# *Job Creation, Job Destruction, and International Competition*: Job Flows and Trade – The Case of NAFTA

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# Abstract

This paper is a chapter in our forthcoming monograph, *Job Creation, Job Destruction, and International Competition* (W.E. Upjohn Institute 2003), and expands on the ideas advanced in Klein, Schuh, and Triest (2003). The chapter is a case study of the impact of the North American Free Trade Agreement (NAFTA) on the U.S. labor market in three industries: textiles and apparel, chemicals, and automobiles. NAFTA significantly altered the trade environment for these industries and contributed to changes in the bilateral export-import structure among the United States, Canada, and Mexico. Our innovation is to examine NAFTA's effect on gross job creation and destruction, the components of change in net employment. Except for a more rapid decline in apparel employment, there is little evidence of NAFTA's having had major effects on either net employment or gross job flows in these industries.

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# *Introduction*

Although we have focused on the effect of real exchange rate movements in this monograph, the real exchange rate is but one of a number of factors that affect the international environment facing establishments. The degree of international competition facing establishments depends upon the extent to which international markets are open and free from government-imposed restrictions on trade. Establishments' efforts to export will be adversely affected by tariffs and quotas imposed upon them by foreign governments. Establishments' domestic sales are promoted through the protection from international competition afford them by their own governments.

The world trading system has progressed by fits and starts towards more openness since the end of World War II. These movements towards freer trade have occurred both at the multilateral level, through the various rounds of the General Agreement on Tariffs and Trade (GATT), and through regional agreements like the 1989 Free Trade Agreement between the United States and Canada and, more recently, the North American Free Trade Agreement (NAFTA). These trade negotiations have lowered tariff rates and reduced quota restrictions on industries in member countries. By lifting these politically imposed impediments to trade, agreements such as NAFTA increase the volume of both imports and exports. Our econometric estimates suggest that the increased openness of the economy leaves patterns of labor demand more sensitive to fluctuations in real exchange rates. Trade agreements also have a direct effect on labor demand, however, as plants and firms expand or contract in response to the new trading environment.

This chapter demonstrates that much of our analysis of the effects of real exchange rate fluctuations is relevant to understanding how trade liberalization affects labor markets. The first section discusses the similarities and differences between trade liberalization and real exchange rate movements. We then turn to analysis of a recent trade liberalization: implementation of NAFTA. Following a brief general analysis of NAFTA, we focus on case studies of how NAFTA affected three industries: textiles and apparel, chemicals, and automobiles.

# *1. Economic Effects of Trade Liberalization*

Trade liberalization may generate economic effects that are much like permanent changes in real exchange rates. An important common element is that trade liberalization and real exchange rate movements both result in changes in the prices of goods produced in the United States relative to goods produced abroad. For U.S. companies producing goods for export, lower tariffs have an effect that is similar to a permanent depreciation of the dollar relative to the currency of the countries that have reduced tariffs on U.S.-produced goods. Both tariff reductions and depreciation reduce the prices charged in the other countries for goods produced in the United States, but tariff reductions differ from a depreciation in that they also reduce the prices in the United States of goods produced by other members of the trade agreement relative to domestically goods. So, from the standpoint of foreign firms' exporting their goods to the United States, implementation of a trade liberalization is much like a permanent real appreciation of the dollar.

In the model presented in Chapter 5, heterogeneity across establishments within industries combined with the general equilibrium effects of changes in exchange rates could result in some establishments' increasing employment in response to an exchange rate movement while other establishments within the same industry decreased their employment level. A similar mechanism could result in simultaneous job creation and job destruction within industries following implementation of a trade agreement. Although establishments within an industry in which the United States has a comparative advantage would tend to experience an increase in the demand for their products following a general trade liberalization, some establishments would experience a greater increase than others as a result of heterogeneity. For example, some establishments may be producing products which are already being marketed abroad, while others may not yet be producing products for export. As a result, some establishments' derived demand for labor schedules would shift out more than would other establishments' labor-demand schedules. As the industry's total labor demand increases, wages of the industry's workers would tend to be bid up, resulting in a backward movement along establishments' labor-demand schedules. The net effect might be for overall industry employment to increase, but for employment at some establishments within the industry to decrease.

One likely source of heterogeneity over establishments within an industry is the stage of production the plant is engaged in. Although the United States might have a comparative advantage at some aspects of production within an industry, other countries may have a comparative advantage in other aspects. Feenstra and Hanson (2001) noted that increased openness may be associated with a shift in the production of less skilled labor-intensive intermediate goods to lower wage countries. This effect of trade might result in reallocation of resources largely within, rather than between, industries.[1] Employment at domestic intermediate-goods plants would decrease, but employment at other establishments within the same industry might simultaneously increase. A trade liberalization would increase the profitability of specialization according to comparative advantage, and thus would tend to promote within-industry reallocation.

The high degree of heterogeneity across industries in their exposure to international trade, which we document in Chapter 2, is as important to understanding the effects of trade liberalization as it is to understanding the effects of exchange rate movements. The magnitude of the impact of trade liberalization on an industry depends on its exposure to trade and the degree to which trade barriers for its output and inputs are reduced. Industries which experience the largest reductions in tariffs, and those which are initially the most open, will be the most affected by trade liberalization. In considering the level of an industry's initial exposure to trade, however, the effect of the initial level of tariffs and trade restrictions on the initial level of openness must be taken into account. Tradeable goods sectors with high tariffs (or other politically imposed barriers to trade) may initially appear to have little exposure to trade, but they may potentially experience greatly increased trade as tariffs are reduced.

Although the economic effects of trade liberalization are similar in many ways to the effects of movements in the real exchange rate, our econometric estimates

[1] Whether the reallocation is mostly between or within industries depends on the degree to which the establishments producing intermediate goods are classified in the same industry as the final goods producers.

cannot be directly used to predict the effects of trade liberalization on job creation and job destruction. As noted above, trade liberalization is equivalent to a simultaneous depreciation of the dollar from the standpoint of exporters and an appreciation of the dollar from the standpoint of importers, and so does not match the type of exchange rate movements which our model estimates are based on. Moreover, the degree and sources of heterogeneity over plants within industries applicable for analysis of the effects of trade liberalization may be quite different from those relevant to analysis of movements in real exchange rates.

An important difference between trade liberalization and exchange rate swings is that trade agreements result from explicit policy decisions, and the resulting political debate is sometimes acrimonious. In contrast, an appreciation of the dollar generally takes place without any explicit policy action. Industry groups may lobby for a weak dollar policy or ask for special assistance to counter the effect of the appreciation on their competitive position, but there is typically relatively little, if any, discussion of exchange rate management policy.

The controversy over trade liberalization is generally focused on negotiations over new trade agreements. The fierce opposition to NAFTA is a case in point. Labor unions promised political repercussions for congressmen who voted for its ratification. The NAFTA debate made its way into American living rooms in November 1993 when Vice President Al Gore debated its merits with Ross Perot, whose prediction of a "great sucking sound" raised concerns about the migration of jobs from the United States to Mexico. Six years later, the streets of Seattle played host to protesters who paralyzed the city while the World Trade Organization (WTO), the successor to GATT, met there. Reflecting on this episode, Jay Mazur, the President of the Union of Needletrades, Industrial, and Textile Employees and Chair of the AFL-CIO International Affairs Committee, wrote in *Foreign Affairs:* "...the labor movement's message from Seattle could not have been clearer: The era of trade negotiations conducted by sheltered elites balancing competing commerical interests behind closed doors is over.... Globalization is ... hurting too many and helping too few." (2000, p. 79). Given the prominence of NAFTA in the recent debate over trade policy, we focus on this trade agreement in the remainder of this chapter.

## *2. An Overview of NAFTA*

The infamous Hawley – Smoot Tariff Act of 1930 brought U. S. tariffs to their highest levels up to that time. This American protectionism prompted retaliatory tariff acts from other countries. These rounds of tariffs are believed to have contributed to both the severity of the Great Depression and its international transmission.

Trade policy in the post-World War II era reflects the hard lessons learned from the interwar period. Trade liberalization has been a goal of most industrial countries and, increasingly, of developing countries as well. This liberalization has proceeded on two fronts, through multilateral agreements and through regional trading agreements involving smaller sets of countries. Multilateral trade liberalization progressed through rounds of negotiations under the auspices of the General Agreement on Tariffs and Trade (GATT). The latest round of negotiations,

the 1986 to 1994 Uruguay Round, led to the creation of the WTO. Alongside this multilateral track, nations have also negotiated trade arrangements among more limited sets of countries. These arrangements can be found all over the globe, with "trade clubs" in Europe (among members of the European Union, who enacted the 1992 "Single Market"), Asia (including the Association of South East Asian Nations, ASEAN), South America (including MERCOSUR, the abbreviation for MERcado COmún del SUR, a trade agreement among Argentina, Brazil, Paraguay, and Uruguay), and North America (NAFTA).

The NAFTA treaty expanded the 1989 United States – Canada Free Trade Agreement by bringing Mexico into a free trade area.[2] The treaty was signed by the United States, Canada, and Mexico in December 1992 and, after being ratified by the legislatures of the three countries, its implementation began on January 1, 1994. Among other provisions, NAFTA calls for the elimination of all tariffs on industrial products traded among the United States, Canada, and Mexico by 2004.[3] The main effect of NAFTA is on trade between the United States and Mexico, since there was already virtually free trade between the United States and Canada, and trade between Canada and Mexico is relatively limited. The tariff reductions undertaken by Mexico exceed those of the United States since, before NAFTA, Mexican tariffs on United States imports were about two-and-a-half times larger than U. S. tariffs on Mexican imports.[4] Mexico eliminated tariffs on almost half of all industrial goods imported from the United States in January 1994, and, by the beginning of 1999, 65 percent of all U. S. exports of industrial products to Mexico were tariff free. NAFTA also led to the elimination of nontariff barriers and trade-distorting restrictions such as local content requirements that limited the access of U.S. manufacturers to Mexican markets.

## *3. Previous Research Related to the Economic Effects of NAFTA*

It is difficult to conclusively link NAFTA to the creation or destruction of jobs in the United States. As is always the case, the world does not offer controlled experiments whereby one and only one feature of the economy is altered while all else is held equal. This difficulty is especially acute here because of other contemporaneous events. Perhaps most importantly, Mexico suffered a financial crisis in December 1994, when speculative pressure forced a 50 percent devaluation of the peso. As Krueger (1999) emphasized, this depreciation had a much larger impact on the relative price of Mexican goods than did the tariff reductions mandated

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[2] NAFTA also expanded upon the Maquiladora 9802 Program which, since 1966, has allowed U. S. firms to establish plants in northern Mexico that export to the United States without U. S. or Mexican restrictions on trade.

[3] A few tariffs on U. S. exports of agricultural products to Mexico are to be phased out over a 15-year period rather than the 10-year period scheduled for phasing out tariffs on industrial products. For a more complete description of the provisions of NAFTA, see the U. S. Department of Commerce's NAFTA homepage at http://www.mac.doc.gov/nafta/nafta2.htm.

[4] For example, Kowalczyk and Davis (1998) estimated that the average Mexican tariff rate in 1991 for products classified as Chemicals and related products was 11.1 percent, and for Manufactured goods, it was 13.2 percent, while the average U.S. tariff rates for these products were 4.8 percent and 6.7 percent, respectively. See table 8.1, p. 238, in their article.

by NAFTA, which will average only 15 percent even after the reductions are phased in completely.

In the wake of its financial crisis, Mexico suffered an economic crisis; its economy contracted by 7 percent over the first nine months of 1995, although there was a subsequent rebound. The United States enjoyed strong growth throughout the second half of the 1990s for reasons not related to NAFTA, and, consequently, the employment growth of this period in any given sector partially reflects the overall trends in the U. S. economy. Further complicating any attempt at isolating the effect of NAFTA is the fact that, beginning in 1995, the United States implemented tariff cuts that were agreed to in the Uruguay Round of GATT and were unrelated to NAFTA. Thus, the United States would have reduced tariffs on Mexican products even in the absence of NAFTA.[5]

Despite the potentially confounding effects of these factors, as well as others, efforts have been made to determine the consequences of NAFTA. At the aggregate level, a study by DRI/McGraw-Hill concluded that NAFTA increased U. S. exports to Mexico by $12 billion per year and Mexican exports to the United States by $5 billion per year. The U. S. Commerce Department estimated that the export gains due to NAFTA support 90,000 to 160,000 jobs in the United States. Furthermore, NAFTA had little effect on the overall level of U. S. imports from Mexico, since the pre-NAFTA tariffs imposed by the United States on Mexican goods were generally low, and, therefore, their removal was not of great consequence. Finally, the feared "great sucking sound" seems to have been little more than the tiniest of slurps, since U.S. direct investment in Mexico declined between 1994 and 1997, while its direct investment in the rest of the world increased. A study by the U.S. International Trade Commission concluded that U.S. direct investment in Mexico had minimal impact on aggregate investment at home.[6] Recent overviews of the economic effects of NAFTA by Burfisher, Robinson, and Thierfelder (2001) and by Krueger (1999) concluded that the overall impact of NAFTA on the U.S. economy has been relatively small.

One would expect that the impact of NAFTA would differ across geographic areas within the United States as a result of differences in industrial specialization. Some areas may have a concentration of industries that would benefit from the increased opportunities for exporting, while others may have a concentration of industries vulnerable to competition from lower wage areas. Coughlin and Wall (2001) found that implementation of NAFTA is associated with changes in the distribution of exports over states. They estimated that overall U.S. merchandise exports increased by close to 8 percent as a result of NAFTA, but that the change varied widely over states. Thirteen states increased exports by 20 percent or more as a result of NAFTA, while the effect was negative for 12 states. The wide variation in the change in exports over regions suggests that the impact on local labor markets, and associated magnitude of job reallocation, exceeded that suggested by the national average of 8 percent export growth.

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[5] It is worth noting, however, that NAFTA may have had an effect on the policy response of the Mexican government to the 1995 financial and economic crises. In the wake of a 1982 financial and economic crisis, the Mexican government imposed quotas and duties of up to 100 percent on American products. It is conceivable that a similar policy may have been pursued in 1995 were it not for NAFTA. In fact, in response to the 1995 peso crisis, the Mexican government raised tariff rates on goods from non-NAFTA countries.

[6] These estimates and statistics, including the results of the DRI/McGraw Hill Study, are cited in Chapter 1 of the report by the Office of the U. S. Trade Representative (1997).

One expected benefit of trade liberalization is lower production costs. As competitive pressure increases, less productive plants need to either improve productivity or shut down. In some cases, the expanded market may also make it possible to realize greater economies of scale. Free trade in raw materials and intermediate products reduce the cost of the inputs into production, resulting in lower costs. Trefler (2001) focused on the effect of the 1989-1996 Canada-U.S. Free Trade Agreement (that preceded NAFTA) on Canadian manufacturing.[7] He found that industries which experienced large tariff reductions suffered a 15 percent decline in employment. Offsetting this, however, is a large increase in labor productivity associated with turnover of low-productivity plants and increased technical efficiency at surviving plants. Tybout and Westbrook (1995) examined the effect of trade liberalization in the 1980s on Mexican manufacturing. They found that average cost decreases were largest in relatively open manufacturing industries. For export-oriented industries, the average cost decreases were associated with decreased input prices. In the case of industries with import competition, productivity improvements played a significant role. Scale effects were relatively unimportant in explaining productivity improvements.

One of the principle concerns of opponents of trade liberalization is the effect of trade on the distribution of wages. Although workers in high-wage countries are viewed as most at risk, workers in protected sectors of less developed countries may also be adversely affected. Revenga (1997) found that trade liberalization has been associated with real wage decreases in Mexican manufacturing. Some of the economic rents arising from trade protection had accrued to workers in the form of higher wages, and these were dissipated as the degree of protection was decreased. Hanson and Harrison (1999) found that the Mexican trade liberalization resulted in an increase in wage inequality. The liberalization in trade was especially strong in low-skill industries, exposing Mexican producers to competition from countries with more abundant supplies of unskilled labor.

It is surprisingly difficult to find a direct link between protection from trade and wages in the United States. Gaston and Trefler (1994) examined how trade protection affects U.S. manufacturing wages. They found that protection is associated with lower wages, holding worker characteristics constant.

## *4. Sector Specific Effects*

Eventually, NAFTA will lead to the full liberalization of trade among the United States, Canada, and Mexico.[8] All tariffs among these countries will be eliminated by 2004 for industrial products and by 2009 for all other products. NAFTA also will bring about the elimination of nontariff barriers and other distortions to trade, such as quotas and licenses.

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[7] Other research on the effects of the Free Trade Agreement includes Gaston and Treffler (1997), who showed that the agreement accounted for only a small share of overall Canadian job losses between 1989 and 1883, and Hein and Sims (2000), who focused on the effect of the agreement on U.S. wine exports to Canada.

[8] See U.S. Department of Commerce, NAFTA homepage, http://www.mac.doc.gov/nafta; documents 3001.htm and 3002.htm.

This section considers the effects of NAFTA for three key manufacturing sectors experiencing significant trade liberalization: the textile and apparel industries (combined), the chemical industry, and the automotive industry. In these industries, NAFTA led to the reduction of large Mexican tariffs on imports from the United States and Canada, as well as to the reduction of tariffs on Mexican exports to the United States and Canada, both of which were lower than the Mexican import tariffs initially. We look at the extent of tariff reductions and elimination of nontariff barriers in these sectors, as well as their possible effects on trade.

In this section, we adopt a more narrative approach than we utilized in our analysis of the effects of real exchange rate movements on job creation and job destruction. Given the limited time span since the implementation of NAFTA began, and the significant macroeconomic developments that occurred during the same time period, the fruitfulness of formal econometric analysis may be very limited.[9] What we can do is look at net employment levels for narrowly defined industries and review reports of industry activity with an eye towards the potential effects of NAFTA on gross job flows. Specifically, we examine the correlation between developments in the foreign trade activity of industries and their labor market behavior. The foreign trade measures for each industry are the export share and import penetration ratios:

$$\frac{\text{Exports}}{\text{Total sales}} \qquad \frac{\text{Imports}}{\text{Total sales + imports}} .$$

These measures are constructed for both multilateral and bilateral trade. Multilateral trade includes all exports or imports in the industry to all countries, whereas bilateral trade includes only trade between the United States and Mexico. Finally, we also look at the ratio of the bilateral trade measures to the multilateral trade measures to ascertain the relative importance of NAFTA trade to worldwide trade for the industry.

Our approach presents us with a result that is a subtext of the entire book, the diverse response within industries to a change in the international environment. This result offers evidence that "globalization" is both helping and hurting, though whether it is helping too few and hurting too many, as in the view cited above, necessarily depends upon a weighting of the relative welfare gains and losses across individuals.

Before turning to the industry analyses, we offer a brief overview of macroeconomic conditions in Mexico, which are important to bear in mind when evaluating the effects of NAFTA. Figure 1 plots the real growth rate of Mexican GDP and the real exchange rate between the Mexican peso and U.S. dollar (adjusted for consumer prices) for the period 1980 to 2002. The most notable feature pertinent to our analyses is the Mexican crisis of 1994-1995, during which the real peso devalued sharply and GDP growth plunged to its lowest level in the sample period. Because the crisis unfolded at precisely the same time NAFTA was implemented, it is extremely difficult to identify the separate effect of NAFTA during the crisis. However, real GDP growth rebounded fairly quickly and was robust throughout the remainder of the 1990s. The real peso took the rest of the decade to return to its pre-crisis level, but it appreciated fairly steadily during that time.

The trend behavior of Mexican real GDP growth and the real peso are also

[9] There are also issues of data availability. The gross job flows data from the Census Bureau's Longitudinal Research Database are not currently available for years after 1993, but we estimate the data plotted in the graphs for the period 1994 to 2001 using employment data from the Bureau of Labor Statistics.

important for interpreting the effects of NAFTA. Since the late 1980s, both real GDP growth and the real peso have been relatively strong on average, especially compared with the rest of the 1980s. This general strength probably contributed to higher Mexican multilateral imports and exports in all industries, on average, and this probably translated into higher bilateral U.S. exports to Mexico and bilateral U.S. imports from Mexico as well.

To summarize, both the cyclical effects of the Mexican crisis and the trend robustness of the Mexican macroeconomy are important factors that influenced Mexican multilateral trade in the years surrounding NAFTA. Thus, we might expect to see a long-run trend increase U.S.-Mexico bilateral trade as well. Also, there may be a cyclical influence from the Mexican crisis, most likely manifesting itself as a decline in U.S. bilateral exports to Mexico. Indeed, we find both of these effects in the trade data. Any separate effects attributable to NAFTA would appear over and above the effects of the macroeconomic developments.

## 4.1. Textiles and Apparel

The U.S. textile and apparel industries (SICs 22 and 23) are often viewed as susceptible to the destruction of low-wage jobs through international competition. In 1996, U.S. average hourly earnings in these industries were relatively low: $9.62 per hour for textiles and $7.67 per hour for apparel, compared with $12.00 per hour for all manufacturing. Nevertheless, the relatively low earnings in these industries are significantly higher than the earnings of textile and apparel workers in less developed countries with which the United States trades, such as Mexico. Thus, U.S. textiles and apparel jobs potentially are threatened by imports and by the relocation of plants abroad. Concern about the welfare of workers in these industries may have contributed to the relatively high tariff protection afforded textile and apparel firms before NAFTA.

Table 1 provides an overview of the changes in tariffs and trade rules for the textile and apparel industries as a result of NAFTA. The primary impact of the agreement was to eliminate the substantial tariffs on these products levied by both the United States and Mexico by the year 2002. Mexico also removed some trade barriers for NAFTA partners but raised tariffs on non-NAFTA partners.

Prior to NAFTA, the average U.S. tariff on imports of Mexican textile and apparel products was the highest among 22 industrial categories. Thus, U.S. firms in these two sectors faced the largest reductions in protection due to NAFTA among all U.S. manufacturers. Mexico had even higher tariffs in these industries before NAFTA, so Mexican firms in these sectors faced even more dramatic changes in their trade with NAFTA partners. However, to some extent the policy changes toward non-NAFTA partners offset the NAFTA changes. [10]

[10] Data on average tariff rates for selected industries in 1992 and 1996 are from the Office of the U.S. Trade Representative (1997), page 32. This document is also the source of the information in Tables 2 and 3.

**Table 1 NAFTA Changes for Textiles and Apparel**

| Country | Category | Change | Developments |
|---|---|---|---|
| Mexico | Tariff | Eliminated 20% apparel and 15% textile tariffs mostly by 1998 and completely by 2002. | U.S. textile and apparel exports to Mexico increased from less than $1.6 billion in 1993 to $2.8 billion in 1996. |
| | Rule | Allowed domestic sales by *maquiladora* plants. | During 1995 financial crisis, Mexico placed 35% tariffs on non-NAFTA goods. |
| United States | Tariff | Eliminated 9.1% average tariff by 2000 on:<br>• 95% of fabric imports,<br>• 83% of made-up textile imports,<br>• 99% of apparel imports. | U.S. importers shifted from Asian to NAFTA imports. From 1993 to 1996, Canadian and Mexican share increases from 6% to 14% of total U.S. textile and apparel imports. Benefits U.S. industry because NAFTA members use more U.S. supplies than Asian competitors. |

For historical perspective, Figure 2 plots U.S. employment in the textile and apparel industries since 1939. Employment declined fairly steadily in both industries for many years—both in absolute terms and as a share of manufacturing employment. These negative trends reflect a variety of long-run technological factors, international trade, and other forces that obviously cannot be attributed to NAFTA.[11] Moreover, the sources of the trends differ between the two industries.

Textile employment has trended downward since its peak following World War II. The main driving force has been revolutionary technological advances, which have led to labor productivity growth of twice the rate for all manufacturing. At least partly because of this innovation, the textile industry faced only mild competition from foreign textile producers. From 1970 to 1988, textiles imports as a proportion of domestic consumption rose modestly from 4.6 percent to 6.8 percent. Within this industry, firms that adopted the technological advances would have been relatively free from foreign competition, while those firms that did not—or could not—keep up with technology likely declined and destroyed jobs at a faster rate.

In contrast, technological innovation in the apparel industry was much less dramatic and much more incremental. Apparel employment did not peak until the early 1970s, when the industry began to experience stiff competition from foreign apparel producers, particularly those in developing countries with very low wages. From 1970 to 1988, apparel imports as a proportion of domestic consumption jumped from 5.2 percent to 26.1 percent and employment began a trend decline, perhaps because of the adverse affects of increased trade via imports.

The question at hand for both industries is whether NAFTA could be responsible for employment effects above and beyond those attributable to other factors such as trend developments, macroeconomic conditions in the United States

[11] For more about this and our other assessments about employment in these industries, see Murray (1995).

and Mexico, and non-NAFTA trade changes. This question is difficult to answer definitively for these industries given the range of factors involved, but also because of the mixed employment responses. Following the implementation of NAFTA on January 1, 1994, textiles employment continued to decline at about the same long-run trend rate as it did before NAFTA. In contrast, employment in the apparel industry appears to have declined at a much faster rate than before NAFTA, dropping about 40 percent since 1994. The timing and magnitude of the apparent change in the apparel employment trend suggests the possibility that it may be related to NAFTA, but one would want corroborating evidence from foreign trade data.

Figure 3 portrays the dramatic changes in U.S. international trade of textile and apparel products.[12] Since the early 1970s, the multilateral import penetration ratio (left scale) has risen steadily by almost six-fold, to nearly 35 percent in 2001.[13] The multilateral export share was essentially flat until the late 1980s, when it began increasing steadily and it has tripled approximately since then. Although multilateral imports have risen somewhat faster in the second half of the 1990s, there is no apparent change in either measure that seems obviously connected with the implementation of NAFTA.

A closer look at the bilateral trade shares between the United States and Mexico, also shown in Figure 3 (right scale), reveals changes that likely to be connected with NAFTA.[14] The most notable development is a sharp increase in the share of U.S. exports to Mexico since the late 1980s. As Krueger (1999) explained, changes in trade between the United States and Mexico before the implementation of NAFTA may reflect anticipation of its passage, but it is more likely that the changes primarily reflect general trade liberalization and favorable macroeconomic developments in Mexico since the late 1980s. Nevertheless, the pace of increase in the bilateral export share quickened significantly since 1994 and may reflect a boost by NAFTA. Most of this faster increase in bilateral exports to Mexico occurred in the textiles industry. The share of U.S. bilateral imports from Mexico is small and did not change as much, but there also appears to be evidence of a significant increase in the upward trend since the implementation of NAFTA.

Whether or not NAFTA was significant enough to affect total U.S. multilateral trade in textiles and apparel, it does seem to have contributed to changes in the bilateral composition of such trade. Figure 4 illustrates the compositional shift by plotting the shares of bilateral United States-Mexico trade in total U.S. multilateral trade. The shares of U.S. textile and apparel trade with Mexico have been increasing rapidly since the mid 1980s; the bilateral export share roughly tripled to about 30 percent, and bilateral import share roughly quadrupled to about 2 percent. In both cases, the reorientation of exports and imports toward firms trading with Mexico quickened shortly after NAFTA took effect.

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[12] The National Bureau of Economic Research World Trade Database (WTDB), which is our main source of historical trade data, provides data for the textile and apparel industries combined only through 1992. Consequently, we supplement the WTDB with data for 1993 to 1999 that also combine the two separate industries.

[13] Trade data for 2000 and 2001 come from the Bureau of Economic Analysis (BEA). The BEA trade data are classified by the new NAICS industry system and thus not exactly comparable to the trade data classified by SIC. To correct for this, we use NAICS-based data to impute estimates of the SIC-based data for these industries.

[14] We calculate bilateral trade shares by dividing the value of the industry's imports (exports) between the U.S. and the specified country by the value of the industry's total multilateral imports (exports).

NAFTA seems to have contributed to the shift in American purchases of textiles and apparels from the Far East to North America, making Mexico and Canada the top two suppliers of textiles and apparel for the United States. In 1993, China, Hong Kong, Taiwan, and Korea together accounted for 39 percent of U.S. textile and apparel imports, while Mexico and Canada accounted for 7 percent. By 1996, these percentages had shifted to 30 percent for China, Hong Kong, Taiwan, and Korea and 14 percent for Mexico and Canada. This shift, towards firms that tend to use more American products as inputs, was welcomed by the textile industry.

In 1999, Doug Ellis, CEO of Southern Mills, Inc., in Atlanta and president of the American Textile Manufactures Institute (ATMI), was quoted as saying that Asian economies "…are still trying to export their way out of their difficulties and, to our detriment, the U.S. is the one they rely on as a buyer of first and last resort." He continued that, because of the use of United States textile products in Mexican and Canadian apparel manufacture, "if it weren't for NAFTA, our exports would be in much worse shape."[15] A September 1997 news release by the ATMI echoes this theme, stating "...in terms of textile and apparel trade, our NAFTA-forged relationship with Mexico is truly symbiotic, truly mutually rewarding." [16]

Note well, however, the disparity in bilateral export and import shares. Although the import share increased more in percentage terms, the import share is an order of magnitude smaller than the export share. In fact, the small share of textile and apparel imports from Mexico suggests that it is unlikely that NAFTA itself stimulated enough new imports to threaten many jobs in the textile and apparel industry overall. Individual U.S. textile and apparel firms, however, would have been affected relatively more or less if their trade with NAFTA partners was disproportionately high or low.

To the extent they exist, any employment effects of NAFTA are manifested in the net and gross job flows depicted in Figure 5.[17] Net employment in the textile and apparel industries has been declining at a much faster rate during the NAFTA period. This net employment reduction probably has been accomplished mostly by an increase in the rate of job destruction, which is estimated to have been at high levels normally associated with past recessions and other major manufacturing contractions. Job creation, on the other hand, has steadied at, or just slightly below, its long-run average. Together, these developments brought about a significant increase in the rate of job reallocation among textile and apparel plants.

Linking trade-related changes in the textiles and apparel industries to net employment change is tricky at best, and we have only a short sample of data for the post-NAFTA period. Because share of imports of textiles and apparel from Mexico is very small, the effect of NAFTA on net employment in this industry is almost surely small as well. Many other factors, some of which were non-NAFTA trade-related

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[15] McClenahen (1999).

[16] See website http://atmi.org/newsroom/naftare1.html.

[17] Job flows through 1993 are from Davis, Haltiwanger, and Schuh (1996) and Schuh and Triest (1998). Gross job flows after 1993 are imputed using industry job-flows data constructed from BLS employment data on four-digit industries. See Haltiwanger and Schuh (1999) for more details. The imputation formula comes from a linear regression model of plant job flows on BLS industry-level job flows and total manufacturing net employment growth, similar in spirit to that used by Davis, Haltiwanger, and Schuh (1996). Net employment growth data after 1993 come from the BLS employment data and thus are not imputed.

issues, also likely played important roles. Competition from non-NAFTA countries and the high value of the dollar have been problems for domestic industries, and competitive pressure will likely further increase in the near future with the expiration of quota restrictions on textile imports from China.[18]

Although the net employment effect of NAFTA probably was very small, it is possible that NAFTA and other trade-related changes in Mexico may have contributed more to gross job flows. This conclusion depends importantly, though, on the assumption that sufficient heterogeneity exists among textile and apparel plants. If plants differ enough in their extent of participation in international trade and in the countries with which they trade, we should expect the trade changes to induce gross job flows. The compositional shift toward trade with Mexico, evident primarily from the substantial increase in the share of exports going to Mexico, may tend to induce job creation in plants exporting to Mexico and job destruction in plants exporting to other countries.

What remains hard to explain, solely based on trade developments, is the asymmetry between creation and destruction in the late 1990s. The multilateral trade gap (exports less imports) for textiles and apparel has grown steadily during the past 3 decades, as is apparent from Figure 3. Undoubtedly, this ongoing shift in the relative importance of domestic producers has put downward pressure on employment in the industry, but it is unclear why domestic producers responded more on the destruction margin. Perhaps Foote's (1998) argument regarding nonconvex employment adjustment in declining industries is applicable here. In any case, the apparent relative success of U.S. textiles and apparel producers who export to Mexico suggests that they may have experienced unusual increases in job creation.

Other more subtle factors may help explain the relative importance of job destruction. As Bernard and Jensen (1995) note, exporters tend to be larger, more technologically advanced, and have higher labor productivity. Thus, a shift in employment toward these producers could, on average, induce a reduction in total industry employment that would be accomplished primarily by job destruction in plants relatively unengaged in foreign trade. A more subtle explanation may arise from differences in the types of textile and apparel products traded among NAFTA partners. For example, if products traded among NAFTA partners were more "sophisticated" and required higher levels of technology and capital intensity, then the compositional shift could also motivate the job flows we observe. Of course, without more specific data, these explanations remain merely speculative.

## 4.2. Chemicals and Allied Products

The chemical and allied products industry (SIC 28) is the third largest U.S. export sector. Its production workers enjoy the highest average wages of any manufacturing sector, about $17 per hour in 1996, reflecting the use of well-trained and highly skilled production workers in an increasingly complex industry. The industry is also quite diverse, manufacturing over 50,000 different substances, and this diversity is reflected in the attributes of its subsectors. For example, the share of

[18] See Morse (2001).

production workers in the two largest subsectors, drugs (SIC 283) at 50 percent and plastic materials and synthetics (SIC 282) at 67 percent, differ significantly from the 60 percent average for all chemical industries.

Table 2 summarizes the changes in tariffs and trade rules pertaining to the chemical industry due to NAFTA. Prior to NAFTA, average chemical tariffs were relatively low compared with the other industry tariffs discussed in this chapter. Nevertheless, the agreement cut average tariffs in both countries by half or more. Tariff reduction in Mexico was more important, as Mexican tariffs were ten times larger than U.S. tariffs. But, these averages mask a range of reductions across subsectors. For example, about one-fourth of all chemical products had entered Mexico duty free before NAFTA, while tariffs on certain pharmaceuticals were as high as 20 percent. The new, lower Mexican chemicals tariff reflects the immediate elimination of 20 percent tariffs on close to one-half of U.S. pharmaceutical exports to Mexico.

**Table 2 NAFTA Changes for Chemicals and Allied Products**

| Country | Category | Change | Developments |
|---|---|---|---|
| Mexico | Tariffs | Average reduced from 10.2% in 1992 to 4.0% in 1996. | U.S. chemical exports to Mexico increased from $3.4 billion in 1993 to $5.1 billion in 1996. |
| | Rule | Eliminated import licenses on chemicals, rubbers, plastics, and pharmaceuticals. | |
| | Rule | Agreed to protect process patents. | |
| | Rule | Initiated competitive bidding for Pemex (government oil) and CFE (government electricity) contracts. | U.S. exports of petrochemicals to Mexico grew more than 75 percent to $1.2 billion from 1993 to 1996. |
| United States | Tariffs | Average reduced from 1.0% in 1992 to 0.5% in 1996. | Mexican chemical exports to United States increased from $0.6 billion in 1993 to $1.4 billion in 1996 (although it is unlikely that this small tariff reduction caused the increase). |

Equally importantly, NAFTA required Mexico to adopt several changes in rules that significantly liberalized trade. For example, it eliminated import licenses and terminated the virtual monopoly held by the Mexican government on petrochemical production. The latter change opened Mexican petrochemical markets to U.S. and Canadian firms, leading to cross-border vertical integration with Mexican firms supplying basic and primary products for manufacture in the United States into high value added secondary petrochemicals. The effects of NAFTA on other chemical industries likely were mixed. Some sectors were little affected for technological reasons. For example, prepared paint is costly to transport relative to its price. This leaves little scope for supply from distant firms; indeed, the U.S. paint market

comprises many small to medium-sized firms that are geographically dispersed.

Figure 6 plots the history of employment in the chemical industry since 1939. Employment grew steadily until the 1970s, when it leveled off at a little above 1 million workers. This time-series pattern is similar to that of total manufacturing employment, except that chemicals employment rose faster in the earlier period, while its manufacturing share has stabilized more recently. In particular, note that chemicals employment has changed little during the post-NAFTA period, hovering at about its average for the past three decades.

As in most industries, foreign trade has been increasing in importance for chemicals, as shown in Figure 7. Total multilateral exports and imports (left scale) have trended upward since the early 1970s, with exports doubling to more than 16 percent and imports more than tripling to about 13 percent by 2001. During the NAFTA period both multilateral exports and imports have continued to increase. Exports have increased in line with their long-term trend, but imports have risen significantly faster since NAFTA. However, because the NAFTA changes pertaining to U.S. chemical imports from Mexico were modest, it seems unlikely that the increasing propensity to import chemicals is attributable to NAFTA. This conclusion is supported by developments in the bilateral trade shares (right scale), also shown in Figure 7. Imports from Mexico have not increased at a significantly faster pace like the multilateral imports did. Exports to Mexico have nearly doubled since NAFTA and may have been influenced at least in part by the trade liberalization, but it appears that bilateral exports to Mexico began to increase faster even before NAFTA.

The shares of bilateral trade to Mexico confirm this assessment, as can be seen in Figure 8. U.S. chemical imports from Mexico (right scale) peaked shortly after NAFTA then declined and now are at about the same level they were at before NAFTA, but they seem to be about in line with their long-run upward trend. These relatively minor changes probably stem from the fact that U.S. tariffs on Mexican chemicals averaged only 1 percent before NAFTA. In contrast, U.S. exports to Mexico seem to have risen more rapidly since NAFTA (left scale). Exports of chemicals to Mexico were approximately 6 percent of total exports of chemicals until NAFTA but have risen to about 10 percent since then. This increase of more than 50 percent compares favorably to the 37 percent increase in exports to non-NAFTA countries during the same period, and Mexico became the third largest foreign destination of U.S. chemicals exports by 1998 (Canada is the largest). However, the increases in bilateral export shares, both relative to industry sales and to total industry exports, are relatively modest and not too far out of line with trend increases since the mid 1980s, when other developments stimulated trade with Mexico. Thus, NAFTA seems to have shifted trade within the chemicals toward Mexico without significantly affecting overall trade, just as it did in textiles and apparel.

Given the lack of significant changes in employment and trade, it seems unlikely that NAFTA generated much job flows in the chemical industry. Figure 9 confirms this conjecture. Gross job flows in the chemical industry have been relatively stable near their long-run averages during the NAFTA period. Thus there is little evidence, from either gross job flows or net employment change, that NAFTA caused much reallocation of jobs beyond the normal churning in this industry. Apparently the NAFTA changes either were not large enough to bring about significant employment adjustments overall. Furthermore, the shifts of trade in chemicals toward Mexico apparently occurred within establishments, rather than

between establishments, and did not entailing many job changes.

## 4.3. Automobiles

The automobile industry (SIC 371) dominates trade among Canada, Mexico, and the United States.[19] Automobiles and automobile products represent not only the largest component of all three bilateral trade relationships, but also the largest component in each direction for all six bilateral trade flows among these three countries. Overall, the auto industry accounts for 40 percent of North American trade (Weintraub and Sands 1998).

The liberalization of the North American automobile trade began in 1965 with the Canada–U.S. Automotive Products Trade Agreement (APTA), also known as the Auto Pact. This agreement increased the number of U.S. vehicles and components allowed to be sold in Canada. It led to the integration of the automotive industries in the United States and Canada, with Canadian plants taking over a disproportionate share of vehicle assembly, and U.S. sites largely responsible for research and development, product engineering, and the production of high-valued parts (Kumar and Holmes 1998). NAFTA represents an effort to extend this vertical integration to Mexico.

Prior to NAFTA, Mexican policy primarily had been directed towards preventing the integration of its auto industry with U.S. firms. The Mexican government issued a series of Auto Decrees, beginning in 1962, that segmented the domestic auto market and awarded rights to manufacture for each segment. The fifth Auto Decree, issued in 1989, liberalized domestic production but retained barriers to exports from the United States. Along with continued tariff protection, this decree included a "trade balancing" requirement for Mexican assemblers that mandated their export sales as a function of their import purchases. This provision made investment in Mexico the only viable way for U.S. auto firms to sell in the Mexican market. The Mexican government encouraged production for export with the 1989 *Maquiladora* Decree. *Maquiladora* plants, sited in Mexico near the U.S. border, manufactured and assembled products that were exported to the United States (Doh 1998).

Table 3 provides an overview of the changes in tariffs and trade rules for the automobile industry due to NAFTA.[20] NAFTA eventually eliminates all of the protectionist aspects of the Mexican Auto Decrees. All Mexican tariffs and most nontariff barriers associated with North American trade in cars and trucks are to be eliminated. Likewise, all U.S. tariffs on cars and light trucks will be removed.

[19] By "automobile" we mean motor vehicles and motor vehicle parts and equipment, a definition that includes trucks, buses, trailers, and motor homes.

[20] For details, see Doh (1998).

**Table 3 NAFTA Changes for Automobiles**

*Cars and Light Trucks*

| Country | Category | Change | Developments |
|---|---|---|---|
| Mexico | Tariff | Immediate reduction from 20% to 10% with elimination by 1998 for light trucks and by 2003 for cars. | U.S. light auto exports to Mexico increase from 17,000 units ($0.24 billion) in 1993 to 91,000 units ($1.3 billion) in 1996.<br><br>Greater economies of scale because manufacturers no longer need to simultaneously manufacture same models in different countries. |
| | Rule | Allow domestic sales by *maquiladora* plants. | |
| | Rule | Eliminate trade balancing rules. | |
| | Quota | Eliminate import quotas. | |
| United States | Tariff | Immediate elimination of 2.5% tariff on cars; immediate reduction from 25% to 10% on light trucks and elimination by 2004. | Mexican light auto exports to U.S. increased from $11.1 billion in 1993 to $22.9 billion in 1996. |

*Heavy and Medium Trucks*

| Country | Category | Change | Developments |
|---|---|---|---|
| Mexico | Tariff | Eliminate 20% tariff by 2003. | U.S. heavy and medium truck exports to Mexico increase. |
| | Rule | Eliminate trade balance and local content requirements by 1998. | |
| | Rule | Mexican companies can lease vehicles. | Mexican vehicle operation and maintenance markets opened to U.S. providers. |
| United States and Mexico | Rule | Liberalized restrictions on land transportation between United States and Mexico. | Mexican fleets must be modernized to meet U.S. safety and environmental standards creating a new market for U.S. suppliers. |

These changes create an essentially frictionless, integrated automobile market in North America. Given the dominance of U.S. automobile manufacturers in NAFTA countries, this integrated market suggests that the impact of trade on U.S. employment may be quite different in the automobile industry than in other industries that are not integrated. Conceivably, the liberalization of automobile trade between the United States and Mexico may actually increase both trade and employment in the industry if liberalization improves the cost efficiency and productivity of the industry, or if it stimulates total demand for automobiles.

Figure 10 plots the history of employment in the automobile industry since 1939. Automobile employment fluctuated widely between 600,000 and 1 million throughout most of the historical period. During the late 1950s and early 1960s

employment declined but subsequently rebounded following APTA. During the 1980s and early 1990s, foreign competition, especially from Japan, and labor-saving technological innovations contributed to much slower employment growth. During the post-NAFTA period, however, employment rose significantly, and even its share of total manufacturing employment increased. Thus, the question arises: are the changes in NAFTA linked in any way to this surge in auto employment?

The importance of total foreign trade in the auto industry has not changed much during the NAFTA period, as can be seen in Figure 11. Multilateral exports and imports (left scale) were relatively flat during this period and neither trade measure ended up much above its previous historical high. The recent slower growth of multilateral trade contrasts with the steady trend increase in both multilateral exports and imports during the prior two decades, particularly in imports, which peaked in the mid 1980s.

However, Figure 11 shows that bilateral trade with Mexico (right scale) has increased dramatically since the 1980s and especially during the NAFTA period. Bilateral imports to Mexico approximately tripled since NAFTA, from less than 2 percent to nearly 6 percent. Bilateral exports to Mexico also increased after NAFTA, approximately doubling from less than 2 percent to nearly 4 percent. The figure reveals that bilateral trade with Mexico began increasing long before NAFTA – at least since the late 1980s, or earlier – so NAFTA cannot be responsible entirely for the shift toward trade with Mexico in the motor vehicle industry. Nevertheless, the rate of increase jumped sharply for imports immediately following NAFTA, and for exports more recently, so there may be some effect of NAFTA in addition to the economic factors underlying the trend increase.

The trend increase in bilateral U.S.–Mexico trade has significantly altered the composition of trading partners for the motor vehicle industry, as shown in Figure 12. As recently as the late 1980s, bilateral exports to and imports from Mexico accounted for less than 5 percent each of multilateral trade. But by 2001, bilateral exports accounted for nearly one-fourth of multilateral exports, and bilateral imports accounted for nearly one-fifth of multilateral imports. Consequently, the importance of both the exchange rate between the Mexican peso and U.S. dollar and of U.S. establishments involved in trade with Mexico have increased greatly for total multilateral trade in motor vehicles.

The period immediately following NAFTA seemed to open trade. Exports of motor vehicles from the U.S. to Mexico rose 584 percent, to $1.3 billion, between 1993 and 1996 (an increase in units from 17,000 to 91,000). Trade also increased in the other direction, with U.S. imports of automotive products from Mexico rising from $11.1 billion in 1993 to $22.9 billion in 1996. This figure includes an increase in motor vehicles exports from Mexico to the United States from $3.7 billion in 1993 to $11.3 billion in 1996. Industry analysts estimate that, on average, over half of the value of the content of vehicles exported to the United States from Mexico is produced in the United States. Mexican imports in the mid 1990s helped American manufacturers when they faced capacity constraints, especially for sport utility vehicles and light trucks.[21]

NAFTA also seems to be affecting the division of production between the United States and Mexico in much the same way that the Auto Pact altered the

[21] See Office of the U.S. Trade Representative (1997), chapter 2.

division of production between Canada and the United States. This restructuring is enabling U.S. manufacturers to realize economies of scale in production. For example, the consolidation of production that can now be achieved under NAFTA has enabled Ford to relocate production of its Thunderbird and Cougar models from Mexico to Lorain, Ohio. Production at the Ford plant in Cautitlin, Mexico, was shifted to the Contour and Mystique models. This change in production patterns allowed Ford to realize economies of scale that it could not enjoy when forced to produce certain models simultaneously in the United States and Mexico.

Turning to the gross jobs flows of the automobile industry, depicted in Figure 13, we see little evidence of substantial changes during the NAFTA period. Relative to their history, gross job creation and destruction have been relatively stable since the mid 1980s when trade in motor vehicles began shifting toward Mexico, except for the usual increases during the two most recent mild U.S. recessions. In fact, job reallocation actually tended to decline throughout the NAFTA period before the U.S. slowdown in the early 2000s.

Thus, even though NAFTA probably had a very significant effect on the composition of foreign trade, the reorientation of trade toward Mexico does not appear to have had a significant effect on employment or job reallocation in establishments in the U.S. automobile industry. Despite significant increases in the shares of U.S. trade with Mexico, the data show little sign of much reshuffling of employment across U.S. auto plants through job creation and destruction. Perhaps because of the unique structure of the North American auto industry, which exhibits strong links between auto producers in each country to U.S. auto companies, or because of the role of unions in the automobile industry, trade liberalization does not induce the same kinds of job reallocation it does in other industries.

Net employment growth was relatively strong following NAFTA, however, and it may be that trade liberalization contributed in part to overall growth in the U.S. auto industry that increased the demand for labor. One should bear in mind that U.S. real GDP and household wealth grew spectacularly well during this period, and these developments and may be the sole explanation for the strong growth in auto employment. Nevertheless, the technological and market-structure advantages offered by NAFTA for this industry likely helped boost overall auto employment somewhat on the margin.

## 4.4. Summary of Industry Results

Mutilateral international trade increased in all three industries since the mid to late 1980s. It now accounts for nearly one-third of activity in the chemicals industry and nearly one-half of the activity in the other two industries. The increase in multilateral trade was greatest in textiles and apparel, where is increased by about one-half. However, there is very little evidence that multilateral trade increased more as a result of NAFTA, with the possible exception of textiles and apparel imports. Instead, it appears that multilateral trade is experiencing a trend increase for other reasons.

Bilateral trade between the United State and Mexico also increased in all three

countries since the mid to late 1980s. However, these data seem to clearly point to a substantive influence of NAFTA on trade within the industries. In particular, NAFTA appears to have substantially altered the composition of trade by shifting U.S. exports and imports in these industries toward Mexico and away from other countries. Although the shares of bilateral U.S.-Mexico exports and imports are relatively small fractions of total industry activity, these bilateral exports and imports account for sizable fractions of total exports and imports in these industries. As of 2001, they account for about two-fifths in the auto industry, one-third in textiles and apparel, and about one-eighth in chemicals. Since NAFTA, the share of bilateral U.S.-Mexico trade doubled in the auto industry and increased almost as much in textiles and apparel.

These trade developments represent important examples of how changes in international factors can affect activity within an industry but without affecting overall industry activity. In this regard, NAFTA-related changes are analogous to the within-industry effects of real exchange rates studied earlier in this book. Attempts to observe the impact of NAFTA using industry-level (or more aggregated) data will have difficulty because, even at the level of industry detail examined here, the impact is subtle at best. To get a clear picture of the effects of NAFTA, one must examine the trade and employment patterns for specific countries and domestic establishments.

Despite strong evidence of a reallocation of bilateral trade toward Mexico in these industries, we do not observe clear evidence of the impact of trade on employment and gross job flows in these industries. During the NAFTA period, employment rose in autos, fell in textiles and apparel, and was roughly unchanged in chemicals. Obviously, these divergent employment experiences are not explained well by either the multilateral or bilateral trade developments in these industries. But even the gross job flows data do not offer clear evidence that the within-industry reallocation of trade toward Mexico induced greater job reallocation, with the possible exception of the textiles and apparel industry.

Why hasn't the reallocation of trade toward Mexico induced by NAFTA produced clearer evidence of greater job reallocation? Two explanations seem the most promising. The most obvious one is that bilateral trade with Mexico is simply too small a share of total industry activity to have a large aggregate impact – even by the 2000s, bilateral trade (exports and imports) account for less than 10 percent of each industry's total activity. A second, and more subtle, explanation is that the reallocation of trade toward Mexico simply may have occurred at the individual establishment level rather than across establishments. In other words, most establishments that trade may have changed their trading partners but not the level of their total trade, rather than establishments that deal with Mexico expanding and establishments that deal with the rest of the world contracting. Corroboration of this hypothesis requires examining establishment-level bilateral trade data, which do not exist.

# *5. Conclusion*

Major trade agreements, such as NAFTA, that liberalize trade by reducing tariffs and other nontariff barriers to trade can significantly affect both trade and labor-market flows. These trade agreements alter the cost of trade between countries significantly. In the case of NAFTA, the price changes were as much as 20 to 25 percent for tariffs, and the implicit cost reduction was even greater with regard to

other trade barriers. Thus, in a sense, trade liberalization potentially has similar effects to those coming about through exchange rate variation. Unfortunately, however, it is difficult to identify the precise manner in which trade liberalization affects trade and employment demand. Trade agreements make discrete, and often large, changes in tariff rates and other barriers.

These difficulties were amplified in the case of NAFTA, particularly regarding trade between the United States and Mexico, because the agreement was primarily bilateral in nature. The United States and Canada already had enacted the Canadian Free Trade Agreement, so most of the changes affected trade between the United States and Mexico. NAFTA reduced tariffs and other barriers to trade between the United States and Mexico significantly. However, the proportion of U.S. trade with Mexico was often small compared with total U.S. trade, so the NAFTA changes could only have modest effects at best. Moreover, U.S. trade with both Mexico and the rest of the world had been increasing long before NAFTA. Thus, it is hard to attribute much of a role to NAFTA in U.S. net employment changes.

The bilateral nature of the NAFTA changes did seem to alter the composition of U.S. exports and imports, raising the share of trade with Mexico relative to the rest of the world. Even in this regard, the extent of the compositional shift was fairly small. Nevertheless, in principle, compositional changes in trade patterns across trading partners could have increased gross job creation and destruction among U.S. plants if exporters and importers were sufficiently segmented in their trading markets. The fact that we find little evidence of higher job reallocation among U.S. plants suggests either that the NAFTA changes were not significant for overall labor demand or that trade with foreign countries is not sufficiently segmented across plants to bring out shifts in labor demand among plants.

To sum up, in principle, trade liberalization can be linked to net and gross job flows by significantly altering the costs of exports and imports among trading partners. In practice, however, NAFTA does not appear to have induced much change in either net or gross job flows in the United States. Clearly, this conclusion is preliminary and tentative, as additional research is needed to more properly ascertain the connection between job flows and impediments to trade.

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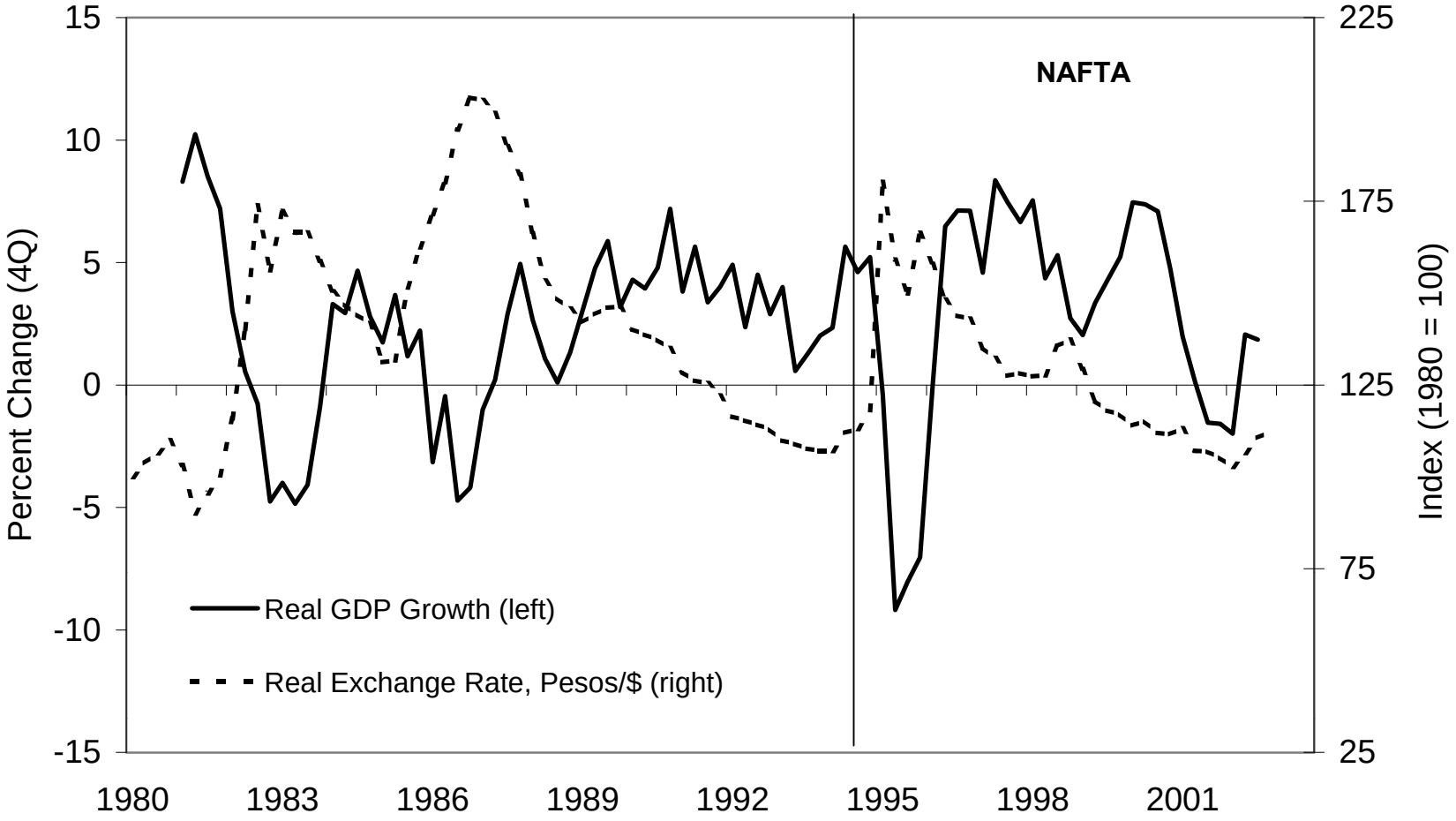
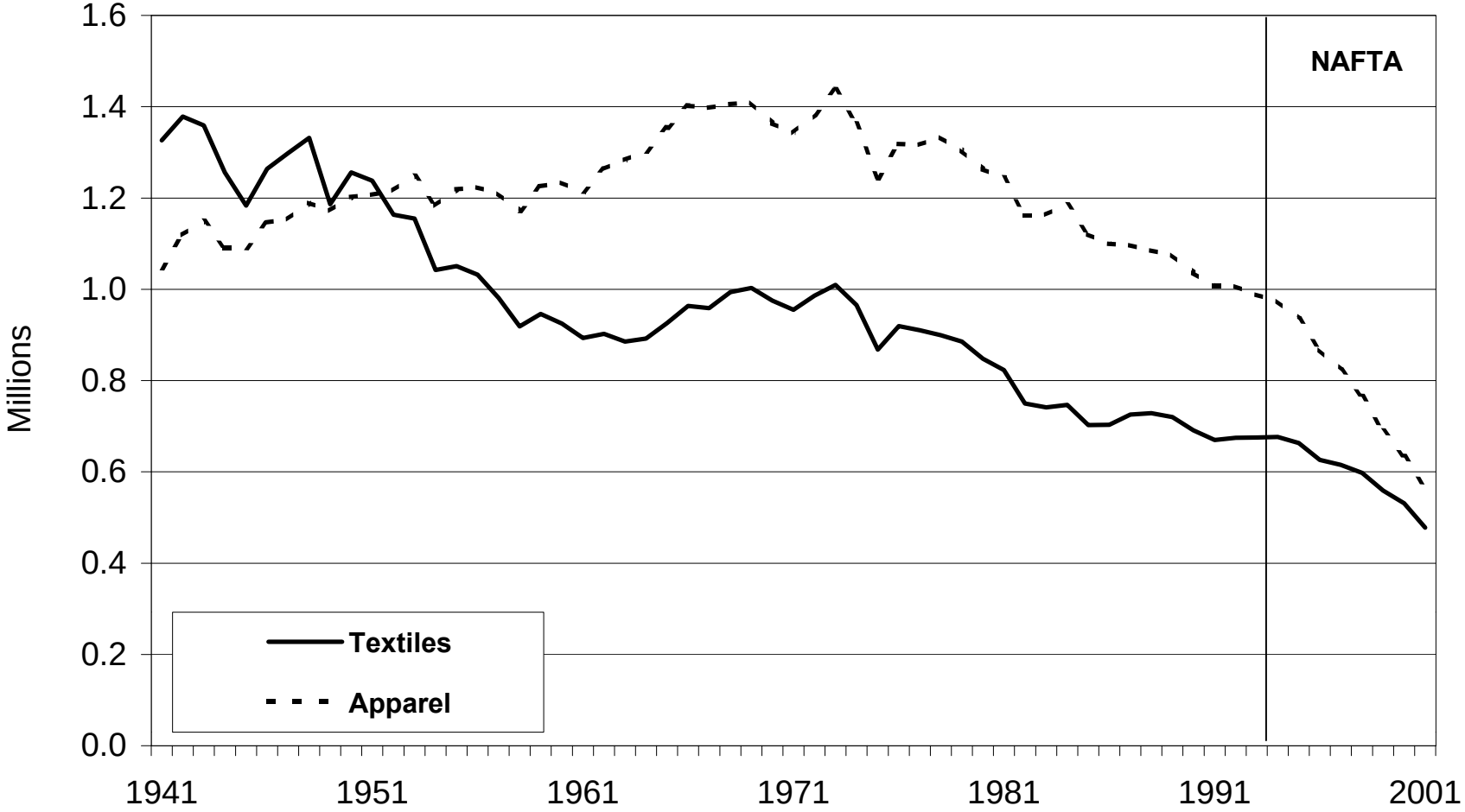
**Figure 1**

## Macroeconomic Developments in Mexico




Source: IFS.

**Figure 2**
**U.S. Employment in the Textiles and Apparel Industries**

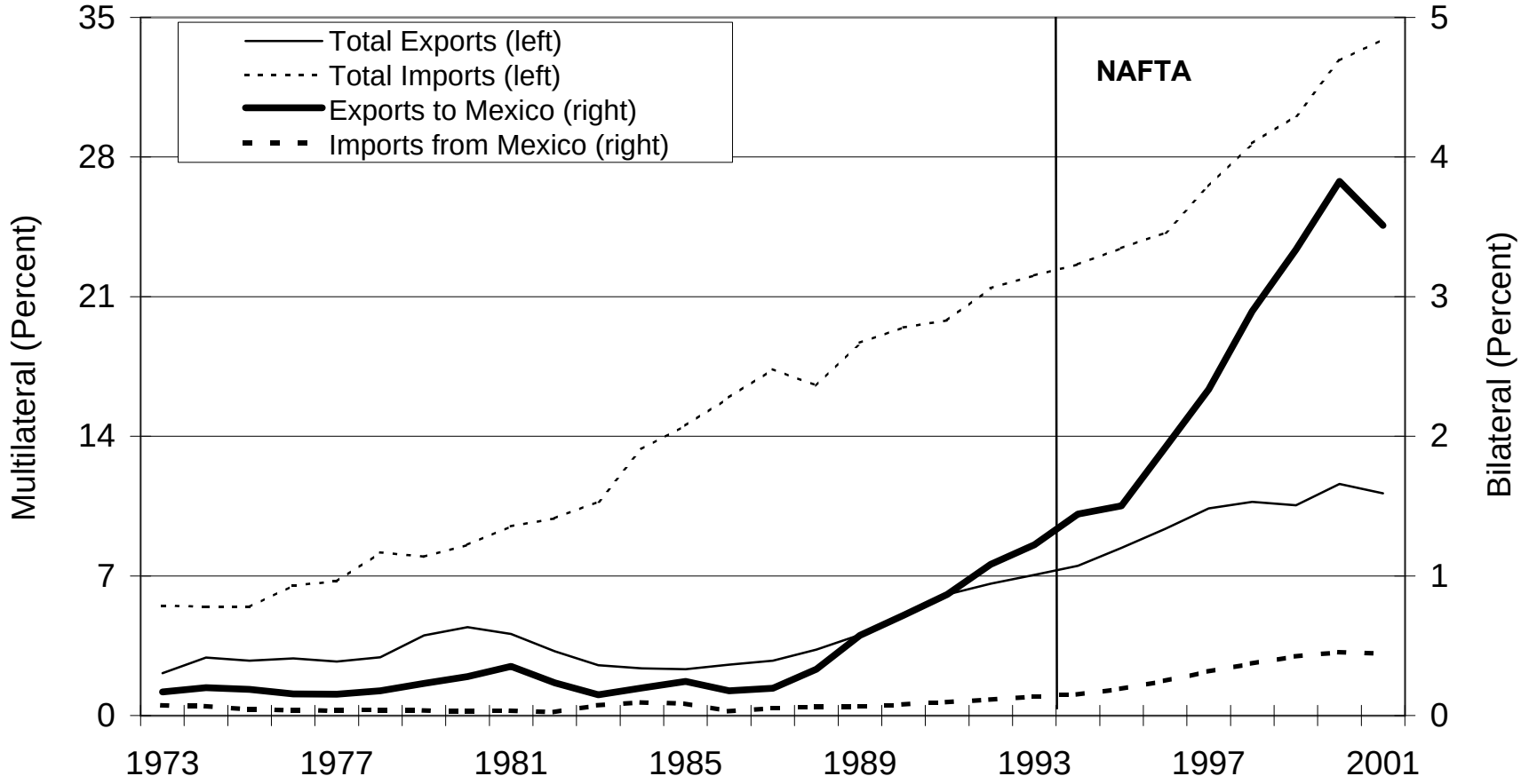



Source: Bureau of Labor Statistics

**Figure 3**

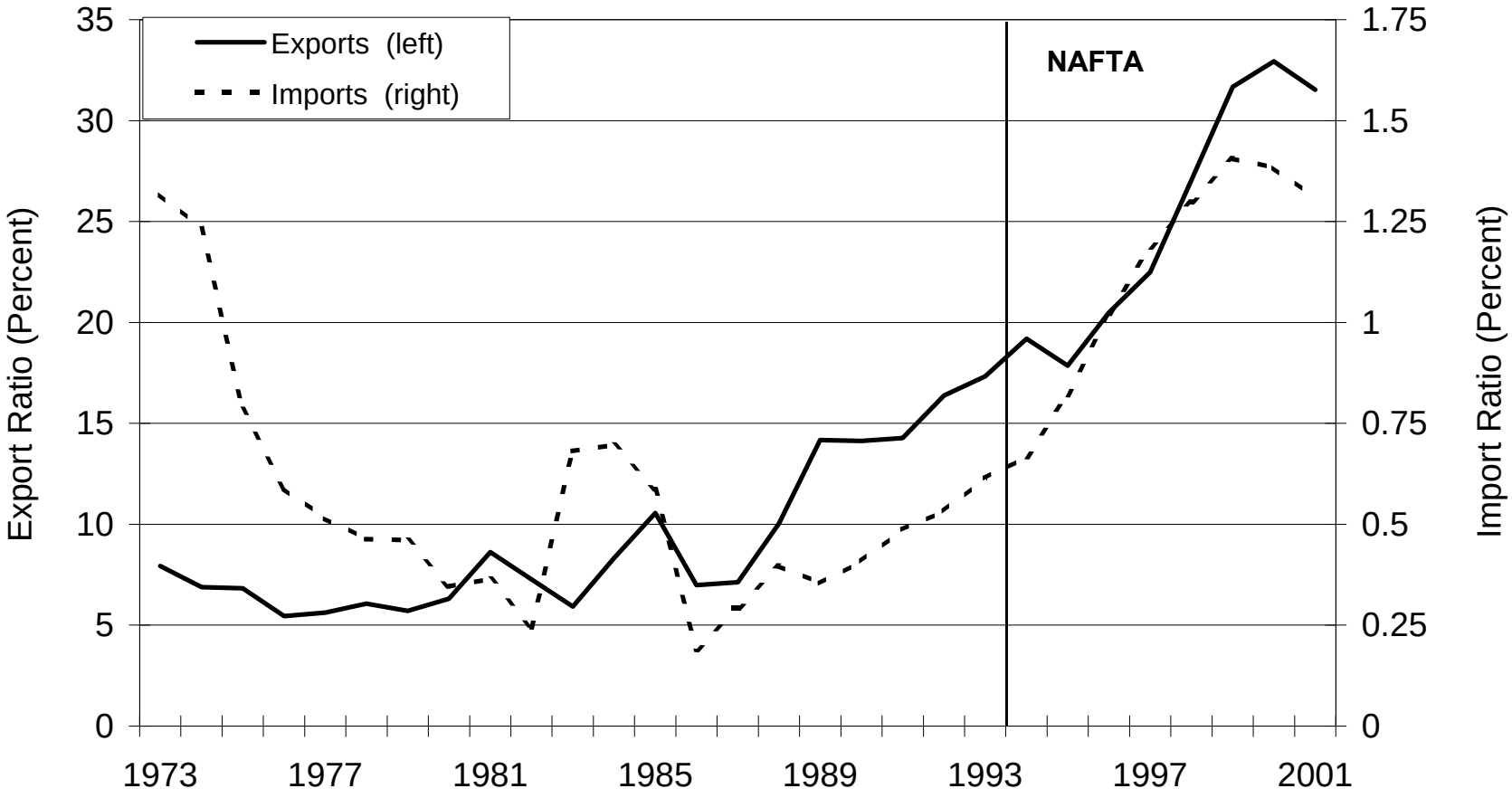
## International Trade Shares in the Textiles and Apparel Industries

### U.S. Multilateral and Bilateral U.S.-Mexico




Sources: Census Bureau, Bureau of Economic Analysis.

**Figure 4**
**Ratio of U.S.-Mexico Bilateral to U.S. Multilateral Trade in the Textiles and Apparel Industries**




Source: Census Bureau, Bureau of Economic Analysis

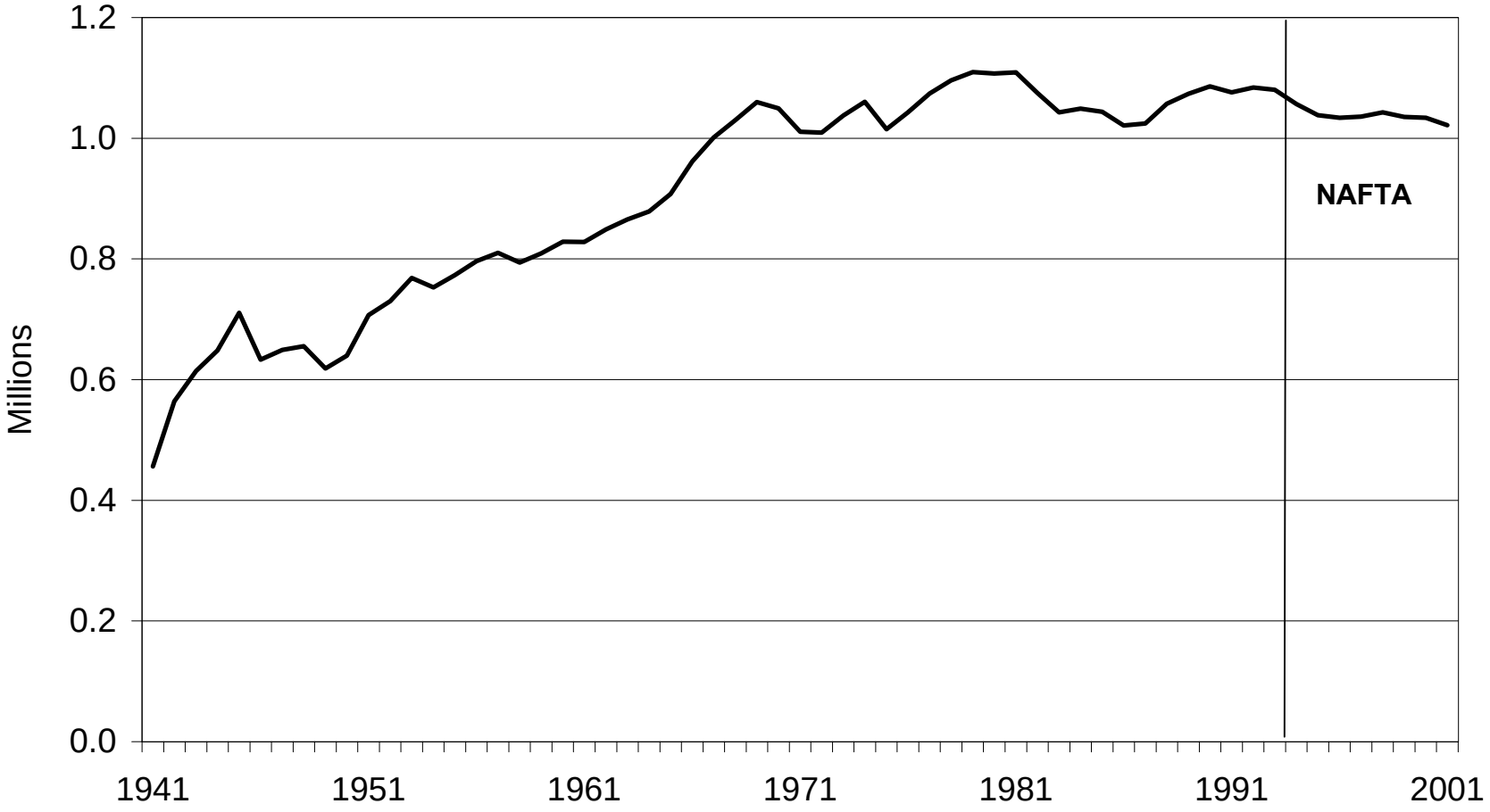
**Figure 5**

**U.S. Gross Job Flows in the Textiles and Apparel Industries**


Sources: Bureau of Labor Statistics, Longitudinal Research Database (LRD).

Note: ■ Indicates imputed data.

**Figure 6**
**U.S. Employment in the Chemical Industry**

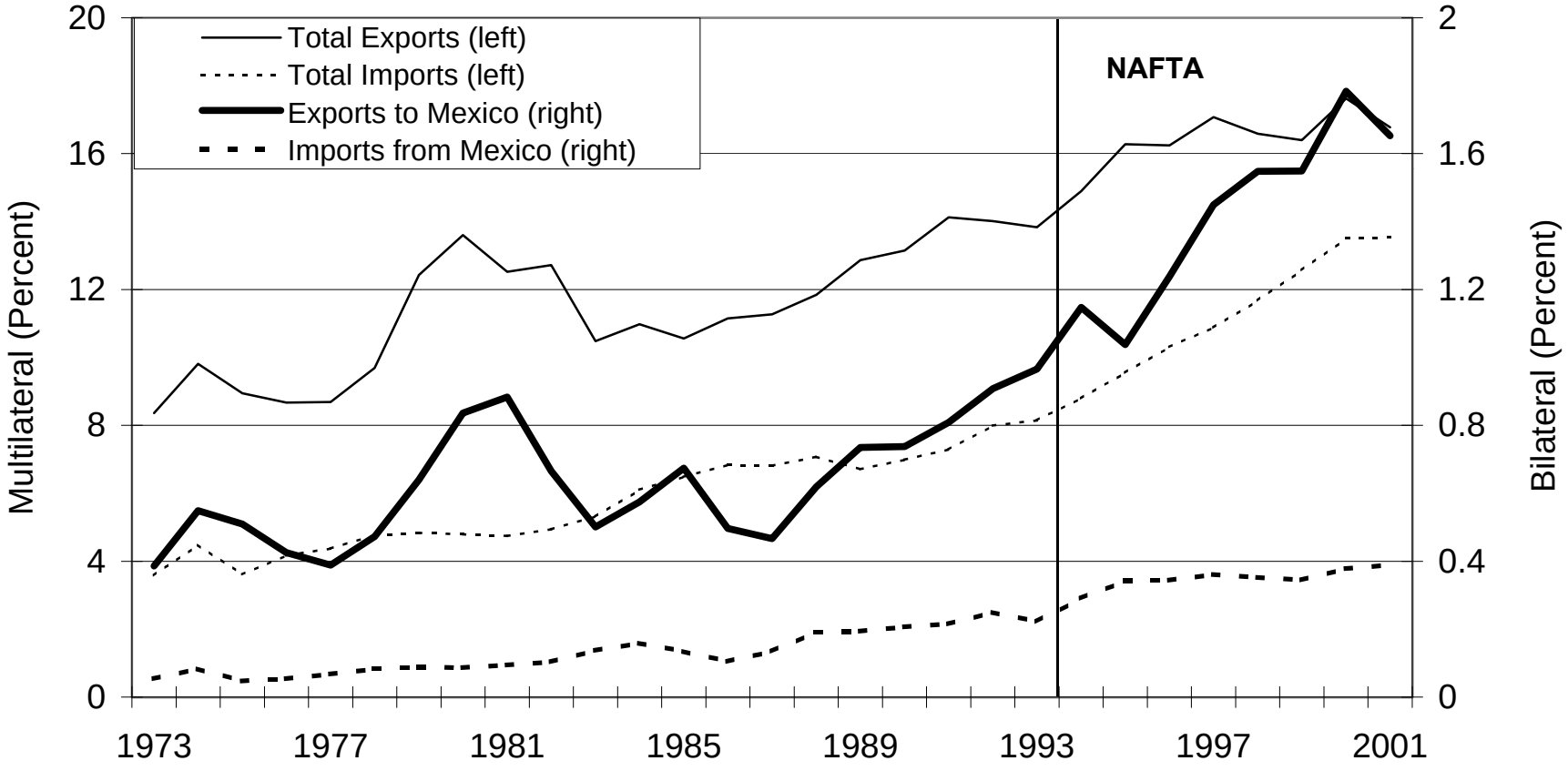



Source: Bureau of Labor Statistics

**Figure 7**

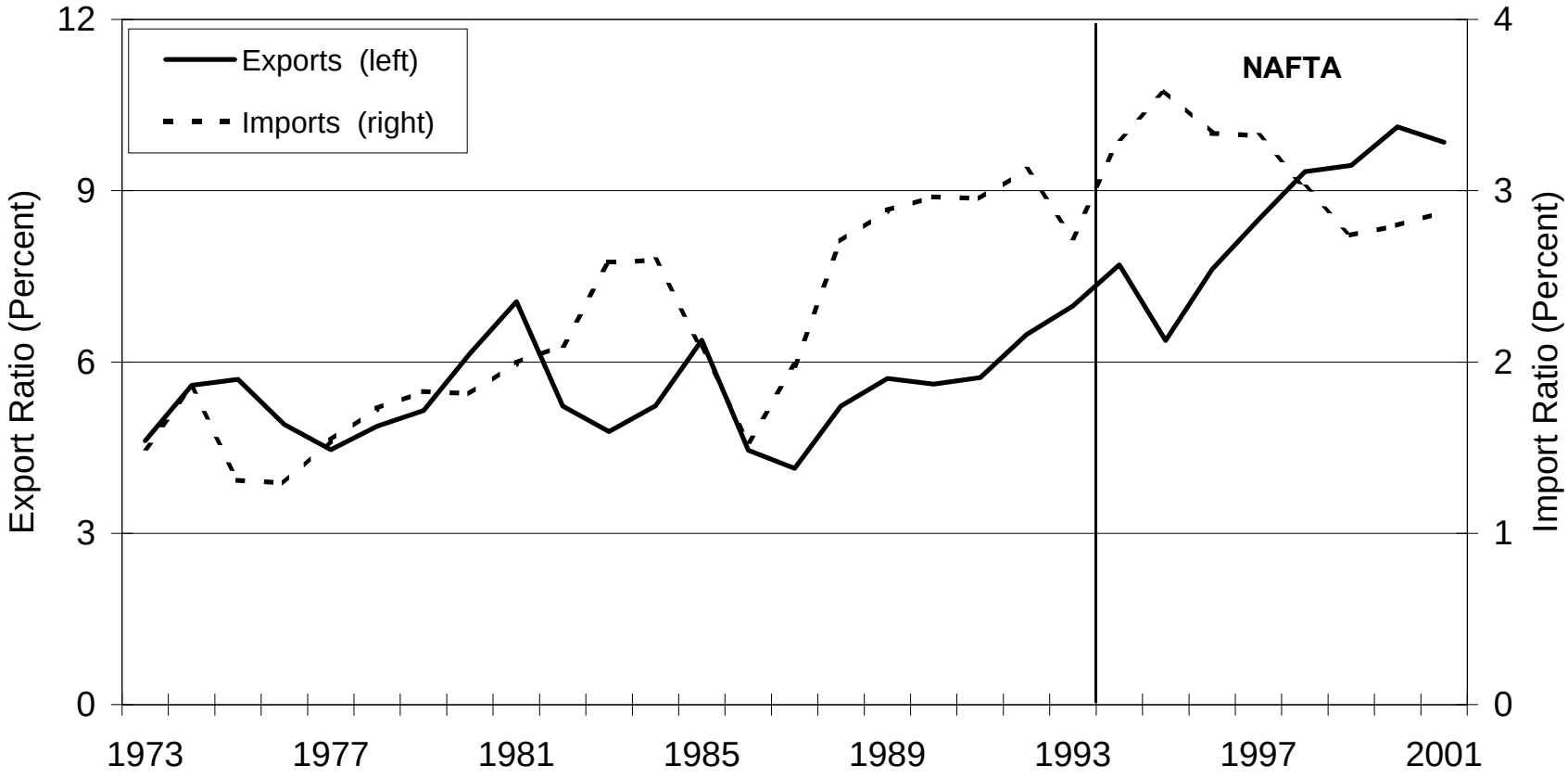
## International Trade Shares in the Chemicals Industry

### U.S. Multilateral and Bilateral U.S.-Mexico




Sources: Census Bureau, Bureau of Economic Analysis.

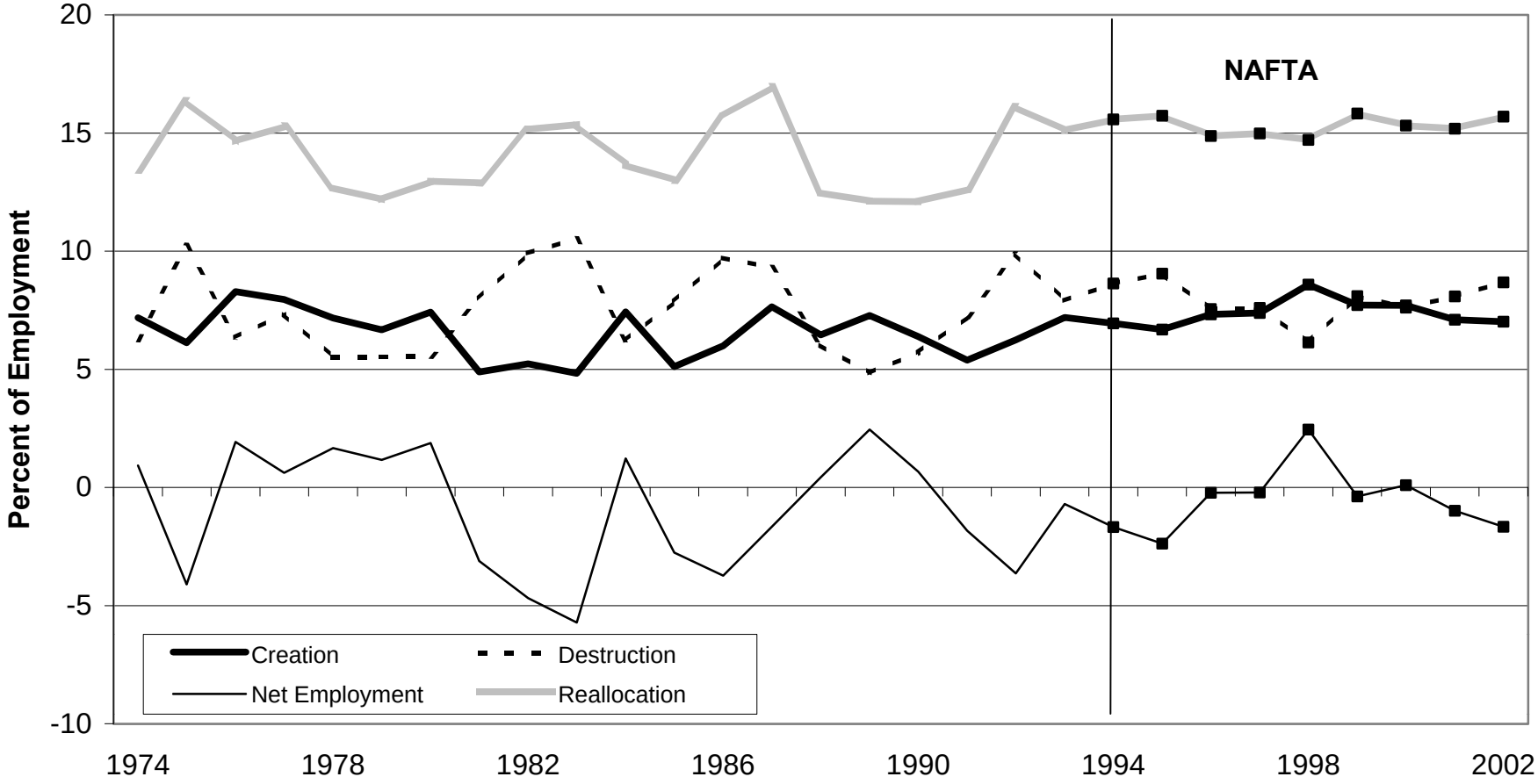
**Figure 8**
**Ratio of U.S.-Mexico Bilateral to U.S. Multilateral Trade in the Chemicals Industry**




Source: Census Bureau, Bureau of Economic Analysis

**Figure 9**

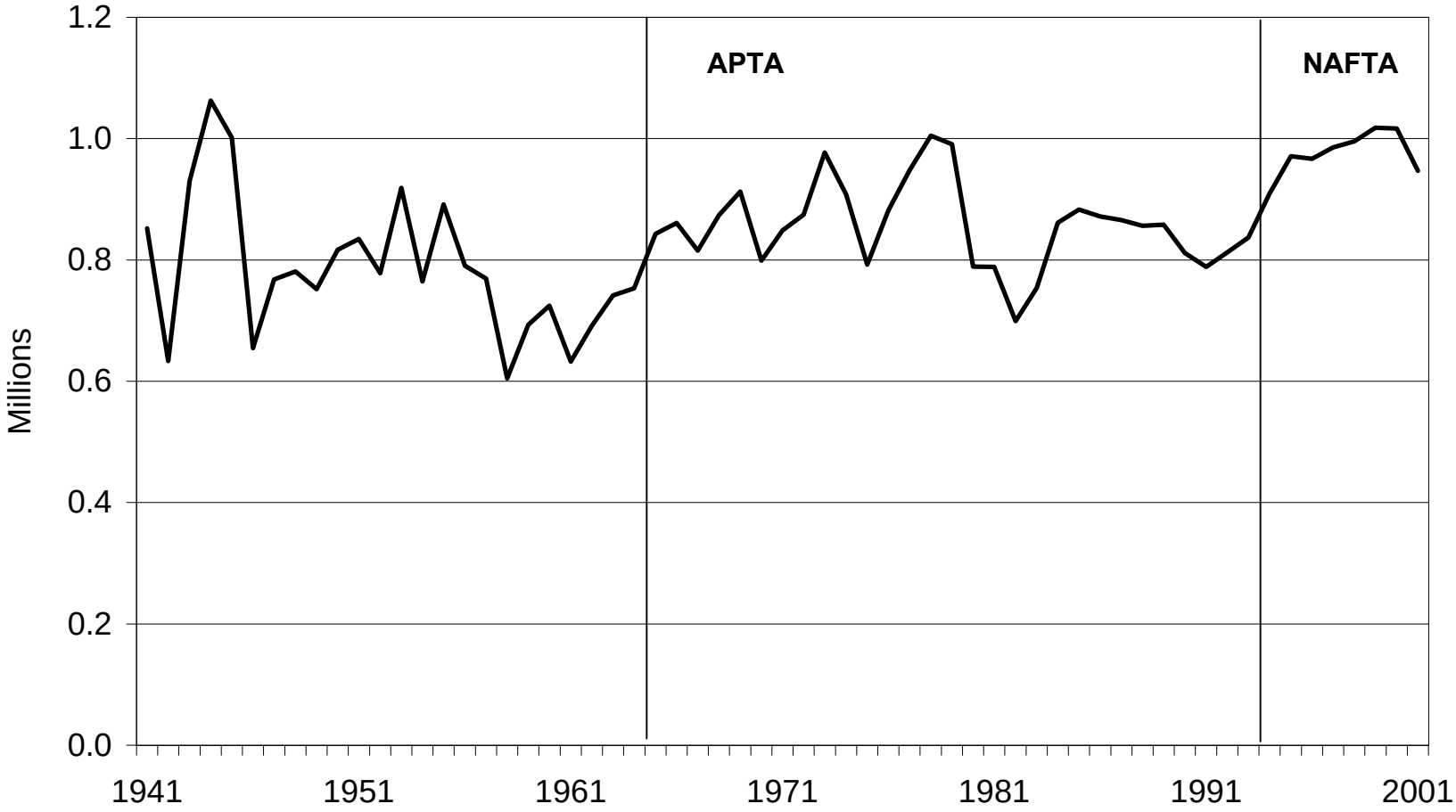
**U.S. Gross Job Flows in the Chemical Industry**




Sources: Bureau of Labor Statistics, Longitudinal Research Database (LRD).

Note: ■ Indicates imputed data.

**Figure 10**
**U.S. Employment in the Motor Vehicles Industry**

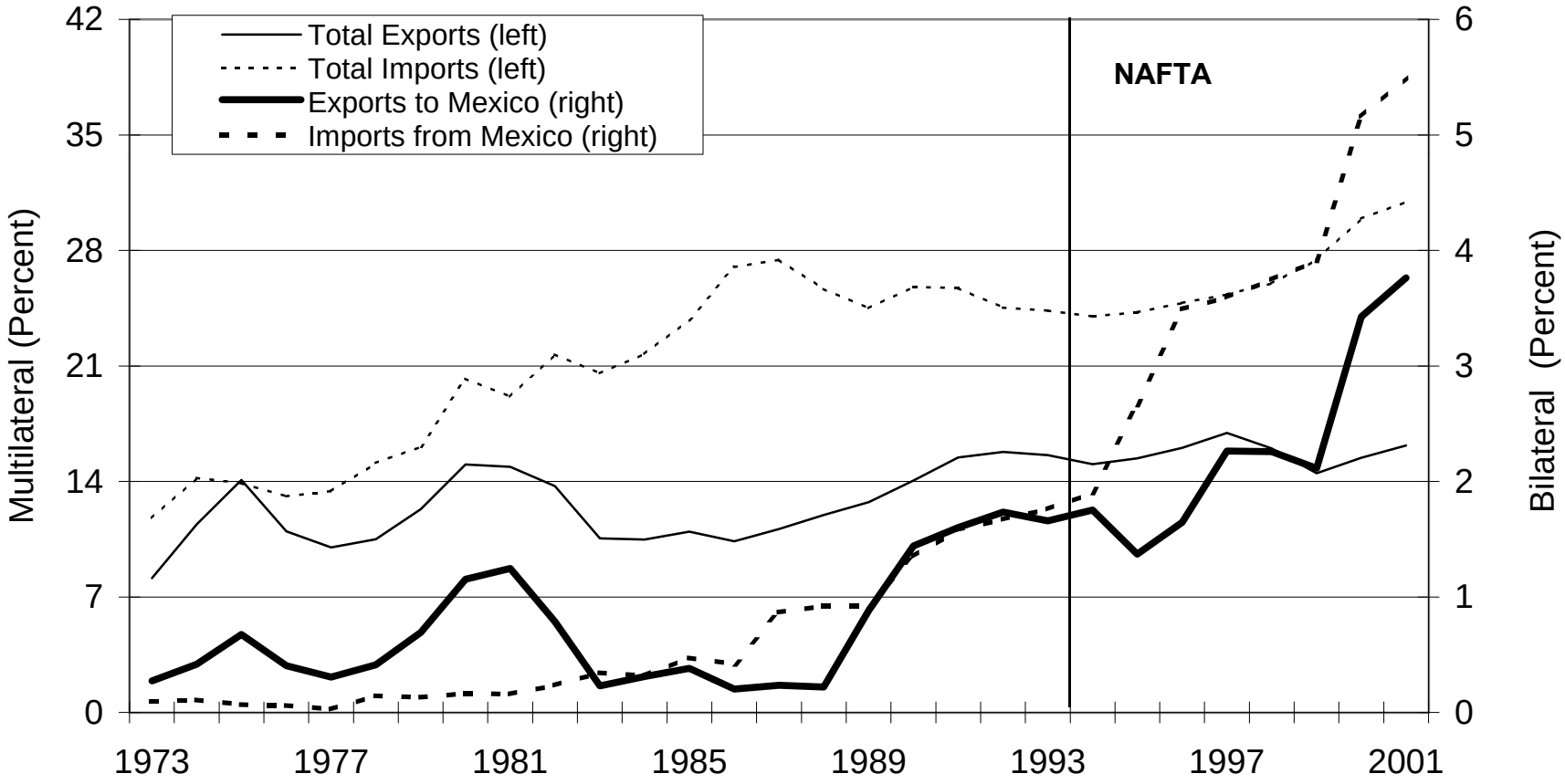



Source: Bureau of Labor Statistics.

**Figure 11**

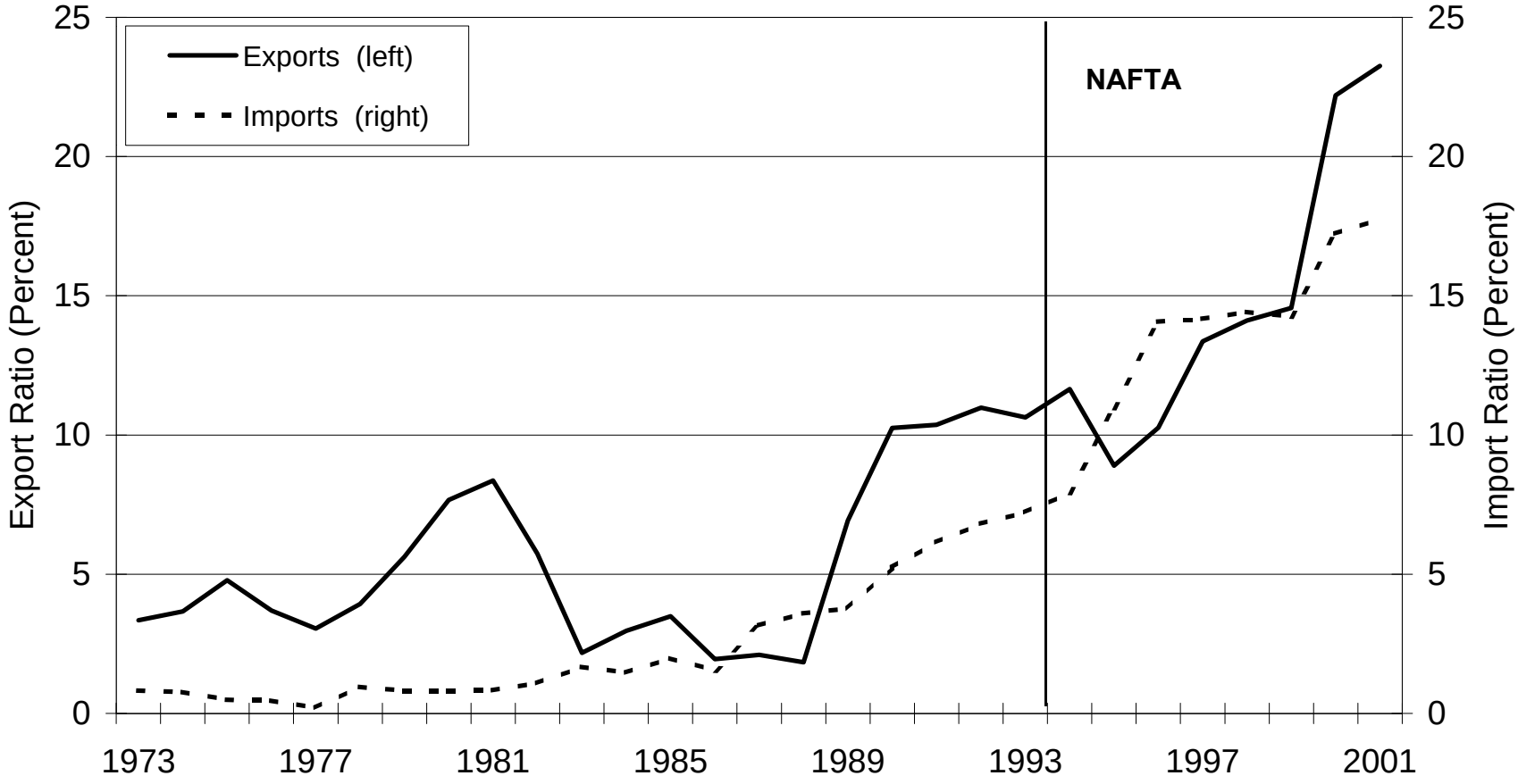
## International Trade Shares in the Motor Vehicles Industry

### U.S. Multilateral and Bilateral U.S.-Mexico




Source: Census Bureau, Bureau of Economic Analysis

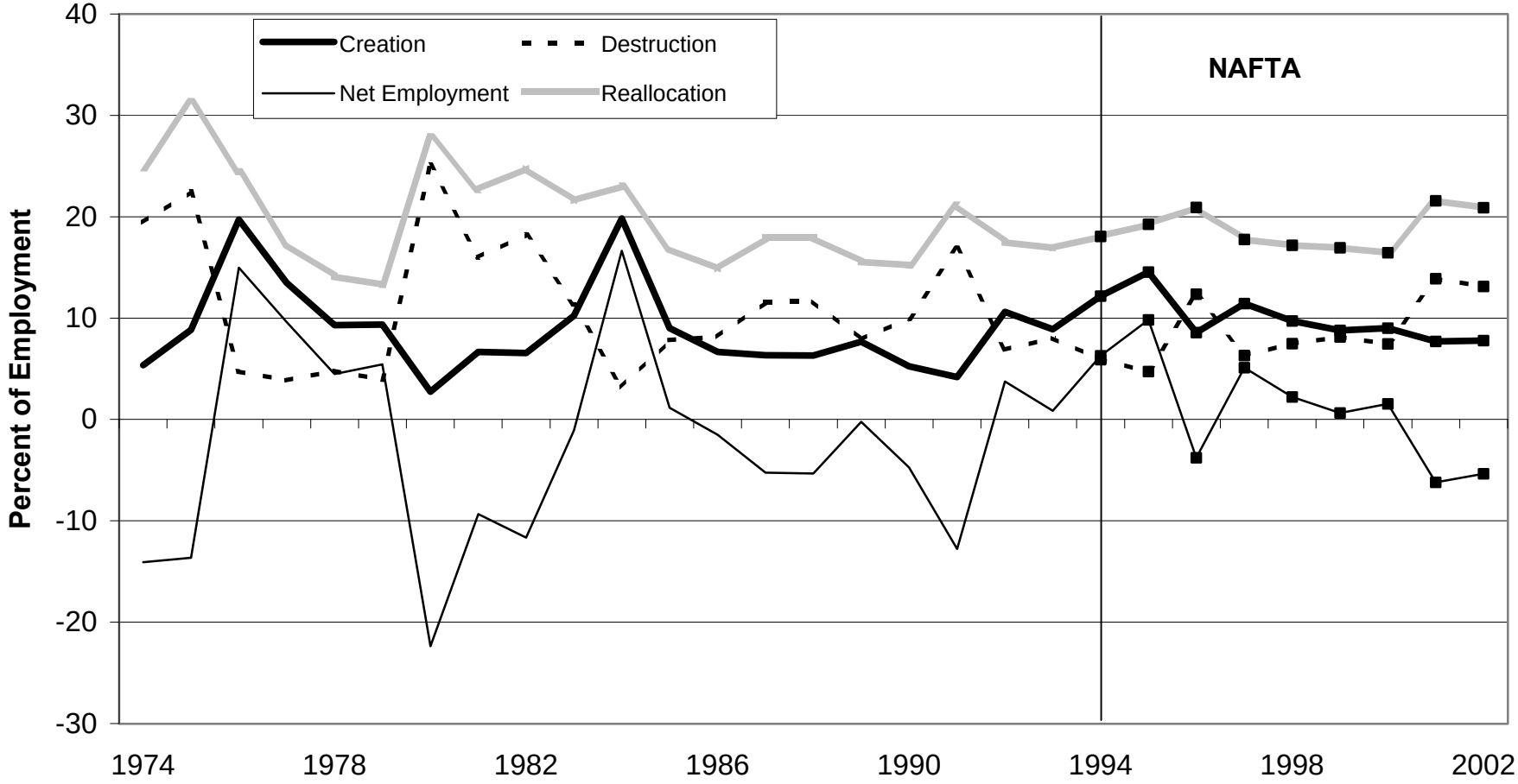
**Figure 12**
**Ratio of U.S.-Mexico Bilateral to U.S. Multilateral Trade in the Motor Vehicles Industry**




Source: Census Bureau, Bureau of Economic Analysis

**Figure 13**

## U.S. Gross Job Flows in the Motor Vehicle Industry




Sources: Bureau of Labor Statistics, Longitudinal Research Database (LRD).

Note: ■ Indicates imputed data.