various sectors, both find an increase in income and trade under NAFTA. There is also substantial agreement about how NAFTA will affect Canada, Mexico, and the United States. In general, because Mexico's is the smallest economy, it reaps the largest benefit relative to its GDP (Kehoe and Kehoe 1994). The United States benefits modestly, and Canada does not have much benefit beyond that resulting from its 1989 free trade agreement with the United States.

Other studies use a partial equilibrium analysis to examine the effects of NAFTA. That is, they focus on particular sectors and assume

Figure 2
U.S. Trade with the World,
Less Mexico and Canada
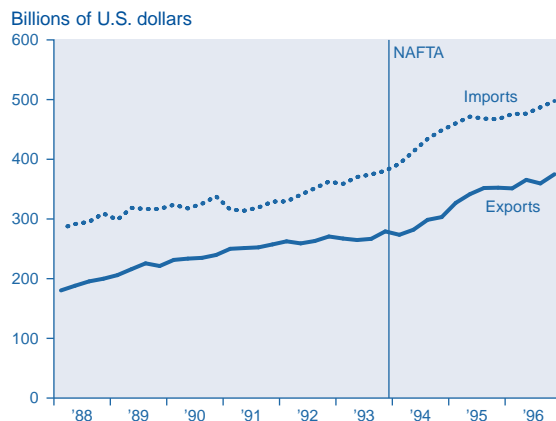
Billions of U.S. dollars

that the rest of the economy is unaffected. Determining NAFTA's trade effects in this context usually entails multiplying reduced-form price elasticities (a measure of how price changes translate into quantity changes) by the expected changes in tariff and tariff-equivalent trade barriers to determine how trade in various sectors is likely to change. In 1993, the U.S. International Trade Commission (USITC) completed a comprehensive study of NAFTA that used reduced-form price elasticities to determine how much NAFTA would affect trade in various U.S. economic sectors.[4] Hufbauer and Schott (1993) discuss NAFTA in a broad context and, based on their expectations of how trade would change under NAFTA, estimate how jobs in various sectors may be affected. They estimate changes in the number of jobs using Department of Commerce data on jobs supported directly and indirectly by exports to Mexico in 1990. They find that NAFTA and Mexico's economic reforms would increase the net number of U.S. jobs by about 170,000 in 1995 (Hufbauer and Schott 1993, 14).

In general, these partial equilibrium studies estimate that the United States will increase its exports of high-tech goods, grains and oilseed, and mechanical parts used in Mexican assembly plants. Increases are projected for U.S. imports of automobiles, apparel, glassware, household appliances, and certain horticultural products.

NAFTA SINCE ITS IMPLEMENTATION

Unlike the studies cited above, which have sought to predict how NAFTA will affect trade, this article's intent is to measure how NAFTA has already affected it. To assess the effects of NAFTA in its first three years, a model of bilateral trade flows in North America is empirically estimated with pre- and post-NAFTA data. The analysis is based on a widely used model of bilateral trade flows that includes incomes, prices, and exchange rates (see the box entitled "The Gravity Model of Bilateral Trade"). Once the fundamental determinants of trade flows are accounted for, any extraordinary flows that have occurred since NAFTA's inception are attributed to the free trade agreement.[5]

This type of analysis has at least two benefits. First, the analysis can estimate trade flows utilizing data since NAFTA's implementation. Second, it can capture most of the potentially important aspects of NAFTA, including tariff and nontariff barrier reductions, as well as changes in administrative rules, regulations, and expectations about the sustainability of free trade that cannot be easily quantified. Changing expectations for the sustainability of free trade under NAFTA are potentially among the most important aspects of the agreement. If NAFTA did not create a credible commitment to free trade, new investment would not flow into export industries to take advantage of reduced trade barriers. Without a credible free trade agreement, the benefits of the trade accord would be much lower. Expectations for a more stable and open trading environment affect trade by providing the incentive for firms to make long-term capital commitments. These expectations cannot be easily accounted for using the methodology cited previously because it is difficult to translate them into price changes.

Of course, there are potential pitfalls to this methodology as well. In particular, the model is unlikely to control for all the factors important to bilateral trade flows. Factors may be attributed to NAFTA that should not be. For example, when NAFTA took effect on January 1, 1994, political unrest was developing in Mexico, resulting in the armed Zapatista movement and two political assassinations later that year. Inasmuch as the uncertainty generated by this unrest reduced trade, it would reduce the estimated trade effects of NAFTA. Even though the events are independent of NAFTA, they would be indistinguishable in the context of the empirical model. If political uncertainty could be measured and included in the model, this would not be a problem.

However, even if important economic or political events are excluded from the model, they may not bias the estimated NAFTA effects if they and the accord's implementation were not simultaneous. Factors such as the peso crisis are unlikely to bias the analysis because exchange rates and incomes (the two factors most affected by the crisis) are included in the model. In other words, a majority of the peso crisis' effects on trade are likely to be taken into account.[6] Still, because NAFTA was implemented in a rather tumultuous period in Mexico that resulted in reduced trade, the estimated effects of NAFTA may be biased downward.

ESTIMATING THE EFFECTS OF NAFTA

To assess the effects of NAFTA since its implementation, the following benchmark model of Canadian, Mexican, and U.S. bilateral trade flows is estimated using quarterly data

The Gravity Model of Bilateral Trade

The empirical bilateral trade model in this article is based on the gravity equation, which derives its name from its resemblance to Newton's law of gravity. The model was originally formulated from ad hoc assumptions but had its intuitive appeal in describing trade flows as increasing as the economic "distance" between two countries shrinks. It describes bilateral trade flows between two countries as a function of their incomes, populations, the physical distance between them, and trade barriers. If countries with similar incomes have similar preferences for goods but produce different types of products, they are likely to trade more with each other than with other countries. Trade is also likely to increase the closer the countries are and the lower the trade barriers between them. The gravity model has been used to describe many different types of flows, such as immigration, shopping patterns, and car traffic, as well as interregional trade. It has been used extensively in international trade applications because it provides an empirically tractable framework.

The ad hoc assumptions behind the gravity equation have been replaced by microeconomic foundations. Anderson (1979), Helpman and Krugman (1985), Bergstrand (1985), and Bikker (1987) have developed variants of the gravity model based on utility and profit maximization. The empirical model this article uses is based on Bergstrand's theoretical foundation for the gravity equation, which is based on the assumption that producers maximize profits subject to a constant elasticity of transformation (CET) technology, and consumers maximize a constant elasticity of substitution (CES) utility function subject to a budget constraint (Bergstrand 1985). Assuming that individual bilateral trade flows are small relative to total trade, the equation for bilateral trade is

(B.1)
$$PX_{ij} = Y_i^{(\sigma-1)/(\gamma+\sigma)} Y_j^{(\gamma+1)/(\gamma+\sigma)} T_{ij}^{-\sigma(\gamma+1)/(\gamma+\sigma)} C_{ij}^{-\sigma(\gamma+1)/(\gamma+\sigma)} E_{ij}^{\sigma(\gamma+1)/(\gamma+\sigma)}$$

$$* \left(\sum_{k=1,k\neq i}^{N} P_{ik}^{1+\gamma} \right)^{-(\sigma-1)/(\gamma-\eta)/(1+\gamma)(\gamma+\sigma)}$$

$$* \left(\sum_{k=1,k\neq j}^{N} P_{kj}^{*1-\sigma} \right)^{(\gamma+1)(\sigma-\mu)/(1-\sigma)(\gamma+\sigma)}$$

$$* \left[\left(\sum_{k=1,k\neq i}^{N} P_{ik}^{1+\gamma} \right)^{(1+\eta)/(1+\gamma)} + P_{ii}^{1+\eta} \right]^{-(\sigma-1)/(\gamma+\sigma)}$$

$$* \left[\left(\sum_{k=1,k\neq j}^{N} P_{kj}^{*1-\sigma} \right)^{(1-\mu)/(1-\sigma)} + P_{jj}^{1-\mu} \right]^{-(\gamma+1)/(\gamma+\sigma)},$$

where PX_{ij} is the value of aggregate trade flows from country i to country j,

Y_i is the aggregate income of country i,
Y_j is the aggregate income of country j,
P_{ik} is the price received for country i's product in the kth country,
$P_{kj}^* = P_{kj}T_{kj}/E_{kj}$ is the price paid for buying k's product in the jth market,
T_{ij} is 1 plus the ad valorem tariff rate on i's product in the jth market,
C_{ij} is a nontariff barrier on i's product in the jth market,
E_{ij} is the exchange rate between country j's currency in terms of i's currency,
γ is the constant elasticity of transformation in the supply between different export goods ($0 \leq \gamma \leq \infty$),
η is the CET between the supply of exports and domestically produced goods ($0 \leq \eta \leq \infty$),
σ is the constant elasticity of substitution between the demand for different imported goods ($0 \leq \sigma \leq \infty$), and
μ is the CES between the demand for imported and domestic goods ($0 \leq \mu \leq \infty$).

As shown in Equation B.1, the value of aggregate trade flows from country i to country j depends on nine terms. In the order of their appearance in the equation, they are (1) the income of the exporting country, (2) the income of the importing country, (3) tariffs, (4) nontariff barriers, (5) the exchange rate, (6) an export price index for exports to all countries to which the exporting country exports, (7) an import price index for imports from all countries from which the importing country imports, (8) an index of domestic prices for the exporting country, and (9) an index of domestic prices for the importing country.

These nine terms can be sorted into three categories: (1) income in the exporting and importing countries, which reflects the potential demand and supply; (2) wedges between the export and import price of the traded goods due to tariffs and nontariff barriers; and (3) price terms reflecting the substitutability between this traded good and the others.

Equation B.1 serves as the basis for the empirical model describing trade flows between the NAFTA countries. Changes in tariff and nontariff barriers are proxied by a binary variable for NAFTA. Because country-specific data for the price terms are not available, the empirical analysis uses proxies. To account for the exchange rate, domestic prices, and the terms of trade between the bilateral trade partners, GDP price deflators and the bilateral real exchange rate between the partners are used. To account for the terms of trade with other trading partners, a multilateral real exchange rate with the rest of the world is used. Economic events, such as the beginning of Mexico's trade liberalization in 1985 and Canada's free trade agreement with the United States in 1989, are proxied by binary variables.

from 1980 though 1996. The empirical equations are based on the gravity model, which is derived from standard microeconomic foundations (Bergstrand 1985). All variables are seasonally adjusted quarterly data and are expressed in log first-differences (growth rates):[7]

$$(1) \quad M_t^{ij} = \alpha_0 + \alpha_1 M_{t-q}^{ij} + \alpha_2 Y_{t-q}^i + \alpha_3 Y_{t-q}^j + \alpha_4 E_{t-q}^{ij}$$
$$+ \alpha_5 E_{t-q}^{iw} + \alpha_6 P_{t-q}^i + \alpha_7 P_{t-q}^j + \alpha_8 D_t$$
$$+ \alpha_9 NAFTA_t + \epsilon_t;$$

$$(2) \quad X_t^{ij} = \beta_0 + \beta_1 X_{t-p}^{ij} + \beta_2 Y_{t-p}^i + \beta_3 Y_{t-p}^j + \beta_4 E_{t-p}^{ij}$$
$$+ \beta_5 E_{t-p}^{iw} + \beta_6 P_{t-p}^i + \beta_7 P_{t-p}^j + \beta_8 D_t$$
$$+ \beta_9 NAFTA_t + \mu_t.$$

The variables are defined as follows: M^{ij} is country i's imports from country j; i and j are either the United States, Canada, or Mexico; t refers to the date; p and q are the number of periods a variable is lagged; X^{ij} is country i's exports to country j; Y^i is real GDP of country i; Y^j is real GDP of country j; P^i is country i's GDP price deflator; P^j is country j's price deflator; E^{ij} is the real exchange rate between countries i and j; E^{iw} is the real exchange rate between country i and the world (excluding country j); and D is a binary variable that represents changes in trade regimes not associated with NAFTA. For trade with Mexico, D equals 1 beginning in 1985, the period in which Mexico begins liberalizing trade. For trade between Canada and the United States, D equals 1 beginning in 1989, representing the period of the U.S.–Canada free trade agreement. *NAFTA* is a binary variable representing the period in which the accord was implemented. The variable *NAFTA* equals 1 beginning the last quarter of 1993.[8] α and β are estimated coefficients, and ϵ and μ are error terms.

The variables in Equations 1 and 2 can be sorted into four categories: (1) lagged trade (M_{t-p}^{ij}, X_{t-q}^{ij}), which reflects the adjustment process of trade to a new equilibrium; (2) income in the exporting and importing countries (Y^j, Y^i), which reflects the potential demand and supply for the traded goods; (3) price and real exchange rate terms (P^i, P^j, E^{ij}, E^{iw}), reflecting the substitutability of nontraded and traded goods in the NAFTA countries and the rest of the world; and (4) one-time trade liberalization variables, reflecting changes in trade regimes and NAFTA (D, *NAFTA*).

The size and statistical significance of the coefficient on the *NAFTA* variable tell us the degree to which NAFTA affects bilateral trade flows in North America.[9] It should be noted that NAFTA is not scheduled to be fully imple-

mented until 2009. Tariff rates in many sectors are to be reduced over a fifteen-year period (see the box entitled "What Has NAFTA Done?"). Consequently, these results should be seen as a preliminary look into NAFTA's effects on aggregate trade.

The estimated equations are in the appendix.[10] Overall, the equations explain the growth of trade relatively well.[11] However, the effects of NAFTA on trade flows (in size and statistical significance) vary a great deal between countries. Figures 3 through 8 show what the estimation results imply for actual exports and imports between the United States, Canada, and Mexico. The shaded bands on both sides of trade estimated without NAFTA represent a 90 percent confidence interval derived from the statistical error of the estimate.[12]

The United States and Mexico

Figures 3 and 4 show NAFTA's estimated effects on bilateral trade flows between the United States and Mexico. As the dotted line in Figure 3 indicates, U.S. exports are estimated to have grown faster than they would have had there not been a trade agreement. On average, U.S. export growth is about 16.3 percentage points higher per year with NAFTA. While the increase in growth is not extraordinary, the cumulative effect is about $21.3 billion more in exports than what would have occurred without NAFTA. The statistical significance of this effect is high, as shown by the 90 percent confidence interval lines that exclude the observed data on U.S. exports to Mexico.

For U.S. imports, as shown in Figure 4, the boost from NAFTA is also relatively high. On average, import growth is about 16.2 percentage points higher per year with NAFTA. Since NAFTA became law, the cumulate impact amounts to about $20.5 billion in additional imports because of the agreement. However, NAFTA's statistical significance for U.S. imports from Mexico is only marginal. The 90 percent confidence interval lines show that we cannot exclude the possibility that trade without NAFTA would have been different from trade with NAFTA.

The United States and Canada

Figures 5 and 6 show the estimated effects of NAFTA on bilateral trade flows between the United States and Canada. As both figures show, trade between the two countries has not been affected much by NAFTA. This is not surprising, given that a free trade agreement with Canada was negotiated in 1989 and NAFTA did not alter
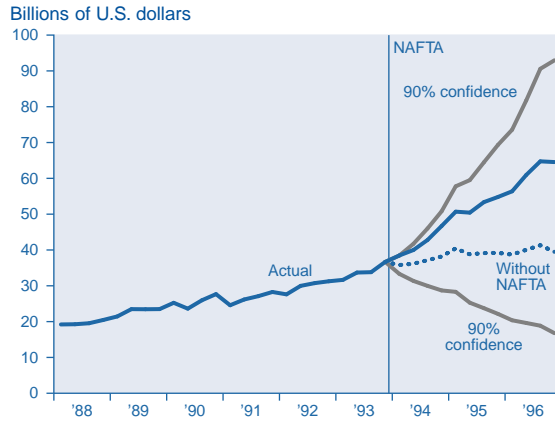
Figure 3
U.S. Exports to Mexico
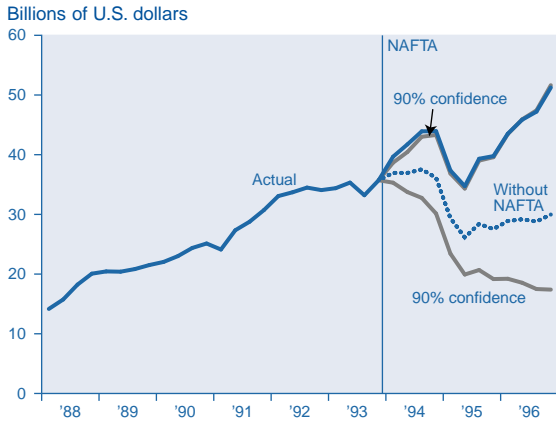
Billions of U.S. dollars

SOURCES: International Monetary Fund, Direction of Trade
Statistics; author's calculations.

Figure 4
U.S. Imports from Mexico

Billions of U.S. dollars

SOURCES: International Monetary Fund, Direction of Trade
Statistics; author's calculations.

that accord significantly. However, even the
1989 agreement, as measured by the binary
variable D^{ij} in the U.S.–Canada trade equations,
does not seem to play a strong role in deter-
mining trade flows. Although trade may have
been liberalized in some sectors, aggregate
trade does not seem to be influenced much.[13]
This may be because trade between the coun-
tries has been generally open for some time.
Figures 5 and 6 show an 8.6 percent average
annual increase in U.S. exports to Canada and a
3.9 percent increase in U.S. imports from Canada
due to NAFTA. The NAFTA effect on both ex-
ports and imports is statistically insignificant.

Canada and Mexico

The effects of NAFTA on exports and
imports between Canada and Mexico appear in
Figures 7 and 8. As the figures show, the esti-

mated effects are very imprecise, with a wide,
90 percent confidence band. One possible rea-
son for the difficulty in measuring the effects of
NAFTA in these equations is that trade between
Canada and Mexico is a very small share of each
country's total and is subject to much more
unexplained volatility than is trade with the
United States.[14] In these equations, the NAFTA
trade effects are estimated to be negative, which
raises the possibility that NAFTA may have
diverted Canadian–Mexican trade toward the
United States or other countries. But because
the effects are so imprecise, the possibility that
the effects are zero or even positive cannot be
excluded.

In summary, it is important to remember that
there is a wide statistical margin of error for
most of the estimated NAFTA trade effects, so
they should be viewed in relative rather than abso-

Figure 5
U.S. Exports to Canada
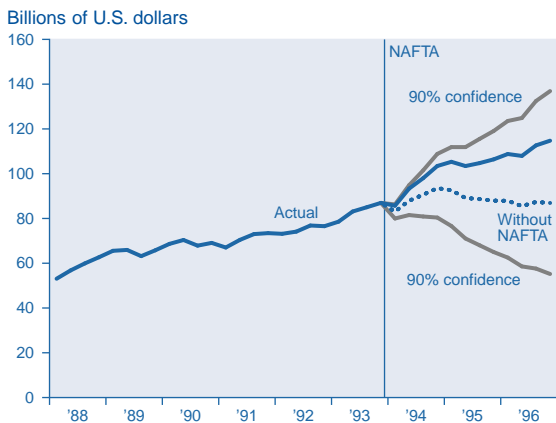
Billions of U.S. dollars
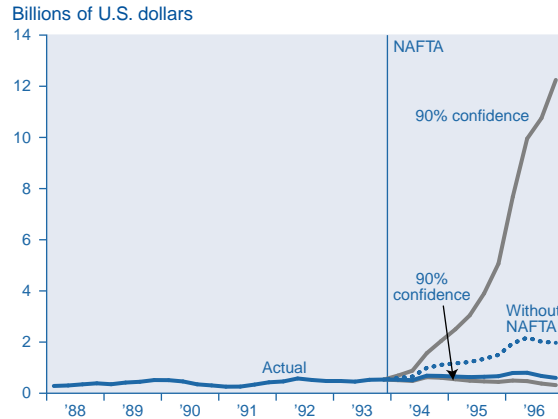

SOURCES: International Monetary Fund, Direction of Trade
Statistics; author's calculations.
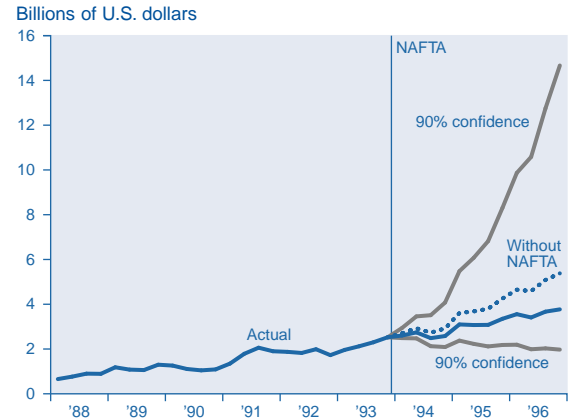
Figure 6
U.S. Imports from Canada
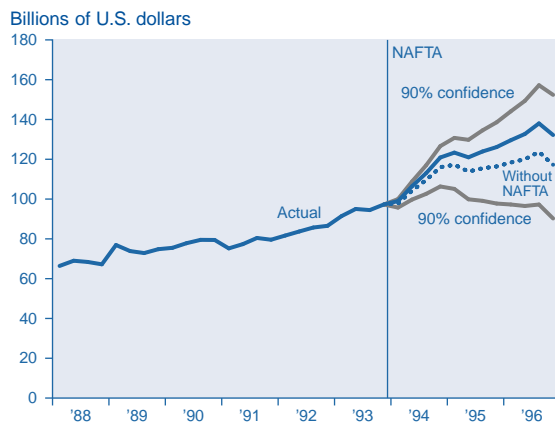
Billions of U.S. dollars

SOURCES: International Monetary Fund, Direction of Trade
Statistics; author's calculations.

Figure 7
Canadian Exports to Mexico

Billions of U.S. dollars

SOURCES: International Monetary Fund, Direction of Trade
Statistics; author's calculations.

Figure 8
Canadian Imports from Mexico

Billions of U.S. dollars

SOURCES: International Monetary Fund, Direction of Trade
Statistics; author's calculations.

lute terms. While it is likely that NAFTA affected U.S.–Mexican trade, it is unlikely that it affected U.S.–Canadian or Canadian–Mexican trade.

TRADE DIVERSION VERSUS TRADE CREATION

To judge NAFTA's effects on the economies of Canada, Mexico, and the United States, it is also important to consider North American trade flows in the context of trade with the rest of the world. In other words, did NAFTA create new trade opportunities within North America, or did it simply divert trade from countries outside NAFTA? If the increased trade caused by NAFTA was simply a shuffling of trade from other, more efficient trading partners, then NAFTA's benefit would shrink. Although a detailed examination of this issue is not within the scope of this article, a glance at how the distribution of trade flows has changed since NAFTA can tell us whether the accord may be associated with trade diversion.

Figure 9 shows how the distribution of trade flows between the NAFTA countries and the rest of the world changed from 1993, the year before NAFTA began, to 1996, three years after NAFTA started. As the figure shows, trade within North America has increased relative to trade with the rest of the world, but the increase is slight. The share of U.S. trade with Canada and Mexico increased from 27.8 to 29.4 percent between 1993 and 1996, with most of that increase attributed to greater U.S. trade with Mexico. Canadian trade with the rest of North America also increased, from a share of 77.3 to 80.4 percent. Mexico's trade share with North America changed very little, from 71 to 71.6 percent.[15]

The share of total trade between the NAFTA countries slightly increased, suggesting that if there was trade diversion, it was small. But to determine the extent of trade diversion in North America, it is also important to consider whether increased trade between NAFTA countries came at the expense of trade with the rest of the world. In other words, did NAFTA shift trade away from countries outside of NAFTA, or did NAFTA simply increase trade within North America at a faster rate than trade increased with the rest of the world? Figure 10 shows that it was the latter; that is, trade with countries outside North America also grew after NAFTA's implementation. The share of total trade between North American countries increased

Figure 9
**Trade Shares of NAFTA Countries,
Before and After the Treaty's Inception**
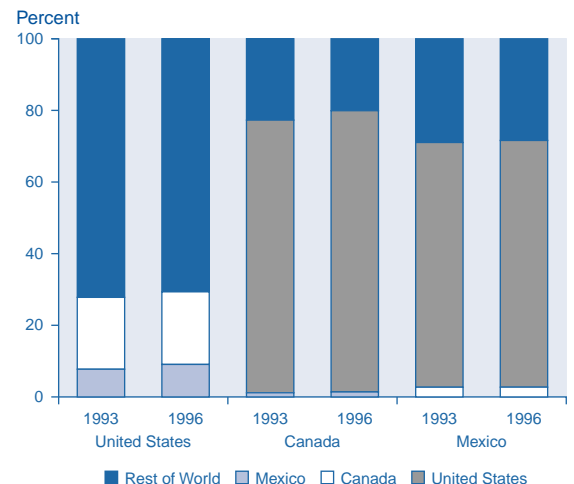
Percent

SOURCES: International Monetary Fund, Direction of Trade
Statistics; author's calculations.

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What Has NAFTA Done?

On January 1, 1994, NAFTA substantially reduced trade barriers across a market with more than 380 million people and a combined gross domestic product of roughly $7.6 trillion. Although trade barriers have already been lowered significantly, NAFTA will not be completely phased in until 2009. Most of the declines in tariffs have been on the Mexican side because Mexico started with higher tariffs than the United States or Canada. In 1992, Mexican tariffs on imports from the United States averaged about 10 percent when weighted by the value imported; at the same time, U.S. tariffs on imports from Mexico averaged about 4 percent. Because Canada and the United States negotiated a separate free trade agreement in 1989, NAFTA affected trade between the two countries very little.

NAFTA substantially reduces, but does not eliminate, nontariff trade barriers, such as import quotas, sanitary regulations, and licensing requirements. Canada and the United States traditionally have had few restrictions on capital flows, whereas Mexican laws prohibited private ownership in the petroleum industry and parts of the petrochemical industry, restricted foreign investment in the financial and insurance sectors, and institutionalized communal ownership of agricultural lands. The petroleum industry is still off-limits to foreign investment, although parts of the petrochemical industry are set to be privatized. Many laws against foreign investment in the financial and insurance sectors have been eliminated or substantially reduced. Although NAFTA set a schedule for liberalizing the banking sector, the 1995 peso crisis helped generate the political momentum to speed the opening of this sector by decreasing the restrictions on foreign ownership of existing banks.

NAFTA has not been without glitches, but the problems are probably fewer than what they would have been without the agreement. The opening of trucking between the United States and Mexico has been delayed, and tariffs have increased for some products. The United States levied additional tariffs on Mexican straw brooms, and in response Mexico levied tariffs on U.S. alcoholic beverages, flat glass, notebooks, and some types of wood furniture. There have also been disputes over agricultural products, such as avocados and tomatoes. Although these disputes are troublesome, their effect on overall trade has been small. Moreover, NAFTA may have limited a protectionist response to the 1995 peso crisis. Unlike Mexico's 1982 crisis, when the Mexican government raised tariffs dramatically in the hope of generating a trade surplus to boost foreign reserves, during the 1995 crisis no such political response occurred.

Here are some specifics by sector on how NAFTA has reduced trade barriers.[1]

Automobiles

NAFTA immediately decreased Mexican tariffs on automobiles from 20 to 10 percent in 1994 and is set to drop them to zero by 2004. Tariffs on most auto parts will be eliminated by 1999. The agreement includes rules of origin specifying that to qualify for preferential tariff treatment, vehicles must have 62.5 percent North American content, which is an increase over the 50 percent provision in the U.S.–Canadian free trade agreement.

By 2004 NAFTA eliminates requirements that automakers supplying the Mexican market produce the cars in Mexico and buy Mexican parts. It has already eliminated mandatory export quotas on foreign-owned auto manufacturing facilities in Mexico, and by 1999 it eliminates the Mexican restriction on bus and truck imports.

Textiles and Apparel

NAFTA immediately eliminated trade barriers on more than 20 percent of Mexican–U.S. trade in textiles and apparel. Over six years it eliminates barriers on another 60 percent. The accord's rules of origin require that, to receive NAFTA tariff preferences, apparel be manufactured in North America from the yarn-spinning state forward.

Agriculture

NAFTA immediately reduced tariffs to zero for half of U.S. agricultural exports to Mexico. The other half of agricultural goods tariffs are to be eliminated by 2009. NAFTA immediately eliminated Mexico's licensing requirements for grains, dairy, and poultry.

Financial Services

NAFTA immediately reduced, and will eliminate by 2000, Mexico's restrictions on Canadian and U.S. ownership and provision of commercial banking, insurance, securities trading, and other financial services. Under NAFTA, Canadian and U.S. financial firms are allowed to establish wholly owned subsidiaries in Mexico and to engage in the same range of activities as similar Mexican firms.

[1] Much of the following is described in Kehoe and Kehoe (1994).

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because trade within North America grew faster than did trade with countries outside of North America. Consequently, although trade diversion is a possibility, it is unlikely to be a large problem. Moreover, because trade under NAFTA was liberalized between countries with very different comparative advantages, it is unlikely that it caused a shift from optimal trading patterns.

HAS NAFTA BEEN A SUCCESS?

Certainly, NAFTA is not the solution to all the economic problems that ail North America, but it is not the disaster that critics claimed it would be. NAFTA is foremost a free trade agreement, and as such its benefits derive from a shift in resources to industries that reflect a nation's comparative advantage and away from indus-

Figure 10

Trade with the World as a Share of GDP (Excluding trade between NAFTA countries)
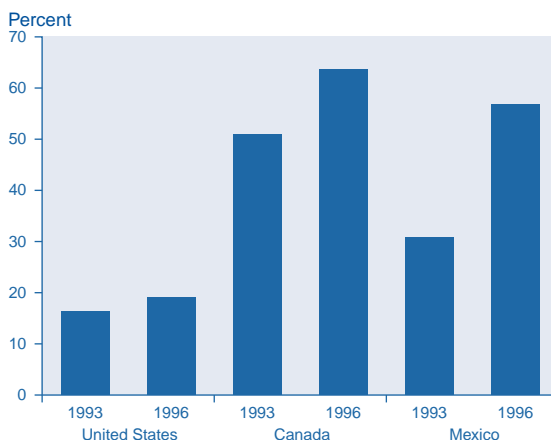
SOURCES: International Monetary Fund, Direction of Trade Statistics and International Financial Statistics.

tries that do not. It is important to understand that this shift implies that the benefits come from both increased imports and exports. Accordingly, the best way to judge a free trade agreement is by whether it increases imports and exports, and not by whether it increases exports and decreases imports. By this criterion, NAFTA has been a success for the United States and Mexico. As expected, NAFTA has meant little for the Canadian economy.

After accounting for the effects of economic variables important to bilateral trade flows—such as income, exchange rates, and prices—NAFTA is found to have a significant positive effect on trade flows between the United States and Mexico. NAFTA is not found to have a significant impact on trade between the United States and Canada or Canada and Mexico. These findings are not surprising, given that the United States negotiated a free trade agreement with Canada five years before the implementation of NAFTA and that most of the trade liberalized under NAFTA is between the United States and Mexico.

Although this empirical analysis controls for economic shocks that would affect trade through changes in incomes and exchange rates, such as the 1995 peso crisis, it cannot control for all external shocks, nor can it capture all aspects of NAFTA's influence on trade. Perhaps the largest omission from the analysis is trade barriers that were not erected because of the free trade agreement but would have been without it. This issue was particularly relevant during the 1995 peso crisis. Unlike previous periods of economic turmoil in Mexico, trade was relatively unimpeded during the peso crisis. NAFTA, by enhancing the economic ties between the North American countries, may have limited a protectionist response to the peso crisis and helped facilitate a return of foreign investment and economic growth to Mexico.

Has NAFTA destroyed U.S. jobs? Clearly, NAFTA has neither spelled the death of the U.S. workforce, nor has it generated a dramatic increase in the number of U.S. jobs. What dominates the employment picture in any year are movements in a country's own business cycle, not trade. U.S. income grew fairly smoothly between 1994 and 1996; as a result, U.S. employment grew by 3.6 million. In contrast, Mexico experienced a currency crisis and deep recession in 1995; its employment fell but is now recovering with the economy. Ultimately, freer trade does not determine the number of jobs available in a country, but it does determine the types of jobs available. In the three years since NAFTA's implementation, there has been a clear trend toward increased trade in North America and higher productivity in the United States. How much of that greater productivity is due to NAFTA is unknown. As time passes, and more economic data become available, cyclical factors and economic shocks will fall to the background and a clearer picture of NAFTA's effects on the economy will emerge.

NOTES

[1] The early controversy can perhaps be best summarized by quotes from Ross Perot and President Bill Clinton during the NAFTA debate in 1993: "NAFTA will pit American and Mexican workers in a race to the bottom. In this race, millions of Americans will lose their jobs" (Perot 1993, *i*); "I believe the Nafta will create 200,000 American jobs in the first two years of its effect" (Clinton 1993).

[2] See, for example, Gould (1996), Weintraub (1997), and USITC (1997).

[3] For an excellent survey of general equilibrium models applied to NAFTA, see Kehoe and Kehoe (1994).

[4] In creating the reduced-form price elasticities, the USITC study assumes that foreign and domestic goods are imperfect substitutes for each other. In other words, the goods have separate markets in which equilibrium prices and quantities are established. See USITC (1993) for a description of this methodology.

[5] The methodology used here is an extension of the work done by Gould (1996). Other recent studies have used a similar methodology to assess the trade and sectoral effects of NAFTA. See USITC (1997).

[6] See Gould (1996) for an assessment of how the peso crisis affected trade independent of NAFTA. See Neely (1996) for a discussion of why NAFTA did not cause Mexico's peso crisis.

[7] Log first-differences, as opposed to a simple log-linear relationship, were used because tests on the dependent and many of the independent variables could not reject the hypothesis of nonstationarity. Consequently, the equations estimate the growth of exports and imports.

[8] Because trade growth equations are estimated, the effects of NAFTA are assumed to influence the growth of trade. However, according to traditional long-run models of trade, lower tariffs only influence the level, not the growth, of trade. Because trade is unlikely to jump to a new, higher level instantaneously, the growth of trade is likely to be affected in the transition to a

new, higher level. This is especially true for the short period that NAFTA has been observed and because NAFTA is being phased in over fifteen years.

[9] NAFTA may also affect bilateral trade flows indirectly through income and prices. Although these indirect effects are likely to be important over the long run, over the short run these effects are probably small. Because of this, these secondary effects are ignored in the estimation.

[10] The equations were estimated with ordinary least squares and the errors terms checked to see if they follow a white-noise pattern. The lag structure of the equations was determined according to the Akaike information criterion. To determine how trade would have grown without NAFTA, the estimated *NAFTA* effect was excluded from the estimated exports and imports equations, and trade flows were calculated with the actual data for the independent variables. To provide the best estimates, the error term (which reflects the degree to which the equation does not match the data) was included in the calculation. Data sources are given in the appendix.

[11] The adjusted R^2 on the equations varies from 0.67 in the U.S.–Mexico export equation to 0.18 in the Canada–Mexico import equation. Most of the equations have an R^2 between 0.30 to 0.40, which is not uncommon for similar growth equations. The adjusted R^2 measures the proportion of the variation in the left-side dependent variable that is explained by the right-side dependent variables, adjusting for the number of variables in the equation.

[12] The confidence interval shows the degree of certainty we can have in the estimated effects. If the confidence interval around the estimated effects of trade without NAFTA excludes the actual observed trade under NAFTA, we can say with 90 percent certainty that trade with NAFTA is different from trade without it. If the 90 percent confidence interval includes the observed trade under NAFTA, we can say that there is less than a 90 percent certainty that trade is different with NAFTA than without it.

[13] An inherent problem in studying aggregate exports and imports is that the analysis cannot explain changes in sector-specific trade flows caused by NAFTA. For example, imports in one industry may expand, while imports in another industry may contract. In aggregate, however, imports overall would appear to remain stable. An attempt was made to study sector-specific trade data, but because equivalent sector-specific price information across countries does not exist, the empirical results were poor.

[14] This is indicated by the relatively low adjusted R^2 of the Canada–Mexico trade equations.

[15] A bilateral trade intensity index, defined as the share of country *j*'s trade in country *i*'s world trade relative to the share of country *i*'s world trade in total world trade $[I_{ij} = (T_{ij}/T_{iw})/(T_{jw}/T_w)]$, also shows a slight increase among NAFTA partners since 1993. See Yeats (1997) for a discussion of this index applied to Mercosur's trade.

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Appendix

Regression Results

Dependent variable	U.S.(i)–Mexico(j)		U.S.(i)–Canada(j)		Canada(i)–Mexico(j)	
	Exports	Imports	Exports	Imports	Exports	Imports
Constant term	.027 (.794)	−.061 (.713)	−.025 (.688)	−.029 (.078)	−.229 (.224)	.169 (.042)
Lagged dependent variable	−.679 (.074)	−.901 (.050)	−.441 (.659)	−.209 (.098)	−.299 (.341)	−.323 (.012)
Y^i	3.623 (.031)	.289 (.209)	3.953 (.334)	2.793 (.135)	9.474 (.366)	2.560 (.543)
Y^j	.082 (.050)	−3.046 (.539)	−1.095 (.394)	.104 (.425)	3.677 (.255)	.335 (.841)
E^{ij}	−2.147 (.000)	−.610 (.317)	−.171 (.536)	.178 (.427)	−.863 (.053)	−.435 (.181)
E^{iw}	−2.971 (.047)	−.061 (.316)	−2.062 (.430)	−.418 (.665)	6.748 (.497)	5.742 (.007)
P^i	.963 (.616)	13.716 (.292)	3.438 (.106)	4.208 (.009)	−17.100 (.384)	−5.847 (.149)
P^j	−.533 (.704)	−.191 (.608)	.477 (.724)	−.877 (.578)	−1.185 (.368)	−.890 (.099)
D^{ij}	−.029 (.522)	.026 (.722)	−.005 (.825)	.008 (.550)	−.008 (.951)	−.003 (.994)
NAFTA	.073 (.015)	.072 (.119)	.031 (.191)	.018 (.374)	−.111 (.240)	−.038 (.453)
Adjusted R^2	.67	.35	.36	.31	.27	.18
Equation F statistic (significance level)	.000	.030	.080	.002	.120	.050
LM test for autocorrelation (significance level)	.31	.53	.20	.25	.01	.24
Lag structure	3	5	5	1	4	1
Degrees of freedom	30	14	18	50	22	46

NOTE: Coefficients are the sum of the lagged terms. Significance level of F statistics (the null hypothesis that all lagged coefficients are equal to zero) are in parentheses.

Data Sources

Variable	Definition	Source
M	Seasonally adjusted value of merchandise imports, in millions of U.S. dollars	International Monetary Fund, Direction of Trade Statistics
X	Seasonally adjusted value of merchandise exports, in millions of U.S. dollars	International Monetary Fund, Direction of Trade Statistics
P	Seasonally adjusted GDP price deflator	International Monetary Fund, International Financial Statistics
Y	Seasonally adjusted real GDP	International Monetary Fund, International Financial Statistics
E	Seasonally adjusted real exchange rate	Trade-Weighted Value of the Dollar, Federal Reserve Bank of Dallas, and author's calculations
E^w	Seasonally adjusted real exchange rate with rest of the world	Trade-Weighted Value of the Dollar, Federal Reserve Bank of Dallas, and author's calculations