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How Has NAFTA Affected the Mexican Economy? Review and Evidence

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How Has NAFTA Affected the Mexican Economy? Review and Evidence

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Abstract

This paper provides a comprehensive assessment of the impact of NAFTA on growth and business cycles in Mexico. The effect of the agreement in spurring a dramatic increase in trade and financial flows between Mexico and its NAFTA partners, and its impact on Mexican economic growth and business cycle dynamics, are documented with reference both to stylized facts and recent empirical research. The paper concludes by drawing lessons from Mexico's NAFTA experience for policymakers in developing countries. The foremost of these is that in an increasingly globalized trading system, bilateral and regional free trade arrangements should be used to accelerate, rather than postpone, needed structural reform.

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I. INTRODUCTION

A decade ago, Canada, Mexico, and the United States launched the world's largest free trade area under the North American Free Trade Agreement (NAFTA). The agreement represented a watershed in global trade policy, not just because of the size of the free trade area it created, but also with regard to the comprehensiveness of the agreement, which covered not just merchandise trade but also issues related to investment, labor markets, and environmental policies. Perhaps the most significant aspect of the agreement, however, was the fact that it was struck between a developing country and highly developed economies. The result has been to spur a dramatic increase in trade and financial flows among the NAFTA partners and to contribute to making North America one of the most economically integrated regions in the world.

Against the background of the experience of the past decade, this paper seeks to offer an assessment of the impact of NAFTA on growth and business cycles in Mexico. Indeed, with continued controversy surrounding the costs and benefits of increased trade and financial flows, NAFTA provides an interesting case study to gauge their effects on developing countries. In order to tackle these issues, the paper first reviews the specifics of the agreement and presents some stylized facts regarding its effects on trade and financial flows in the region. Second, it studies the extent to which changes in trade and financial flows have affected business cycle dynamics in Mexico. Third, it reviews the empirical evidence on how NAFTA has changed the growth dynamics in Mexico. Finally, the paper discusses the interaction between NAFTA and the other policy challenges facing the Mexican economy and seeks to draw some basic lessons for both Mexico and other countries in Latin America, as the region works toward a Free Trade Area of the Americas (FTAA).

Isolating the effects of NAFTA on its partner countries is particularly difficult given the significant other shocks that have occurred over the past decade. NAFTA undoubtedly had a significant impact on the macroeconomic environment facing Mexico, given the decline in trade barriers and increased market access that the agreement provided Mexico. The key provisions of NAFTA and changes in trade barriers between the member countries are documented in Section II. However, as discussed in Section III, distinguishing the effect of these changes is complicated by the fact that many of these were anticipated well in advance of the agreement's ratification, and by the fact that the liberalization was phased in only gradually. In addition, a host of significant other "shocks" had important effects on Mexico and its NAFTA partners during this period, including: (i) the severe financial crisis that Mexico suffered in 1994 (the Tequila crisis), which forced a sharp devaluation of the peso; (ii) the wide range of other free trade arrangements that the NAFTA partners signed during the same period; and (iii) the broader global cyclical environment, which included a recovery from recessions in the early 1990s, the boom through to the end of the decade, and the more recent global slump.

Nonetheless, the data still appear to confirm that NAFTA played an important role in boosting trade and financial flows in the region. As illustrated in Section IV, both casual inspection of the data and recent empirical analysis suggest that NAFTA has spurred a

significant increase in merchandise trade among the partner countries. Perhaps more importantly, the nature of trade within the region changed markedly, with Mexico's exports shifting toward manufactured goods and a substantial increase in vertical specialization and intra-firm trade among the NAFTA partners. Recent research also suggests that the NAFTA membership has significantly affected foreign investment flows to Mexico.

The increase in regional integration among NAFTA partners has had a substantial effect on business cycles in Mexico. Section V documents that output variability declined in Mexico after the inception of NAFTA, and Section VI shows that there has been a significant increase in comovement of business cycles within the NAFTA region during the past decade. Deeper analysis using a dynamic latent factor model suggests that these stylized facts reflect the manifestation of structural changes in the Mexican economy that have decreased the role of country-specific shocks in driving the Mexican business cycle and led to a concomitant increase in the role of region-wide shocks. The importance of structural factors is further confirmed by studying a stochastic dynamic general equilibrium model, which is calibrated to reflect some basic features of the NAFTA economies. The model illustrates that reductions in trade frictions that boost trade flows can cause a concomitant increase in business cycle interdependence.

NAFTA also appears to have favorably affected Mexico's growth performance over the past decade. This conclusion is confirmed by a broad range of studies, which are surveyed in Section VII. In particular, there has been a dramatic increase in the average growth rate of investment after NAFTA. The dynamics of economic growth in Mexico also have changed as contributions of exports and investment to GDP growth have sharply increased following the introduction of the agreement. Moreover, using industry- and firm-level data, recent empirical studies suggest that NAFTA has significantly improved total factor productivity in Mexico.

Notwithstanding these benefits, the NAFTA experience suggests important lessons and challenges for policymakers in Mexico and elsewhere in the Western Hemisphere. The Mexican experience under NAFTA illustrates the significant benefits from free trade agreements and from the broader trend toward globalization and integration of goods and financial markets. At the same time, however, Mexico has in recent years begun to face increasing competitive pressures, including from Asia and elsewhere in Latin America, at a time when U.S. demand has slumped. As discussed in Section VIII, these competitive pressures are unlikely to dissipate, given the increased integration of China into the global economy and the momentum toward lower trade barriers within the Western Hemisphere. For Mexico, these more recent trends underscore the importance of pressing ahead in the area of structural reforms, in order to improve the ability of the economy to respond flexibly to these increased competitive pressures. Similarly, NAFTA also illustrates that countries should take early advantage of the boost to trade and financial flows that can result from free trade arrangements and ensure that necessary structural reforms are in place to sustain the benefits of these agreements.

These policy messages are closely related to those contained in recent studies of NAFTA. For example, Lederman, Maloney, and Serven (2003) conclude that NAFTA has generated significant benefits to the Mexican economy, but Mexico still needs to implement a wide set of structural reforms to close the income gap with its advanced partners. Tornell, Westermann, and Martinez (2003) compare Mexico's recent growth performance with those of several other emerging market economies that liberalized trade and financial flows in the early 1980s. Their results suggest that although NAFTA has had a significant and favorable impact on exports and foreign direct investment flows, Mexico's growth performance could have been even stronger if structural reforms had been pursued more aggressively.

The contribution of this study to this research program is threefold. First, it supplements recent research about the impact of increased trade and financial flows on the dynamics of growth and macroeconomic fluctuations in developing countries with particular reference to Mexico's NAFTA experience. Second, it extends this literature by analyzing the impact of NAFTA on business cycles in Mexico using various methods. Finally, the paper provides a review of Mexico's macroeconomic policies during the 1990s and studies its future policy challenges in light of the developments during the past three years.

II. The Basics of NAFTA

A. NAFTA Negotiations and Objectives of the Member Countries

Canada, Mexico, and the United States started bilateral trade negotiations at various levels in the mid-1980s.[2] For example, Mexico and the United States undertook trade negotiations on specific sectors and reached framework agreements in 1985, 1987, and 1989. Mexico and Canada started discussions toward closer bilateral trade relations in 1990. Canada and the United States began negotiations for a free trade area in 1986 and launched the Canada-U.S. Free Trade Agreement (CUSFTA) in 1989. Negotiations for NAFTA formally started in June 1991. Since the member countries had held bilateral discussions earlier, negotiations moved forward quickly and were completed in August 1992. The United States and Mexico passed the NAFTA legislation in November 1993, and Canada did the same in December 1993. Finally, NAFTA entered into force on January 1, 1994.

NAFTA was a groundbreaking agreement in several aspects. The agreement was the first comprehensive free trade arrangement between advanced countries and a developing economy. It also created the world's largest free trade area in terms of total gross domestic product (GDP) and it is the second largest, in terms of total trade volume, after the European

[2] The roots of trade integration in the region go back to the mid-1960s. In 1965, Canada and the United States signed the Canada-U.S. Auto Pact, which freed cross border trade in the sector (Cardarelli and Kose, 2004). Mexico and the United States initiated the maquiladora program in 1965. The program allowed maquiladora plants to import intermediate inputs, such as parts and equipment, duty-free as long as manufactured product was exported back to the United States, which, in turn, imposed tariffs only on the value-added portion of the product (Canas and Coronado, 2002).

Union.[3] Moreover, NAFTA's reach was unusual as it liberalized trade flows in a broad range of sectors, introduced a unique dispute settlement mechanism, and included side agreements on labor and environmental issues.

Both political and economic considerations in Mexico helped spur NAFTA forward. For example, Whalley (1998) argues that the central objective of Mexican negotiators was to make sure that the agreement helped secure the permanence of Mexico's economic reform program. Tornell and Esquivel (1997) also conclude that NAFTA was a commitment device to ensure the continuation of the reform process. DeLong, DeLong, and Robinson (1996) argue that the agreement formally linked Mexico's domestic economic reform program to an international agreement and made it unlikely for future governments of Mexico to abandon it.[4]

Mexico also hoped that its NAFTA membership would increase the credibility of its reform agenda, improve its risk profile, and boost foreign investment inflows. For example, Hufbauer, Schott, and Wong (2003) emphasize the importance of NAFTA's dispute settlement process in ensuring the NAFTA partners that Mexico was serious about implementing various reforms. Moreover, they argue that NAFTA's dispute settlement process was viewed as a tool for Mexico to gain institutional legitimacy to attract foreign investment flows.

B. The Key Provisions of NAFTA

NAFTA aimed at eliminating all tariffs and substantially reducing nontariff barriers between the member countries. In particular, the agreement eliminated the majority of tariffs and other trade barriers in its first ten years and will have phased out most remaining tariffs by 2008.[5] Since Mexico's tariffs were higher than those of other member countries, it implemented the largest reductions in tariff rates—the average Mexican tariff rate fell from 12 percent in 1993 to 1.3 percent in 2001 (Figure 1a). U.S. tariffs on imports from Mexico fell from around 2 percent to 0.2 percent during the same period (Figure 1b). Since U.S. tariffs on imports from non-NAFTA partners were much higher than those on imports from

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[3] In 2002, total GDP of NAFTA members was more than 25 percent larger than that of the European Union. Exports (imports) of the European Union constituted roughly 38 (35) percent of world exports (imports) while exports (imports) of NAFTA accounted for about 18 (25) percent (DFAIT, 2003).

[4] Fernández (1997) argues that since NAFTA did not include any provisions about domestic reform programs, it is not clear how it provided a commitment device. Some argue that a major consideration for the United States was that economic growth in Mexico could help slow down illegal immigration (World Bank, 2000). Hufbauer and Schott (1992) provide an extensive analysis of various objectives of the member countries.

[5] USITC (1997, 2003) provide detailed information about the provisions of NAFTA. Kowalczyk and Davis (1998) analyze NAFTA tariff phase-outs between Mexico and the United States.

Mexico, the agreement gave Mexico a considerable preferential tariff advantage. There was a substantial increase in the volume of Mexican exports entering into the U.S. market duty free as the share of imports from Mexico entering duty free increased from approximately 50 percent in 1993 to more than 85 percent in 2001 (Figure 1c).

However, some sensitive sectors were still protected under NAFTA. For example, NAFTA set out separate agricultural market access requirements between Mexico and the United States, and between Mexico and Canada. When considered in combination with the CUSFTA, these provisions established three separate bilateral agreements on agriculture. In addition, NAFTA included comprehensive rules of origin requirements and products must generally be wholly produced in North America or originate in a member country to qualify for NAFTA preferences. Moreover, NAFTA contained safeguard clauses covering import surges from the member countries.

NAFTA included various provisions covering investment flows, financial services, government purchases, and protection of intellectual property rights. For example, NAFTA removed many investment barriers and included clauses protecting the rights of direct investors. NAFTA's financial services provisions covered banking, insurance, and securities industries and provided the right of establishment in these industries, subject to some exceptions. Government procurement provisions of NAFTA eliminated "Buy National" restrictions on the majority of nondefense goods and services that were supplied by firms in North America to the federal and state governments of the member countries. In addition, NAFTA established comprehensive standards for the protection and enforcement of intellectual property rights in the member countries.

NAFTA introduced unique mechanisms for settlement of disputes and included side agreements covering labor and environmental issues. In particular, NAFTA set out procedures for binational panel review of final antidumping and countervailing duty determination and included detailed procedures for government-to-government dispute resolution. NAFTA also established clear procedures for taking safeguard actions and compensation rules. In addition, NAFTA accompanied with the following side agreements: the North American Agreement on Labor Cooperation, which promoted effective enforcement of domestic labor laws; and the North American Agreement on Environmental Cooperation, which was established to ensure that trade liberalization and efforts to protect the environment were mutually supportive.

III. MEXICO IN THE 1990S AND ISOLATING THE IMPACT OF NAFTA

A. Economic Developments in Mexico

Leading up to the introduction of NAFTA in 1994, Mexico's economy was in the latter stages of a stabilization and reform program that started in the late 1980s.[6] This program was similar to those adopted elsewhere in the region in the 1990s, featuring inflation control in the form of an exchange rate-based monetary anchor and market liberalization measures, notably in the financial sector. However, the challenges of sustaining this program in Mexico increased over time, as the peso became overvalued and external competitiveness declined. In addition, imprudent fiscal policies and excessive reliance on external borrowing contributed to financial fragilities.

Against this background, by early 1994, Mexico was facing serious macroeconomic imbalances. These include a widening current account deficit in the face of strong domestic spending, emerging problems in the financial sector, increasing concerns about the fiscal outlook, and outflows of private capital.[7] The initial response of the authorities to market pressures was to shift toward increasingly risky financing instruments as other credit channels dried up. When the crisis eventually hit at end-1994, the impact was amplified by the balance-sheet effects of exchange rate depreciation, which required extensive government intervention in support of financial institutions. The currency depreciated sharply, output plunged, and inflation rose significantly.

In some respects, this unstable macroeconomic environment was an unpromising setting for Mexico to reap the benefits of North American trade integration. Significant exchange rate and inflation uncertainty, coupled with a sharp contraction in domestic financial intermediation and external capital flows, had severely damaged investor confidence. In some respects, however, the crisis left Mexico better positioned to take advantage of trade liberalization. Notably, the crisis left Mexico with a highly depreciated real exchange rate and a firm commitment to a strengthened policy framework, including a flexible exchange rate, inflation control combined with measures to strengthen the fiscal position and comprehensively deal with problems in the banking sector.

While the immediate output contraction following the 1994–95 crisis was the most severe experienced by Mexico since the 1930s, this combination of policies led to a relatively

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[6] Loser and Kalter (1992) provide a review of the reform programs implemented in Mexico since the early 1980s.

[7] Gil-Diaz and Carstens (1996) analyze various reasons that are used to the explain the 1994–95 crisis. Sachs, Tornell, and Velasco (1995) examine various domestic factors which contributed to the 1994–95 crisis. Kalter, Ribas, and Armando (1999) analyze the fiscal problems associated with the crisis. Krueger and Tornell (1999) study the problems in the banking sector and the effects of bank structuring on the recovery.

rapid recovery in activity—particularly compared with the 1982 crisis. After contracting for almost two years, real GDP briefly recovered, but did not return to its pre-crisis level for more than three years following the crisis in 1982. In contrast, while GDP decreased more quickly following the 1994–95 crisis than it did in 1982, it bounced back faster and reached its pre-crisis level by the first quarter of 1997 (Figure 2a). Although investment fell by roughly similar proportions following the two crises, there was a stark difference in the recovery of investment. After the 1982 crisis, investment did not return to its pre-crisis level before 1991. In contrast, the recovery in investment was much faster in the 1994–95 crisis as investment was back to its pre-crisis level by the third quarter of 1997 (Figure 2b).

The speedy recovery from the 1994–95 crisis partly stemmed from the credibility offered to the Mexican reform process by participation in NAFTA. In 1982, Mexico imposed prohibitive restrictions on imports, such as tariff increases to 100 percent and strict licensing requirements on all imports. In the 1994–95 crisis, while Mexico increased some tariffs on imports from non-NAFTA countries, it respected its NAFTA obligations and continued to implement the reform program. The change in policy response affected the dynamics of trade flows: the growth of exports and imports was much faster after the 1994–95 crisis than in 1982 (Figures 2c and 2d). Moreover, while it took seven years for Mexico to return to international capital markets after its 1982 crisis, it took seven months after the crisis in 1994–95.

Several studies argue that NAFTA played an important role in shaping the policy responses of Mexico and the United States to the 1994–95 crisis. The World Bank (2000) claims that there was an implicit understanding that Mexico would receive preferential treatment for U.S. assistance as long as it maintained its reform program. Mexico stayed on course in terms of firmly implementing its reform agenda during the crisis. The United States, in return, fully supported Mexico's stabilization and reform programs by providing a large loan to help Mexico to deal with its balance of payment problems.[8]

Allowing the exchange rate to adjust flexibly to shocks, in turn, proved to be less problematic than it had been in the past, given the commitment of policymakers to inflation control. Inflation peaked at 52 percent (12-month rate) in late 1995, well below the rates observed during previous financial crises in the region. It then declined steadily through the latter part of the decade (Figure 3). By 2003, Mexico enjoyed the lowest and most stable inflation rates in its modern history. As inflation declined and policy credibility increased, the pass-through of exchange rate changes to domestic prices fell. This allowed the nominal exchange rate to play a greater role in buffering the effects of external shocks without destabilizing financial markets or the domestic economy.

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[8] USTR (1997) examines Mexico's policy responses after the two crises (1982 and 1994–95) and concludes that NAFTA membership was an important factor in the relatively rapid recovery from the 1994–95 crisis.

The 1996–2000 period was characterized by strong growth in real output, in conjunction with a significant opening of the economy in terms of rising shares of imports and exports in GDP. Most significant was the increase in trade with the NAFTA partners as extensively discussed in the next section. The substantial opening of Mexico's export sector provided a key engine of growth in the process of recovering from the Tequila crisis. At the same time, trade deepening made Mexico more resilient to shocks to international capital flows by redressing the previous imbalance between the large size of capital flows compared with small trade flows. In contrast, some other countries in the region, such as Argentina and Brazil, experienced little trade deepening during the 1990s, in part because inflexible exchange rate regimes did not provide scope to stimulate exports through nominal exchange rate depreciation.

B. A Challenge: Isolating the Impact of NAFTA on Mexico

Analyzing the impact of NAFTA on the Mexican economy is a complicated task, since a variety of factors affected the member countries before and after the agreement. These factors are associated with various policies implemented by the member countries, cyclical conditions in member countries, and increase in the global trade and finance flows (Krueger, 1999 and 2000; Lederman, Maloney, and Serven, 2003; and CBO, 2003).

Important changes took place before the agreement

- NAFTA was a continuation of Mexico's comprehensive trade liberalization and economic reform programs that started in the late 1980s. Mexico joined the General Agreement on Tariffs and Trade (GATT) in 1986 and undertook a series of reforms liberalizing its trade regime. In particular, the maximum tariff rate was reduced from 100 percent in 1982 to 20 percent in 1988 and the average tariff rate was lowered to 10 percent in 1988 from 25 percent in 1985. In addition, a comprehensive privatization and deregulation program was undertaken in the period 1988–94.

- There was an anticipation effect after the member countries agreed to pursue negotiations for a free trade agreement in 1991. As a result, the dynamics of trade and financial flows in the region were impacted in advance of NAFTA by expectations of its entry into force.

Cyclical conditions in member countries were important

- The Mexican economy experienced a severe economic and financial crisis in 1994–95. As discussed above in detail, the financial crisis in late 1994 resulted in Mexico's deepest recession in more than sixty years, a collapse of the Mexican peso, and a substantial decline in foreign investment inflows.

- Cyclical dynamics in the partner countries changed as well. In particular, after an unprecedented expansion in the 1990s, the U.S. economy went into a recession in

2001 and remained sluggish until mid-2003. Canada also enjoyed a long expansionary period during the 1990s.

Global factors were also in play

- There has been a substantial increase in the volume of global financial flows since the mid-1980s. For example, private capital flows from industrialized economies to developing countries have increased dramatically during this period and a significant fraction of this increase went to emerging market economies (Kose, Prasad, and Terrones, 2004a). These developments certainly affected the financial flows in the region.

- The member countries as well as many others have liberalized their trade regimes through unilateral and multilateral arrangements during the past ten years. For example, Mexico has signed more than ten free trade agreements since the inception of NAFTA.[9] Canada and the United States have also been active in establishing bilateral trade agreements with several countries during this period. The Uruguay Round of multilateral trade negotiations was concluded in December 1993 and a new round of multilateral trade negotiations, the Doha Round, was launched in 2001.

Trade liberalization occurred only gradually under NAFTA

- NAFTA has gradually removed barriers on trade and financial flows in the region. Although NAFTA resulted in immediate reductions in various tariff and nontariff barriers when it became law in 1994, the majority of tariffs and other trade barriers were gradually eliminated in its first ten years. Moreover, some remaining tariffs will have been phased out in fifteen years.

IV. Growth of Trade and Financial Flows after NAFTA

A. Growth of Trade Flows

Mexico's trade with NAFTA partners has increased significantly since the inception of NAFTA. For example, Mexico's exports to the United States and Canada more than doubled in dollar terms between 1993 and 2002 (Figure 4a). Mexico's trade (the sum of exports and imports) with NAFTA partners rose from 25 percent of its GDP in 1993 to 51 percent in 2000. While the growth of trade slowed since 2000, Mexico's trade with

[9] The agreements included those with Chile, the European Union, the European Free Trade Association, Israel, Bolivia, Colombia, Venezuela, Nicaragua, El Salvador, Guatemala, Honduras, Costa Rica, and Uruguay. Ibarra-Yunez (2003) studies Mexico's trade policy initiatives after NAFTA and concludes that Mexico's use of NAFTA parity in other free trade agreements dampened these agreements' potentially negative welfare effects stemming from trade diversion.

NAFTA partners still accounted for more than 38 percent of its GDP in 2002 (Figure 4b). Approximately 90 percent of total exports of Mexico went to the partner countries in 2002 while imports from the partner countries constituted more than 65 percent of total imports (Figure 4c).[10]

The growth performance of Mexico's exports has been impressive during the 1990s. For example, during the period 1993–2002, the increase in total world exports in dollar terms was less than 75 percent whereas the increase in Mexico's exports was around 300 percent (Figure 4d). Possibly reflecting the effects of Mexico's other trade agreements during the 1990s, Mexico's trade with the non-NAFTA countries rose almost threefold during 1993–2002 (Figure 4e). Moreover, growth in Mexico's exports was stronger than that of several emerging market economies during the post-NAFTA period (Tables 1a and 1b). For example, only Korea and Turkey registered a higher growth rate of exports than did Mexico during the period 1996–2002.[11] Mexico's growth rate of imports was the highest in the group during the same period. The openness (trade-to-GDP) ratio for Mexico rose from 32 percent in 1980–93 to 58 percent in 1994–2002.

B. How Has NAFTA Affected Trade Flows in the Region?

Studies using gravity models typically find that NAFTA helped spur a modest increase in Mexico's trade without trade diversion. Gould (1998) studies the period 1980–96 and concludes that, while NAFTA increased the total trade between Mexico and the United States by 16 percent during 1994–96, its impact on Mexico's exports to the United States was small. In addition, Gould finds that NAFTA was not a trade diverting agreement, i.e., the expansion of trade was not at the expense of other countries.

Krueger (1999) uses a gravity model and biannual data for the period 1987–97 to analyze the impact of NAFTA on Mexico's trade performance. She finds that most of the increase in Mexican trade after NAFTA was driven by factors other than the agreement, including Mexico's unilateral reduction of tariffs following its entry into GATT in 1986 and the collapse of the Mexican peso in 1994. Krueger (1999, 2000) also studies the changes in the volume and patterns of trade flows among NAFTA partners and the rest of the world using disaggregated data for the period 1990–96. She finds that the categories in which Mexican exports to the United States registered the largest increase overlapped with those in which they rose most rapidly with the rest of the world. She interprets this result as an

[10] NAFTA has also affected the growth of trade and financial flows between Canada and the United States (Cardarelli and Kose, 2004). U.S. exports to NAFTA partners climbed nearly 90 percent, twice the increase in its exports to the rest of the world (Kose, 2003). DFAIT (2003) documents the increase in trade and financial flows between Canada and Mexico after the inception of NAFTA.

[11] The emerging market countries in the sample undertook trade and financial liberalization programs at around the same time as Mexico did. Tornell, Westermann and Martinez (2003) document the dates of financial and trade liberalizations for several emerging market economies.

indication that NAFTA was not a trade-diverting agreement. Lederman, Maloney, and Serven (2003) also use a gravity model and concludes that NAFTA did not have a significant impact on trade flows among the member countries and did not induce trade diversion.

Studies employing export and import demand equations find that NAFTA had contributed to the growth of Mexico's exports to the United States. For example, the United States International Trade Commission (USITC) (1997) estimates export and import demand functions using aggregate monthly series for the period 1989–96. The results suggest NAFTA boosted exports of Mexico (the United States) to the United States (Mexico) by 1.0 (1.3) percent in 1994, 5.7 (3.8) percent in 1995, and 6.4 (3.3) percent in 1996. The Congressional Budget Office (CBO) (2003) employs a similar methodology with quarterly aggregate data for the period 1969–2001 and finds that NAFTA boosted U.S. imports from Mexico by 8 percent and raised U.S. exports to Mexico by just over 11 percent in 2001.

Some recent studies using sectoral data series find a more significant impact of NAFTA on trade flows. For example, Romalis (2002) examines the impact of tariff preference afforded by the United States to the NAFTA partners on different industries employing disaggregated data series covering the period 1980–2000. Using the tariff preference afforded to Canada and Mexico in 1999, he finds that between 25 to 50 percent of the increase in U.S. imports from Mexico after 1993 was driven by Mexico's preferential treatment associated with NAFTA. He also reports that Mexico's exports of commodities with the greatest NAFTA advantage grew much faster than others. Moreover, these commodities constituted a significant fraction of the U.S. demand implying that NAFTA produced substantial trade diversion. Romalis argues that his results are different than those in Krueger because he uses longer and more disaggregated time series enabling him to analyze the impact of tariff preference on trade flows more precisely.

In a related study, Agama and McDaniel (2002) conclude that NAFTA had a positive impact on the growth of trade flows in the region. They focus on the time varying dimension of the U.S. tariff preference afforded to Mexico using the data over the period 1983–2001. They estimate that a 1 percentage point increase in tariff preference induced around 4 percent growth in the volume of exports from Mexico to the United States and a roughly 6 percent increase in U.S. exports to Mexico during the period 1993Q4–2001Q4. Some other studies focus on the impact of NAFTA on particular sectors (USITC, 1997; Burfisher, Robinson, and Theirfelder, 2001); and Fuako, Okubo, and Stern, 2002). These studies conclude that NAFTA resulted in trade diversion in textiles and apparel industries.

Some other studies rely on computable general equilibrium (CGE) models to analyze the impact of NAFTA on trade flows. Unlike ex-post studies, which employ econometric methods with historical time series data, ex-ante studies with CGE models utilize various simulation methods to analyze a calibrated model economy for a particular base year. These studies estimate that NAFTA's long-run impact on Mexico's exports to the United States was between 3 and 16 percent (CBO, 2003). Kouparitsas (1998) argues that these studies are not able to account for the dynamic effects of the agreement on trade flows since they use static

models. He constructs a dynamic model and finds that the increase in trade flows between Mexico and its NAFTA partners was around 20 percent.[12]

C. How Has the Nature of Trade Changed After NAFTA?

Mexico's export base shifted toward manufactured goods following NAFTA's introduction. Although the share of manufactures in total exports had been increasing since at least 1980, the pace of diversification accelerated after the inception of NAFTA, as the average manufacturing share increased to more than 80 percent during the post-NAFTA period (1994–2002) from around 37 percent in the pre-NAFTA period (1980–93) (Figure 5a). As a result, Mexico's export and import base has become one of the most diversified among emerging market economies (Table 2).

Vertical specialization—i.e., the value of a country's imports that are embodied in its exports—has increased among the NAFTA partners. Hummels, Ishii, and Yi (2001) focus on the *maquiladora* trade and conclude that vertical specialization played an important role in the growth of Mexico's exports since 1979. *Maquiladora* firms, which are mostly located along Mexico's northern border, import inputs from the United States, process them, and re-export back to the United States. These firms specialize in the manufacture of electronics, auto parts, and apparel industries. Maquiladora firms grew substantially after the early 1980s, with the share of maquiladora exports in total exports of Mexico rising from 15 percent in 1980 to roughly 50 percent in 2001 (Figure 5b).

The growth of maquiladora industry accelerated during the 1990s. The average growth rate of real value added produced by the maquiladora sector was around 10 percent in the period 1990–2002, over three times the average growth of real GDP during the same period (Hanson, 2002). Although there was a significant increase in employment during the first five years of NAFTA, recent research suggests that this increase reflected cyclical factors rather than the tariff preference afforded by NAFTA (Gruben, 2001). Indeed, the maquiladora sector has been going through a recessionary period since the early 2001 (Gruben, 2004), which is explored further in Section VIII.

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[12] A recent paper by Kehoe (2003) argues that CGE models severely underestimated the impact of NAFTA on the volume of regional trade. For example, a static CGE model by Brown, Deardorff, and Stern (1992) estimates that Mexico's exports (imports) relative to its GDP would increase roughly 51 (34) percent during the period 1988–99 while the data suggest that the relative increase in exports (imports) was larger than 140 (50) percent in the same period. Kehoe also finds that the models were unable to account for much of the increase in sectoral trade flows. He argues that these models fail to explain the dramatic increase in trade flows because they do not capture the impact of productivity changes associated with NAFTA and they do not allow endogenous formation of specialization patterns implying that the largest increase in trade would take place in those sectors which have already had intensive trade linkages.

Intra-industry trade between Mexico and its NAFTA partners rose significantly. Intra-industry trade, which is defined as trade in similar but differentiated products, is also closely associated with maquiladora trade. OECD (2002) reports that the share of intra-industry trade in Mexico's manufacturing sector rose from 62.5 percent in 1988–91 to 73.4 percent in the period 1996–2000.[13] OECD also argues that most of the increase in intra-industry trade flows was related to NAFTA. Clark, Fullerton, and Burdorf (2001) find that a number of manufacturing industries registered substantial increases in intra-industry trade flows between Mexico and the United States after the inception of NAFTA.

NAFTA also boosted intra-firm trade in the region. Intra-firm trade is defined as cross-border trade between multinational companies and their affiliates. In the case of Mexico, most of these affiliates are maquiladora firms. OECD (2002) reports that intra-firm exports from Mexico to the United States rose by more than 3 percent in the period 1992–99 and accounted for more than two-thirds of total exports in 1999.

NAFTA also resulted in a substantial increase in the variety of products traded between Mexico and its partners. Hillbery and McDaniel (2002) analyze the impact of increase in the variety of products on the volume of trade between Mexico and the United States. They find that almost 25 percentage points of the 190 percent increase in Mexico's exports to the United States was attributable to the increase in the number of traded good varieties while more than 8 percentage points of the 93 percent increase in the exports of the United States to Mexico was accounted for by the growth of product variety. In a related paper, Kehoe (2003) documents that the sectors with very small trade in 1988 have experienced the largest increases in exports in the period 1988–99. For example, the share of the "motor cars for transport of passenger and engines" sector in total Mexican exports to the United States increased from under 1 percent in 1988 to 15 percent in 1999.

D. Growth of Financial Flows

Foreign direct investment (FDI) flows between Mexico and its partners strengthened after NAFTA. The agreement contained various provisions that improved the relative standing of investors from the partner countries in Mexico and expanded the sectors in which they could operate. These changes helped boost FDI flows to Mexico from US$12 billion over 1991–93 to roughly US$54 billion in the 2000–02 period and increased share of FDI flows in domestic gross fixed capital formation (investment) from 6 percent in 1993 to 11 percent in 2002, mainly on account of inflows from Mexico's NAFTA partners (Figures 6a and 6b). Net portfolio flows also increased rapidly after the inception of NAFTA (Figure 6c).

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[13] During the same period, the share of intra-industry trade in total manufacturing trade of the United States (Canada) increased from 63.5 (73.5) percent to 68.5 (76.2) percent (OECD, 2002). Chen and Yi (2003) provide a detailed account of the changes in the nature of global trade flows during the past thirty years.

Recent research suggests that the NAFTA membership significantly affected FDI inflows to Mexico. Cuevas, Messmacher, and Werner (2002b) employ panel regressions using the data of 45 countries for the period 1980–99 to analyze the impact of NAFTA membership on FDI flows. They find that Mexico's participation in NAFTA led to roughly a 70 percent increase in FDI flows. In a related study, Waldkirch (2003) examines data from 11 countries for the period 1980–98 and finds that NAFTA induced a 40 percent increase in the volume of FDI flows. He argues that NAFTA's impact on FDI inflows to Mexico was the result of increased vertical specialization as well as the effect of the agreement on Mexico's commitment to liberalization and reform programs. Anderson and Pereira (2003) report that there were statistically significant structural breaks in both the level and the share of FDI in GDP, of Mexico in 1993 and argue that this was associated with the Mexico's NAFTA membership.[14] Blomstrom and Kokko (1997) conclude that foreign multinationals increased their investment in Mexico in response to NAFTA as well as to the relaxation of various barriers on FDI flows since the mid-1980s.

V. Dynamics of Macroeconomic Volatility

One of the major policy challenges for an emerging market economy like Mexico is to establish a stable macroeconomic environment. A burgeoning literature has documented a negative relationship between macroeconomic instability (volatility) and growth (Ramey and Ramey, 1995).[15] There are several channels through which NAFTA membership could help Mexico to establish and sustain a stable economic environment, some of which are discussed below.

A. Economic Integration and Volatility: Theory and Recent Empirical Studies

The theoretical impact of increased trade and financial flows on output volatility depends on various factors including the nature of financial flows, patterns of specialization, and the sources of shocks. For example, if trade openness is associated with increased inter-industry specialization across countries and industry-specific shocks are important in driving business cycles, this could lead to an increase in output volatility. However, if increased trade is associated with increased intra-industry specialization across countries, which leads to a larger volume of intermediate inputs trade, then the volatility of output could decline (Kose, Prasad, and Terrones, 2003a). In addition, economic theory suggests that increased access to international financial markets should dampen the volatility of consumption while inducing an increase in investment volatility.

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[14] Rivera-Batiz (2000) provides a brief review of how restrictions on FDI flows were relaxed over time since the 1930s in Mexico.

[15] Kose, Prasad, and Terrones (2004b) provide a review of this literature, which also shows that macroeconomic instability has a negative impact on investment growth.

Recent studies are unable to establish a clear empirical link between stronger economic linkages and macroeconomic volatility. While some of these studies find no significant relationship between the increased degree of economic interdependence and domestic macroeconomic volatility (Buch, Dopke, and Pierdzioch, 2002), some others find that an increase in the degree of trade openness leads to higher output volatility, especially in developing countries (Easterly, Islam, and Stiglitz, 2001).[16] Kose, Prasad, and Terrones (2003a) find that while trade openness increases the volatility of output, income, and consumption in emerging market economies, it reduces the relative volatility of consumption implying that it improves the consumption risk sharing possibilities. They also document that increased financial integration is associated with rising relative volatility of consumption, but only up to a certain threshold.

B. Changes in Macroeconomic Volatility in Mexico after NAFTA

Macroeconomic volatility in Mexico declined markedly after the inception of NAFTA. This can be seen in the uniform and sizeable decline in the variance of several macroeconomic aggregates between the 1980–93 and 1996–2002 periods (Figures 7a and 7b).[17] In particular, output volatility decreased by almost 30 percent and the volatility of investment fell by more than 40 percent in the latter period. Consistent with the prediction of economic theory, increased trade and financial linkages also led to a reduction in the volatility of consumption in Mexico.[18] In addition, consumption became slightly less volatile than output in 1996–2002 period. This result along with the increased cross-country consumption correlations documented in the next section suggests that Mexico has been able to utilize risk sharing benefits of increased trade and financial linkages with its NAFTA partners.

The decreased volatility of the Mexican economy during the past eight years could be the result of several factors, including some associated with NAFTA. In particular, the decrease in volatility could be the result of NAFTA's effect on intra-industry and vertical trade, and the increased importance of regional rather than country-specific shocks in driving the Mexican business cycles, which are further explored in Section VI, item C. Torres and

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[16] De Ferranti, Perry, Gill, and Serven (2000) study the sources of macroeconomic volatility in Latin American countries. Santos (2002) finds that recessions in Mexico are deeper and shorter than expansions.

[17] Volatility is measured as the standard deviation of the Hodrick-Prescott filtered quarterly series.

[18] Prasad, Rogoff, Wei, and Kose (2003) show that welfare gains associated with international consumption risk sharing are quite large in emerging market economies including Mexico. They find that emerging market economies could, on average, increase their consumption by roughly 3.5 percent. Since its consumption stream is less volatile than that of most other emerging market countries, consumption in Mexico could increase by 1.8 percent through the diversification of its consumption risk.

Vela (2003) argue that the advent of NAFTA led to an increase in the correlation of the Mexican exports and imports over time, which in turn dampened the volatility of net exports during the period 1991–2001. The decrease in the volatility of business cycles could also have been the result of increased stability of domestic macroeconomic policies. For example, there was a uniform decline in the volatility of several exogenous policy variables and prices (Figure 7c). Cuevas, Messmacher, and Werner (2002b) also find that the volatility of Mexico's output decreased by almost 50 percent during the 1990s relative to the previous decade. They argue that the substantial decline in volatility could be the result of the implementation of sound monetary and fiscal policies over the period 1996–2001.

VI. Dynamics of Comovement

What impact has the significant increase in trade and financial flows had on the comovement of business cycles in Mexico and its NAFTA partners? This section answers this question by first reviewing the relevant economic theory and empirical studies on the relationship between increased economic linkages and business cycle comovement. Then, the evolution of the cross-country comovements of various macroeconomic aggregates of the NAFTA members is documented using simple correlations. Next, a dynamic factor model is employed to examine how the importance of regional and country specific factors has changed in driving business cycles in Mexico over time. Then, changes in the channels of business cycle transmission in the region after the agreement are examined using impulse responses from a multi-country business cycle model.

A. Economic Integration and Comovement: Theory and Recent Empirical Studies

In theory, increased trade linkages have ambiguous effects on the comovement of business cycles. On one hand, stronger trade linkages can result in more highly correlated business cycles since they generate both demand and supply-side spillovers across countries. For example, on the demand side, an investment or consumption boom in one country can generate increased demand for imports, boosting economies abroad. Moreover, if stronger trade linkages are associated with increased intra-industry specialization across countries, and industry-specific shocks are important in driving business cycles, then business cycle comovement would be expected to increase. However, the degree of comovement might diminish if increased trade is the result of a rise in inter-industry trade and industry-specific shocks are important in driving business cycles (Kose and Yi, 2003).

Increased financial flows also have an ambiguous theoretical effect on business cycle correlations. For example, stronger financial linkages could result in a higher degree of synchronization of output fluctuations by generating large demand-side effects. Contagion effects that are transmitted through financial linkages could also lead to heightened cross-country spillovers of fluctuations. However, financial linkages could stimulate specialization of production through the reallocation of capital in a manner consistent with countries' comparative advantage. This type of specialization, which could result in more exposure to industry- or country-specific shocks, could lead to a decrease in the degree of output

correlations while inducing stronger comovement of consumption across countries (Kalemli-Ozcan, Sorensen, and Yosha, 2003).

Several recent studies suggest that trade linkages result in greater business cycle synchronicity. For example, using the results from cross-country or cross-region panel regressions, Frankel and Rose (1998), Clark and van Wincoop (2001), Kose and Yi (2003) and others show that, among industrialized countries, pairs of countries that trade more with each other exhibit a higher degree of business cycle comovement. Calderon, Chong, and Stein (2002) find that the impact of trade intensity on business cycle comovement is positive but smaller in a sample including both industrialized and developing countries. Calderon (2003) documents that the impact of trade intensity on cross-country business cycle correlation is larger if the two countries have a free trade agreement.

Recent empirical studies also show that stronger financial linkages could lead to higher cross-country output and consumption correlations. Kose, Prasad, and Terrones (2003b) study the impact of increased financial linkages on the correlations between fluctuations in individual country aggregates (output, consumption, and investment) and those in corresponding world (G-7) aggregates. They report that countries that are more open to financial flows have higher business cycle correlations with the G-7 aggregate. Imbs (2003) also finds that financial integration has a positive impact on the degree of comovement of business cycle fluctuations in output and consumption.

B. Comovement of Business Cycles after NAFTA

The agreement appears to have been associated with an increased degree of comovement of business cycles of Mexico and its NAFTA partners.[19] The increase in comovement can be seen from the marked increase in cross-country correlations of the major macroeconomic aggregates, including output, consumption, and investment (Figures 8a and 8b).[20] In particular, the output correlation between Mexico and its NAFTA partners rose from almost zero in the pre-NAFTA period to around 0.75 during the post-crisis period. There was a significant increase in consumption correlations, which could be a reflection that Mexico was able to diversify its consumption risk more effectively after NAFTA. Cross-country correlations of exports and imports also increased significantly after the inception of NAFTA which could be associated with the jump in intra-industry trade in the region. In addition, there was a substantial increase in the cross-country correlations of manufacturing and

[19] Comovement is measured as the cross-country correlation of the Hodrick-Prescott filtered quarterly series of main macroeconomic aggregates (output, consumption, investment, exports, and imports) of Mexico, Canada, and the United States.

[20] In several cases, the changes in correlations are statistically significant. The correlations between Mexico and a NAFTA aggregate are also studied and found to be consistent with the results reported here. The results are also robust to alternative detrending methods, such as first-differencing.

industrial production, which could be the result of the increase in the trade of manufactured goods.

The increase in business cycle comovement in the region is documented by several studies. Torres and Vela (2003) find that business cycle correlations between Mexico and the United States rose as trade linkages between the manufacturing sectors of the two countries became stronger after the inception of NAFTA. Using quarterly data for the period 1991–2001, they document that the cyclical dynamics of Mexico's exports, imports, and output became more responsive to the changes in the U.S. exports and imports. Cuevas, Messmacher, and Werner (2002a) use the quarterly output series of the NAFTA members for the period 1981–2001 and find that business cycles in Mexico became more synchronized with the cycles in Canada and the United States after NAFTA. They also document that there was an increase in the correlations of sectoral business cycles in Mexico and the United States during the period 1997–2001, with the correlation of manufacturing sector output rising from 0.28 to 0.97.

C. How Have the Regional Cycles Changed?

Simple correlations do not allow conclusive statements about the changes in the degree of business cycle comovement. First, cross-country correlations capture only the contemporaneous comovement in macroeconomic variables, and do not account for common fluctuations associated with "leads" and "lags". Second, correlations can account for the degree of comovement in only a single macroeconomic variable. Moreover, correlations are not helpful to analyze the relative importance of different types of factors and/or shocks in explaining business cycle comovement.

To overcome these problems, a dynamic latent factor model that captures the dynamic comovement in output, consumption, and investment series of the NAFTA partners is estimated. The model helps account for contemporaneous as well as temporal covariation among the variables and enables us to study how common (regional) and country specific factors affect the fluctuations in different macroeconomic variables. A very brief explanation of the model is presented here.[21] There are K dynamic, unobserved factors thought to characterize the temporal comovements in our cross-country panel. Let N denote the number of countries, M the number of time series per country, and T the length of the time series. Observable variables are denoted by $y_{i,t}$, for i= 1,…,M×N, t=1,…,T. There are two types of factors: N country-specific factors ($f_n^{country}$, one per country), and the single regional factor (f^R). Thus, for observable i:

[21] Kose, Otrok, and Whiteman (2003) provide a detailed discussion about these models. Using various factor models, Lumsdaine and Prasad (2002), Helbling and Bayoumi (2003) and Kose, Otrok, and Whiteman (2003, 2004) document that there is a significant common component explaining business cycles in industrialized countries.

$$y_{it} = a_i + b_i^R f_t^R + b_i^{country} f_{n,t}^{country} + \varepsilon_{i,t} \qquad E\varepsilon_{i,t}\varepsilon_{j,t-s} = 0 \qquad for \quad i \neq j,$$

where n denotes the country number. The coefficients b_i^j are called "factor loadings", and reflect the degree to which variation in $y_{i,t}$ can be explained by each factor. We use output, consumption, and investment data for each NAFTA member, so there are M×N (3*3=9) time series to be "explained" by the N+1 (3+1=4) factors. The "unexplained" idiosyncratic errors $\varepsilon_{i,t}$ are assumed to be normally distributed, but may be serially correlated.

The estimated regional factor model explains some of the major economic events since 1980. Figure 8c displays the median of the posterior distribution of the regional factor and Figure 8d presents the Mexico's country factor and output. The behavior of the regional factor is consistent with the recessions of the early 1980s and 1990s, and the expansionary period of the late 1980s. The Mexican-country factor is quite successful in replicating some important episodes of cyclical fluctuations as it is consistent with the recessions of the early 1980s, 1982–83, 1986, and the mid-1990s.

The importance of the regional factor in driving business cycles is analyzed using variance decompositions. To measure the relative contributions of the regional, country, and idiosyncratic factors to variations in aggregate variables in each country, the variance of each macroeconomic aggregate is decomposed into the fraction that is due to each of the two factors and the idiosyncratic component in three different time periods. Specifically, the fraction of variance of each macroeconomic aggregate explained by the following factors is computed: (i) a regional factor that is common across all variables/countries; (ii) country-specific factors, which are common across the main aggregates within a country; and (iii) factors specific to each variable.

Regional factors became more important in driving business cycles in Mexico with the advent of NAFTA. The proportion of output volatility explained by the regional factor in Mexico rose from less than 1 percent in the period 1980–93 to more than 19 percent in 1994–2002 period, while the variance of investment accounted for by the regional factor increased almost tenfold during the same period (Figure 9a). A significantly large fraction of consumption fluctuations in Mexico was driven by the regional factor after the inception of NAFTA. While the importance of the country-specific factor remained relatively stable during the later period, the idiosyncratic factor became less important. Examination of business cycles in manufacturing and industrial production using a set of single factor models suggests that the regional factor also played a more important role in explaining these variables after NAFTA (Figure 9b).

These findings are consistent with recent empirical studies. Kose, Otrok, and Whiteman (2003) examine the roles of world, regional, and country-specific factors in a 60-country sample that includes both developed and developing countries. Their results suggest that the North American regional factor played an important role in driving macroeconomic fluctuations in Mexico, Canada, and the United States. Cuevas, Messmacher, and Werner (2002b) employ simple regression models to analyze the responsiveness of

Mexican business cycles to changes in economic activity in the United States. They show that changes in output growth of the United States accounted for a larger fraction of the variation in the growth rates of output and industrial production in Mexico during the period 1997–2001 than before 1997.

D. Changes in the Channels of Business Cycle Transmission

A multi-country dynamic stochastic general equilibrium (DSGE) model is constructed to illustrate the channels through which NAFTA could effect business cycle spillovers among its participants. The multi-country DSGE model is a natural setting for this purpose because it accounts for the demand- and supply-side spillover channels that are critical in transmitting business cycles. The model, developed by Kose and Yi (2004), extends the two-country free trade, complete market model of Backus, Kehoe, Kydland (1994) by including three countries, trading frictions (tariffs and transportation costs), and allowing for international financial autarky.

The model economy includes a traded intermediate goods-producing sector and a nontraded final goods-producing sector. Perfectly competitive firms in the intermediate goods sector produce traded goods according to a Cobb-Douglas production function. When the intermediate goods are exported to other countries, they are subject to transportation costs, which are considered as a proxy for tariffs and other nontariff barriers, as well as transport costs. It is assumed that each country is completely specialized in the production of an intermediate good. Each country's output of intermediates is used as an input into final goods production. Final goods firms produce their goods by combining domestic and foreign intermediates via an Armington aggregator. These assumptions imply that imports from Mexico are used as intermediate inputs to produce final consumption and investment goods in the United States and Canada in the model economy. In each country, there are representative agents who derive utility from consumption and leisure.

The model is calibrated to reflect some basic structural features of the NAFTA members. Since the objective is to analyze the interdependence of business cycles in Mexico and its NAFTA partners, it is assumed that the three countries in the model are Mexico, its NAFTA partners, which are an aggregate of Canada and the United States, and the rest-of-world, represented by an aggregate of the members of the European Union and Japan. It is assumed that Mexico is 4 percent of the world economy and each of the other two countries is 48 percent of the world economy. The elasticity of substitution between domestic and foreign goods is set at 1.05. The impact of NAFTA is simulated by changing the level of transportation costs (trading frictions) between the member countries. The model is solved following the standard linearization approach in the international business cycle literature.

The results suggest that agreements, such as NAFTA, that lower trade frictions can magnify the impact of external shocks on the Mexican economy. To analyze the responses of macroeconomic aggregates in Mexico to shocks originating in Canada and the United States, the impulse responses of Mexico's variables to a temporary productivity (supply) shock in Canada and the United States are computed. The results indicate that the responses of

Mexican output, consumption, and investment to the external shock become larger after the inception of NAFTA (Figures 10a, 10b, and 10c). In addition, pre- and post-NAFTA simulations illustrate the substantial increase in Mexican exports that results from the lowering of tariffs after the advent of the agreement (Figure 10d). In other words, the reduction in trade frictions in the model results in greater trade intensity in the region, which in turn leads to a higher degree of business cycle interdependence.

VII. Dynamics of Economic Growth

Has NAFTA been successful in improving the long-run growth prospects of Mexico? This section tries to answer this question by studying the impact of NAFTA on the growth dynamics in Mexico. First, a brief survey of the literature about the effects of trade and financial integration on economic growth is provided. Next, some basic statistics associated with economic growth in Mexico are documented. Then, some recent studies about the impact of NAFTA on Mexico's growth performance are briefly reviewed.

A. Effects of Trade and Financial Integration on Economic Growth

Do regional trade agreements like NAFTA have a positive impact on economic growth in member countries? The theoretical impact of regional trade agreements on economic growth and welfare is ambiguous because it depends on various factors, including changes in trade volume and terms-of-trade after such agreements.[22] However, various theoretical models emphasize the importance of trade openness in promoting economic growth. Some of these theoretical models focus on the static gains, including the gains derived from comparative advantage considerations. Others consider knowledge spillovers associated with international trade as an engine of growth (Grossman and Helpman, 1991).

There is a large empirical literature suggesting that openness to trade has a direct positive effect on economic growth. For example, using a variety of methods, several researchers, including Sachs and Warner (1995), Frankel and Romer (1999), and Dollar and Kraay (2003) show that trade openness helps promote economic growth.[23] Some other

[22] Baldwin and Venables (1995) provides a survey of theoretical studies on the growth and welfare implications of regional trade agreements. Kose and Riezman (2000) employ a general equilibrium framework to analyze the welfare implications of different types of preferential trade agreements, such as customs unions and free trade areas, and conclude that these agreements could lead to large welfare gains in member countries. Krueger (1997) argues that trade-creating custom unions are superior to free trade areas on welfare grounds since a free trade area imposes a variety of rules-of-origin requirements and could potentially result in more trade diversion than does a customs union.

[23] Berg and Krueger (2003) and Baldwin (2003) provide extensive surveys of the literature on trade and growth. Overwhelming majority of empirical studies in the literature find that trade openness has a positive impact on economic growth. Rodrik and Rodriquez (2001) present a critical review of some of these empirical studies.

studies consider the indirect links between trade openness and growth and focus on the positive effect of increased trade linkages on productivity (USITC, 2003) and on investment growth (Levine and Renelt, 1992, and Baldwin and Seghezza, 1998).

In theory, there are various direct and indirect channels through which increased financial flows can enhance growth in developing countries. While direct channels include augmentation of domestic savings, reduction in cost of capital through better global allocation of risk, development of domestic financial sector (Levine, 1996), and transfer of technological know-how, indirect channels are associated with promotion of specialization and inducement for better economic policies (Gourinchas and Jeanne, 2003).

However, recent empirical research is unable to establish a clear link between financial integration and economic growth. Prasad, Rogoff, Wei, and Kose (2003) review several empirical studies and conclude that the majority of the studies find financial integration has no effect or a mixed effect on economic growth. For example, Edison, Levine, Ricci, and Slok (2002) employ a regression model that controls for the possible reverse causality—i.e., the possibility that any observed association between financial integration and growth could result from the mechanism that faster growing economies also more likely to choose to liberalize their capital accounts. They conclude that there is no robustly significant effect of financial integration on economic growth. However, some studies (Borenzstein, De Gregorio, and Lee, 1998) find that FDI flows (rather than other capital movements) tend to be positively associated with investment and output growth.

B. Growth Performance of Mexico after NAFTA

The Mexican economy has recently slowed down, but Mexico's growth performance since the inception of NAFTA has been better than it was before the agreement. In particular, Mexican GDP growth rose from an annual average of 2 percent in 1980–93 to an annual average of roughly 4 percent in 1996–2002 (Figure 11a). Compared with several other emerging market countries, the Mexican economy has performed well in the post-NAFTA period and, in particular, the period after the 1995 crisis (Table 3). Moreover, the average growth rate of investment has been particularly impressive, as it rose almost eightfold during the period 1996-2002 (Table 3). The factors driving the recent economic slowdown and relevant policy issues are analyzed in the next section.

The effects of exports and investment on growth in Mexico have changed after NAFTA. Contributions of exports and investment to GDP growth have increased more than two-fold following the introduction of the agreement (Figure 11b). For example, while the contribution of investment (exports) was less than 0.5 (1.5) percentage points before NAFTA, it went up to 1.5 (3.0) percentage points during the period 1996–2002.

Studies employing CGE models report that NAFTA has had a sizeable impact on the growth performance of the Mexican economy. For example, the results from the static CGE

models (Brown et al., 1992 and Sobarzo (1992)) suggest that NAFTA raises the steady-state level of GDP of the Mexican economy by around 2 percent.[24] Kouparitsas (1997) considers a dynamic general equilibrium model that captures the impact of NAFTA on investment flows in the region. He finds that the agreement increases Mexico's steady-state level of GDP by 3.3 percent, consumption by 2.5 percent, and investment by more than 5 percent.

Recent research shows that NAFTA also contributed to total factor productivity in Mexico. For example, Lopez-Cordova (2002) use plant-level data for the period 1993–99 and analyze the relationship between Mexico's manufacturing productivity and a variety of variables, including tariff rates in Mexico and the United States. He reports that NAFTA raised total factor productivity by roughly 10 percent in Mexico over the sample period, partly in response to foreign capital inflows. In a related paper, Schiff and Wang (2002) use data for 16 manufacturing industries over the period 1981–98 and establish a positive link between total factor productivity in Mexico and the increase in the volume of intermediate inputs trade after NAFTA. In particular, they estimate that NAFTA increased total factor productivity in Mexico by 5.5–7.5 percent.

Other studies show that the agreement has accelerated economic convergence in North America. Easterly, Fiess, and Lederman (2002) examine data for 28 industries and find that the speed of convergence of productivity among NAFTA partners accelerated during the post-NAFTA period. They also find that institutional gaps inhibited the convergence of income levels between the two countries. Lopez-Cordova (2001) argues that the passage of NAFTA induced some institutional changes as it led to the revamping of institutions in charge of competition policy, intellectual property protection and standards.

Some recent empirical studies also establish a positive association between NAFTA membership and Mexico's growth performance. Arora and Vamvakidis (2003) analyze the impact of trading partner's economic growth on domestic growth performance of a country. They use the data for 101 countries over the period 1960–99 and employ various growth regressions, and find that the growth rate and relative income of trading partners are positively associated with domestic economic growth. They conclude that half of the increase in Mexico's growth in the latter half of the 1990s was attributable to the growth performance of its NAFTA partners. However, they argue that since Mexico and the United States have had strong trade linkages even before the agreement, NAFTA played a small role in accounting for the growth in Mexico. CBO (2003) employs a regression model to estimate the impact of NAFTA on trade flows and concludes that the increase in Mexico's exports to the United States raised Mexico's GDP by 1.7 percent in 2001.

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[24] Baldwin and Venables (1995) provide a summary of the studies using CGE models to evaluate the impact of NAFTA. Manchester and McKibbin (1995) conclude that the decrease in Mexico's country risk premium associated with NAFTA could lead to very large growth gains.

VIII. FUTURE POLICY CHALLENGES FOR MEXICO

Following the strong performance in the late 1990s, Mexico's overall growth and the growth of its trade with NAFTA partners began to fall off in recent years (Figure 12a).[25] This appears to reflect a combination of both cyclical and structural factors. After the prolonged expansion during 1995–2000, U.S. growth has fallen significantly since 2001, especially in the industrial sector, which is the destination for most of Mexico's exports. In addition, Mexico has faced increased competition from other emerging market economies. For example, China has been rapidly expanding its market share in the United States, and some of the lower value-added segments of Mexico's export sector, such as textiles, have shifted production to elsewhere in the region, including Central America (Figure 12b).

Challenges to Mexico's export position in the U.S. market are likely to continue. In particular, the advantage conveyed to Mexico by NAFTA could well be eroded as the global trade environment evolves including in response to the increasing integration of China into the world economy, especially given its membership in the World Trade Organization (WTO). Since Mexico has traditionally had little two-way trade with China, it is likely to benefit little from increased access to Chinese markets while facing stiffer competition from China in North America. In addition, ongoing trade liberalization with the region—including in the context of bilateral free trade agreements, the Free Trade Area of the Americas (FTAA), and the Central American Free Trade Agreement (CAFTA)—will mean greater access to the U.S. market by Mexico's regional competitors. Moreover, the phasing out of the global Multi-Fiber Agreement (MFA) will place further pressure on Mexico's competitiveness in the U.S. textile market.

These developments underscore the importance to Mexico of designing proactive policies, particularly in the area of structural reforms, to raise competitiveness in international markets.[26] There are several areas in which reforms are critical. The energy sector suffers from a lack of investment and exploitation of new opportunities. Electrical generation and transmission capacity is inadequate to support an expanding industrial base, yet private participation in these areas is hampered by constitutional provisions. Similarly, investment in oil and gas pipeline capacity and exploration for new reserves has been lacking, both because of the financial regime in which Petroleos Mexicanos (PEMEX) operates and obstacles to private participation.

Rigidities in several markets have remained as major obstacles to economic growth. For example, Mexico has among the most rigid labor market institutions in the region,

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[25] Nevertheless, unlike previous recessions in Mexico, which carried the seeds of major financial and economic crises, the latest downturn appears to be of a more normal cyclical nature (Federal Reserve Bank of Dallas, 2002).

[26] Mexico stood 55th in the 2002 World Economic Forum's ranking of country's microeconomic competitiveness.

discouraging development of the formal labor sector. Telecommunications also remain highly regulated, driving up business costs. In the institutional area, judicial reforms are needed that would provide greater certainty to the legal process and enhance the rule of law. Moreover, comprehensive tax reform is essential to reduce dependence on oil revenues and generate the resources needed to improve public infrastructure and education. The role of social objectives in advancing economic development, which include giving higher priority to education and human capital development, combating corruption, and dealing with poverty issues, are also critically important (Köhler, 2003).

Addressing these challenges will be central to recovering the growth momentum experienced in the latter part of the 1990s from membership in NAFTA.[27] Mexico will need to overcome traditional barriers to action in these areas to keep pace with other developing countries that are undertaking more dynamic reforms, particularly in Asia. Within the region, the potential for increased opening to trade of other large economies, such as Brazil, could provide additional competition to Mexico in North American markets. Anticipating these developments and moving aggressively to continue modernizing Mexico's economy will be central to sustained growth in living standards.

IX. Summary and Conclusions

A. How Has NAFTA Affected Mexico?

Separating the effects of NAFTA on Mexico from macroeconomic shocks over the past decade is difficult. Following the agreement, the U.S. economy experienced a prolonged boom, followed by the 2000 stock market collapse and subsequent recession. The Mexican economy also suffered a major financial crisis in the mid-1990s, from which the banking sector has slowly recovered. Subsequently, the implementation of sound domestic economic policies along with the strength of the U.S. economy played important roles in boosting Mexican growth.

Nonetheless, most studies suggest that NAFTA spurred a dramatic increase in trade and financial flows. For example, Mexico's exports to the United States and Canada tripled in dollar terms between 1993 and 2002. While the growth of trade has slowed since 2000, Mexico's trade (exports plus imports) with NAFTA partners still accounted for around 40 percent of its GDP in 2002. The agreement also appears to have significantly altered the nature of trade flows, with a substantial increase in intra-industry trade between Mexico and its NAFTA partners. Similarly, NAFTA helped boost FDI flows to Mexico, which rose from US$12 billion over 1991–93 to roughly US$54 billion in the 2000–02 period.

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[27] Cuevas, Messmacher, and Werner (2002b) argue that one of the potential explanations of the growth slowdown in Mexico was the halt of economic reforms since the mid-1990s. Tornell, Westermann, and Martinez (2003) also conclude that the slowdown in GDP and exports since 2001 was associated with the lack of structural reforms.

Increased trade and financial linkages have affected the dynamics of economic growth in Mexico in several ways. Contributions of exports and investment to GDP growth have increased substantially following the introduction of the agreement. In particular, the contribution of investment to GDP growth reached 3 percentage points during the period 1996-2002 as the average growth rate of investment rose to more than 8.5 percent. Recent studies suggest that NAFTA induced a sizeable increase in total factor productivity in Mexico, helping double GDP growth from an annual average of 2 percent in 1980–93 to 4 percent in 1996–2002.

NAFTA appears to have also been associated with significant changes in the Mexican business cycle. Mexico's output volatility decreased by almost 30 percent, and the volatility of investment fell by more than 40 percent, since 1996. Business cycles in Mexico and the United States have become significantly more synchronized, with marked increases in the cross-country correlations of the major macroeconomic aggregates.

NAFTA also has been instrumental in improving macroeconomic as well as institutional policies in Mexico. Recent research emphasizes the importance of NAFTA as a commitment mechanism ensuring the continuation of Mexico's reform process during the 1990s. This, in turn, improved the risk profile of the Mexican economy and helped attract foreign investment flows. In addition, there have been improvements in institutions in charge of competition policy and intellectual property protection.

B. Future Policy Challenges for Mexico

Mexico's trade with NAFTA partners has slowed in recent years and Mexico's output growth has also fallen sharply. This has reflected cyclical factors, including the U.S. recession and subsequent halting recovery. At the same time, however, structural factors have been important. Mexico has been adversely affected by the broad-based weakness of the U.S. manufacturing sector, which has been the destination for most of Mexico's exports, as well as by the rapid expansion of the market share of emerging market economies, particularly China, in the United States.

Mexico's experience under NAFTA illustrates that structural reforms are needed to sustain the benefits of comprehensive trade agreements. In Mexico's case, there remains a clear need for measures to boost competitiveness in a number of areas, including by easing labor market rigidities, to facilitate investment and exploitation of new opportunities in the energy sector, deregulate telecommunications, as well as to push forward judicial reforms that provide greater certainty to the legal process and enhance the rule of law. Finally, comprehensive tax reform is essential to reduce dependence on oil revenues and generate the resources needed to improve public infrastructure and education.

C. Prospects for NAFTA and Implications for Regional Free Trade

There could be large gains from further steps to deepening economic linkages among the NAFTA members. The NAFTA experience illustrated the significant benefits accruing to member countries from free trade, but important barriers remain. For example, differences in regulatory frameworks impede trade and investment flows; security concerns, which have become critically important during the past two years, slow cross-border flows of goods; and extensive rules-of-origin requirements also restrict trade flows. Recent research suggests that the removal of rules-of-origin requirements and the harmonization of MFN tariffs could result in large welfare gains (Policy Research Initiative, 2003).[28]

The NAFTA experience also suggests that the Free Trade Area of the Americas (FTAA) could have potentially significant effects on its developing country members. Care is undoubtedly needed in drawing too strong a lesson from Mexico's experience under NAFTA, given that Mexico benefited from the depreciated peso, the strength of the U.S. economy, and a common border with the United States. Nonetheless, the analysis above does suggest that, in addition to boosting economic efficiency, foreign investment and trade flows, the FTAA could also help promote greater macroeconomic stability in the region.

[28] NAFTA partners have recently decided to establish study groups to analyze avenues for harmonization of MFN tariffs and rules of origin requirements, and to improve rules governing investment flows. In addition, recognizing the importance of secure and continuous access to each other's markets, NAFTA members have recently placed an emphasis on border security (Cardarelli and Kose, 2004).

Table 1a. Growth Rates of Exports and Imports
(average, in percent)

	Argentina	Brazil	Chile	Indonesia	Korea	Malaysia	**Mexico**	Peru	Philippines	Thailand	Turkey	Uruguay
Exports												
1980-2002	5.8	7.3	7.5	7.2	13.0	11.4	**9.6**	3.3	5.5	12.5	14.3	3.8
1980-1993	4.1	7.9	7.2	10.3	11.2	14.1	**7.4**	-1.0	4.4	17.4	16.0	5.6
1994-2002	8.3	6.3	7.9	4.8	15.5	9.0	**12.9**	9.0	7.1	8.1	11.9	1.8
1996-2002	5.3	7.8	6.9	3.1	14.1	5.8	**9.7**	8.0	4.6	6.2	11.9	0.4
Imports												
1980-2002	3.7	5.0	6.8	7.0	11.1	11.6	**8.1**	3.6	5.7	11.2	11.8	5.3
1980-1993	7.2	3.9	5.9	9.8	11.0	15.5	**5.8**	1.2	5.4	18.1	14.9	9.4
1994-2002	-1.3	6.5	8.0	4.7	11.3	8.2	**11.6**	6.9	6.2	4.9	7.3	0.7
1996-2002	-3.2	1.1	5.2	0.2	8.2	3.5	**14.0**	1.2	3.6	1.4	8.3	-1.3

Table 1b. Openness
(average, exports + imports in percent of GDP)

	Argentina	Brazil	Chile	Indonesia	Korea	Malaysia	**Mexico**	Peru	Philippines	Thailand	Turkey	Uruguay
1980-2002	18.9	18.9	54.7	54.3	68.6	156.2	**42.7**	32.2	71.9	78.9	42.4	42.9
1980-1993	15.7	17.5	51.9	46.5	65.1	124.2	**32.0**	32.3	55.1	61.9	31.4	45.0
1994-2002	23.6	20.9	58.7	65.7	73.7	202.3	**58.2**	32.0	96.2	103.5	58.2	39.7
1996-2002	24.9	21.7	59.8	69.3	77.8	207.0	**61.0**	32.6	101.6	108.3	61.4	39.9

Table 2. Diversification of Exports and Imports
(average, in percent of total)

	Argentina	Brazil	Chile	Indonesia	Korea	Malaysia	**Mexico**	Peru	Philippines	Thailand	Turkey	Uruguay
Exports												
Manufacturing												
1980-1993	25.9	47.5	9.8	23.0	91.9	39.8	**37.1**	15.9	33.4	46.5	57.1	37.1
1994-2000	32.9	54.8	15.8	50.4	91.9	77.2	**81.2**	18.3	75.7	73.2	76.1	39.1
Agriculture and Food												
1980-1993	67.0	36.9	32.5	17.1	5.5	34.1	**11.9**	25.3	29.3	47.9	35.5	62.0
1994-2000	52.3	32.9	36.5	16.1	3.3	13.1	**7.2**	34.1	9.8	22.5	19.4	59.4
Fuel and Ores												
1980-1993	7.1	14.5	56.8	59.8	2.5	25.8	**50.9**	58.8	11.6	4.4	7.3	0.5
1994-2000	14.2	10.9	45.8	29.2	4.7	8.8	**11.5**	47.6	4.1	2.6	3.8	1.5
Imports												
Manufacturing												
1980-1993	78.0	47.4	69.9	71.8	57.6	75.4	**74.9**	68.2	49.3	65.8	57.3	62.9
1994-2000	88.0	73.7	76.9	66.5	63.7	84.8	**84.9**	72.1	78.4	77.7	72.1	74.6
Agriculture and Food												
1980-1993	8.6	11.6	11.4	11.8	15.4	11.5	**16.8**	23.2	11.7	9.6	8.7	11.8
1994-2000	6.6	11.2	8.6	17.4	9.7	6.7	**7.6**	16.4	9.7	8.0	9.4	13.7
Fuel and Ores												
1980-1993	13.3	40.9	16.8	16.0	26.7	12.6	**6.5**	7.2	23.0	20.8	33.8	25.3
1994-2000	5.1	15.0	13.5	15.9	26.2	6.5	**4.7**	11.4	11.7	12.7	16.4	11.7

Table 3. Rate of Growth of GDP and Investment
(average, in percent)

	Argentina	Brazil	Chile	Indonesia	Korea	Malaysia	**Mexico**	Peru	Philippines	Thailand	Turkey	Uruguay
GDP												
1980-2002	0.8	2.1	4.7	4.8	7.2	6.2	**2.5**	1.9	2.6	6.0	4.1	1.1
1980-1993	1.3	1.7	4.6	6.0	8.2	6.8	**2.2**	0.2	1.5	8.0	5.1	1.6
1994-2002	0.1	2.7	4.7	3.1	5.8	5.3	**2.9**	4.5	4.0	3.2	2.5	0.3
1996-2002	-0.3	2.0	3.7	1.7	5.0	4.2	**4.0**	2.7	3.9	1.5	2.9	-0.5
Investment												
1980-2002	-0.6	0.2	7.1	5.9	7.5	7.5	**1.9**	1.2	3.0	5.3	3.8	1.3
1980-1993	2.0	-1.7	8.6	10.2	10.8	12.2	**0.1**	-1.3	2.0	11.0	7.3	5.9
1994-2002	-4.2	2.9	4.9	2.6	2.7	3.3	**4.3**	4.5	4.4	-2.9	-1.4	-3.7
1996-2002	-5.5	0.6	2.1	-0.6	0.3	-1.3	**8.5**	-2.1	3.9	-6.9	-0.9	-5.0

Figure 1a. Average Tariff Rate on Imports

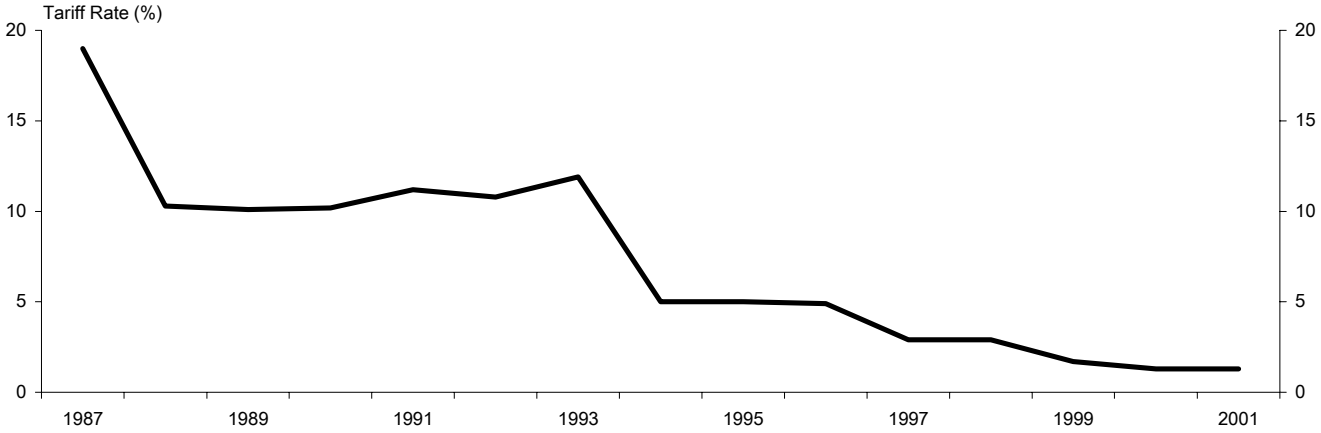


Figure 1b. United States: Average Tariffs on Imports from Mexico and World

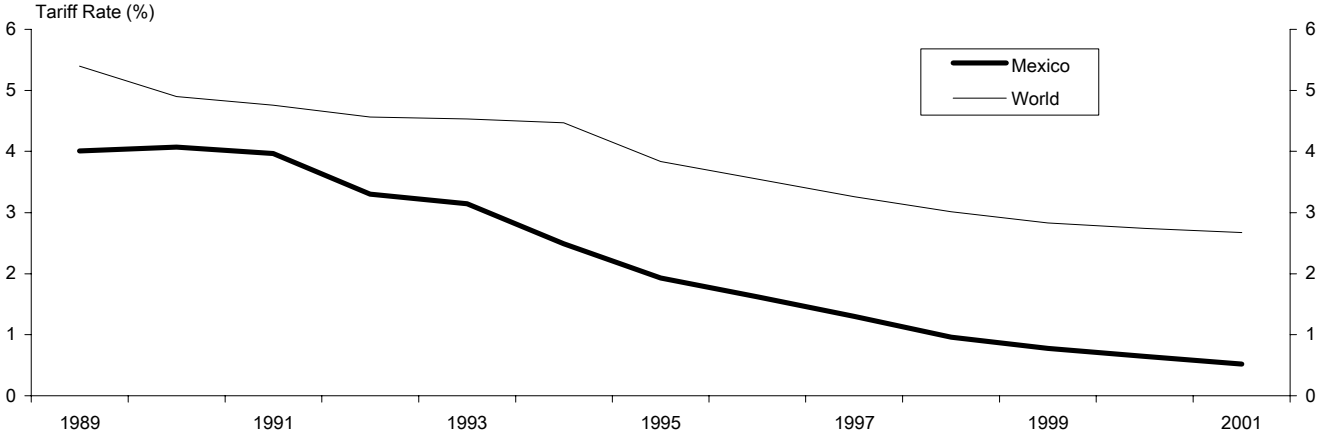


Figure 1c. United States: Share of Imports from Mexico Entering Duty Free

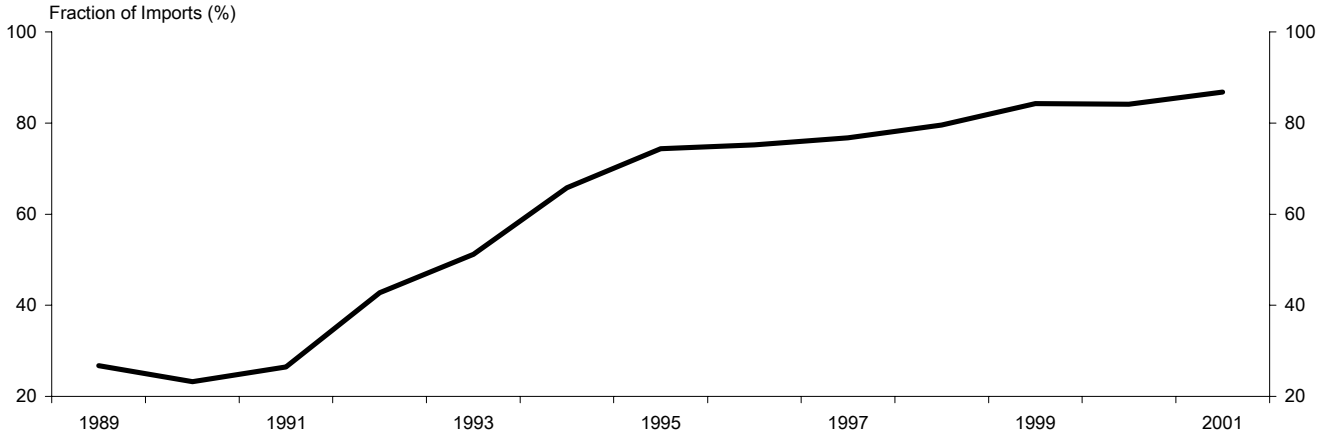


Figure 2a. Response of GDP

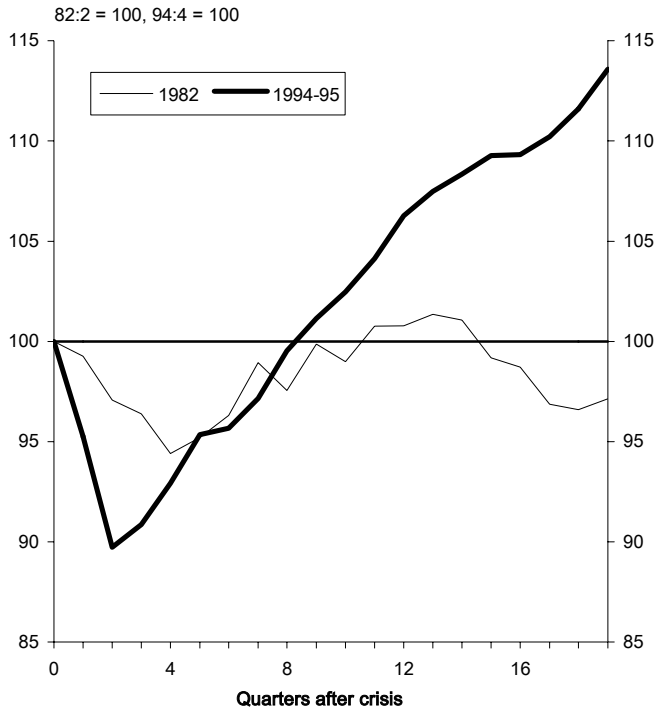


Figure 2b. Response of Investment

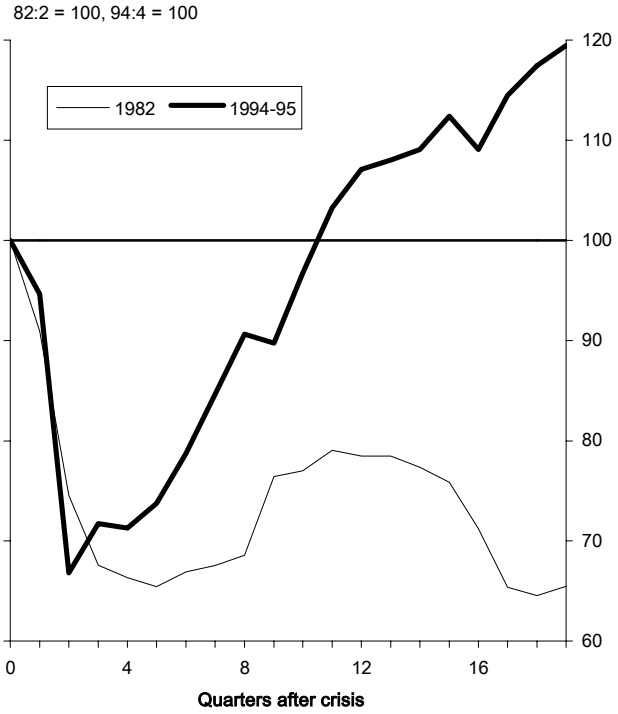


Figure 2c. Response of Exports

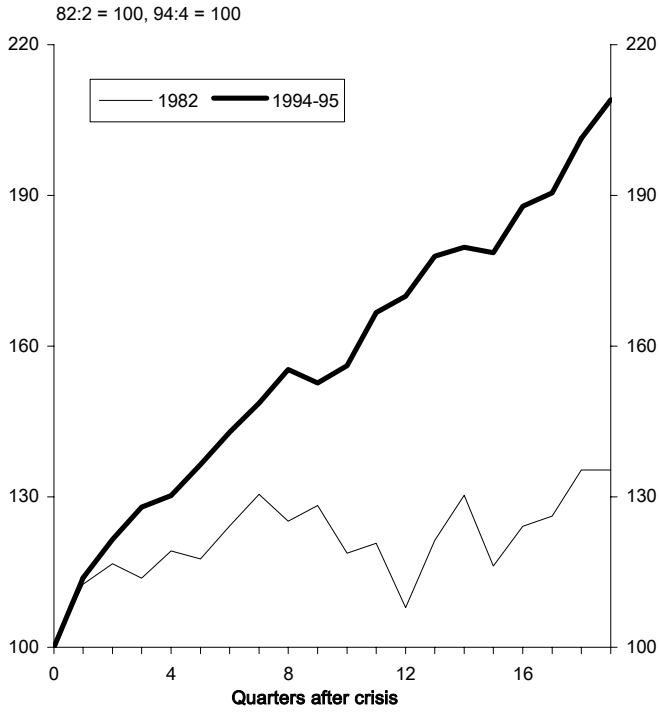


Figure 2d. Response of Imports

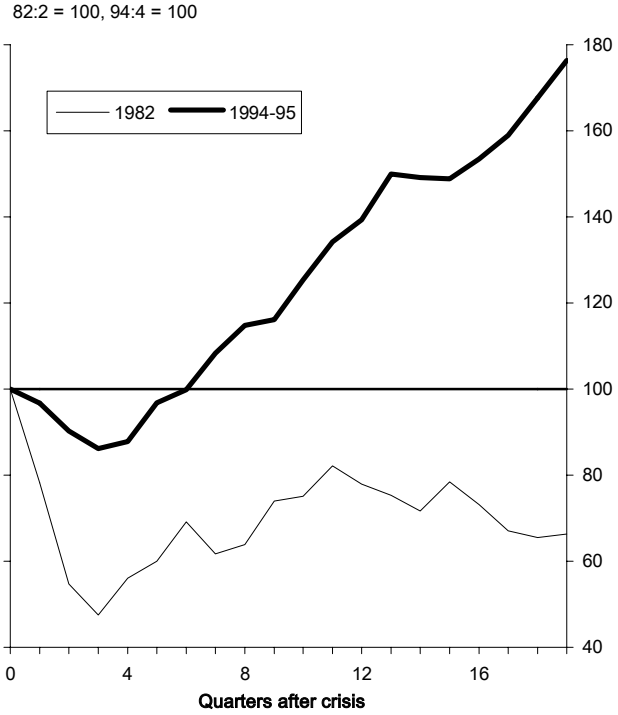


Figure 3. Inflation

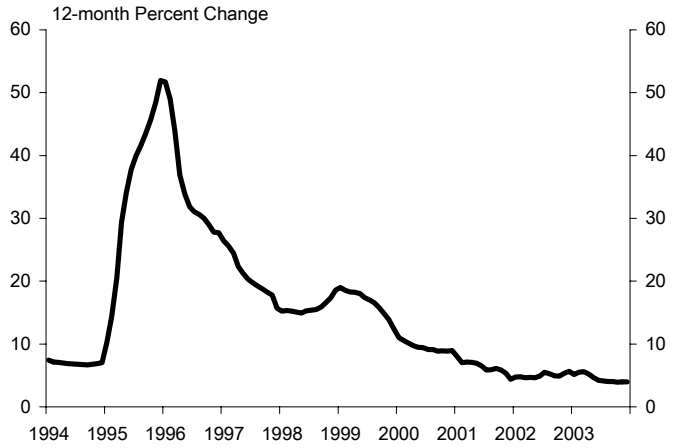


Figure 4a. Trade with NAFTA Partners

Figure 4b. Trade with NAFTA Partners

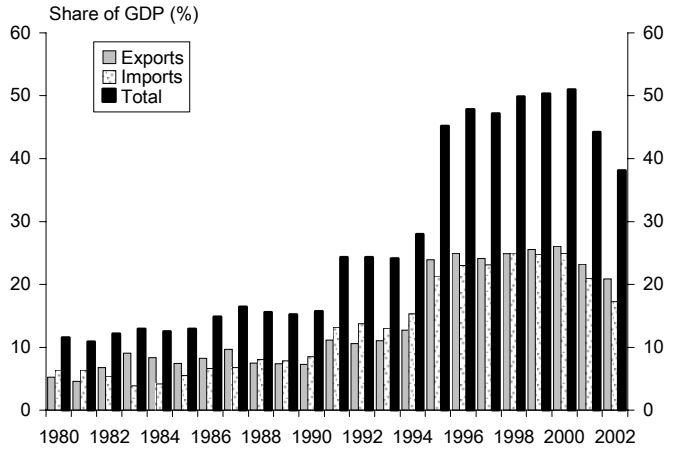


Figure 4c. Trade with NAFTA Partners

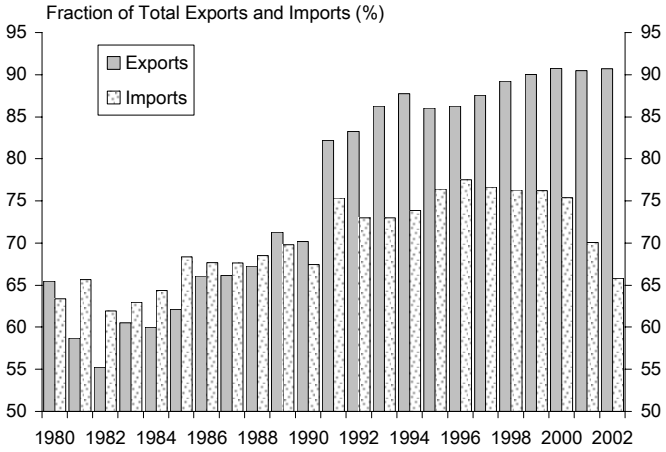


Figure 4d. Growth of Exports

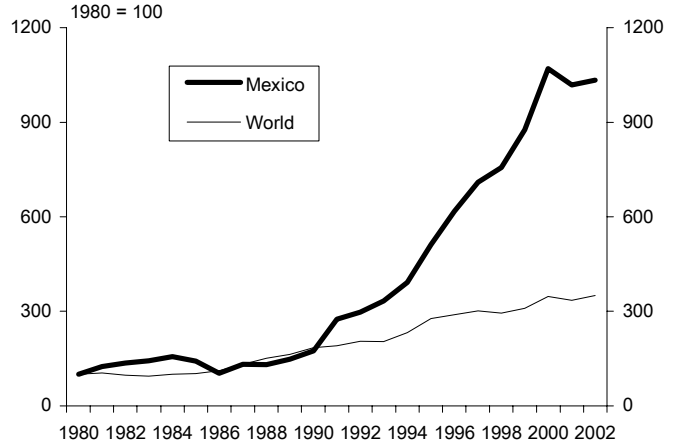


Figure 4e. Trade with Non-NAFTA Partners

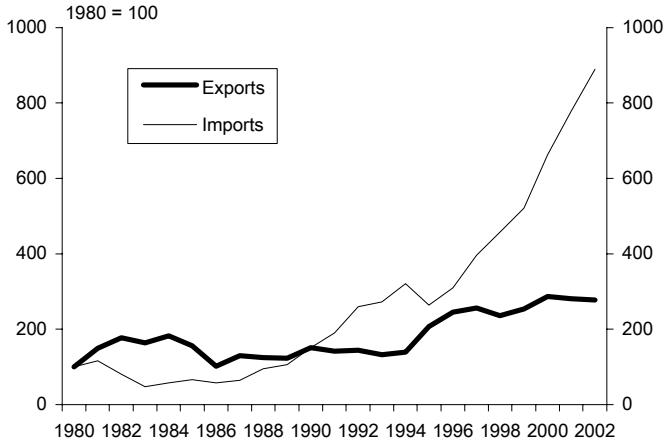


Figure 5a. Diversification of Exports

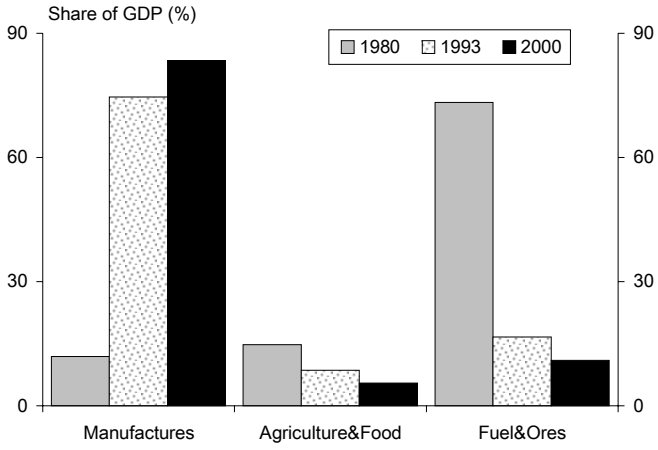


Figure 5b. Maquiladora Exports and Imports

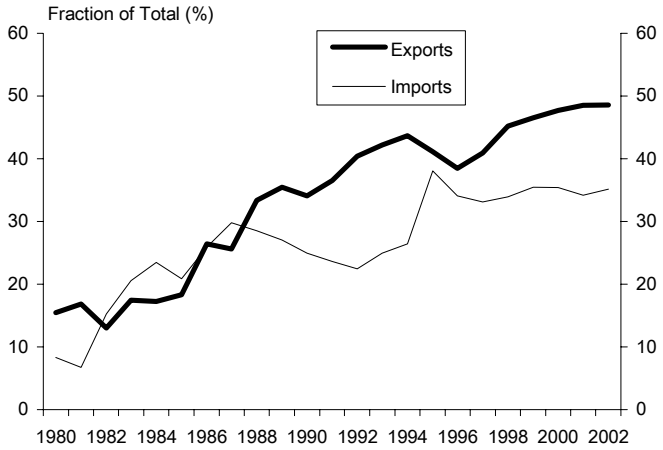


Figure 6a. Gross FDI Flows

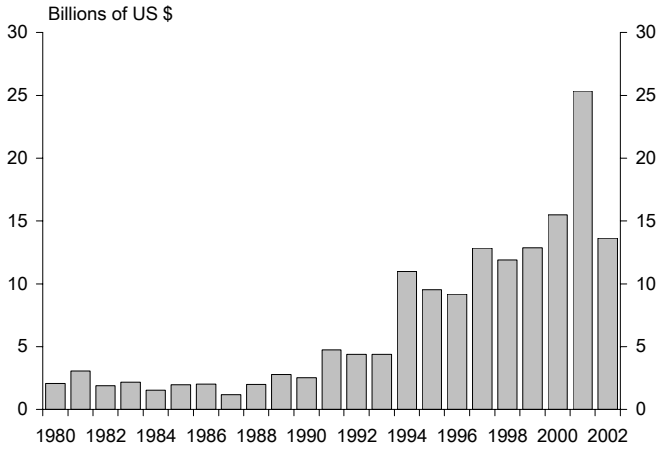


Figure 6b. FDI Flows and Investment

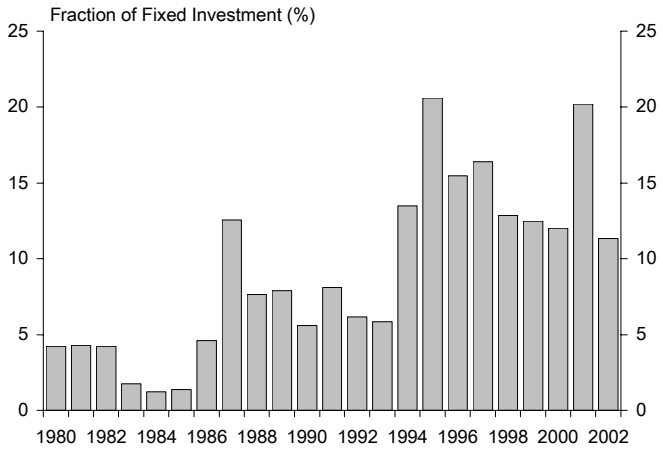


Figure 6c. Net Portfolio Flows

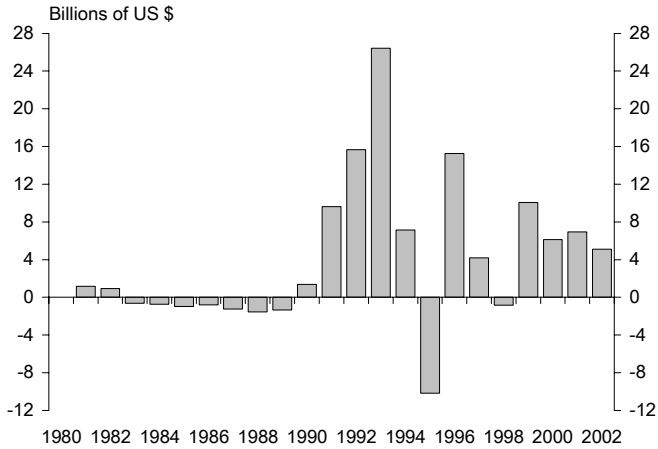


Figure 7a. Volatility of Macroeconomic Aggregates

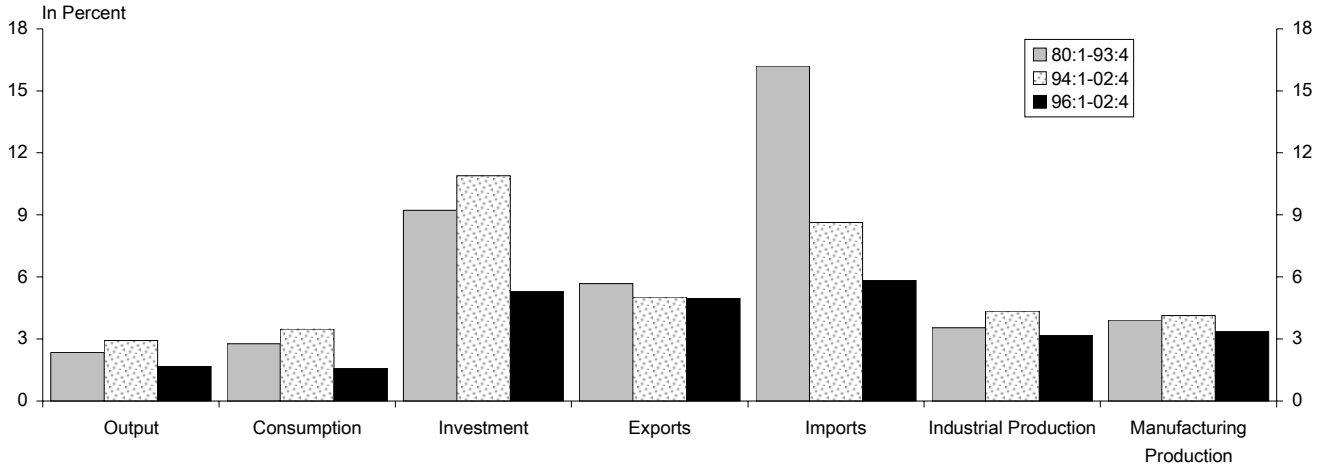


Figure 7b. Evolution of Output Volatility

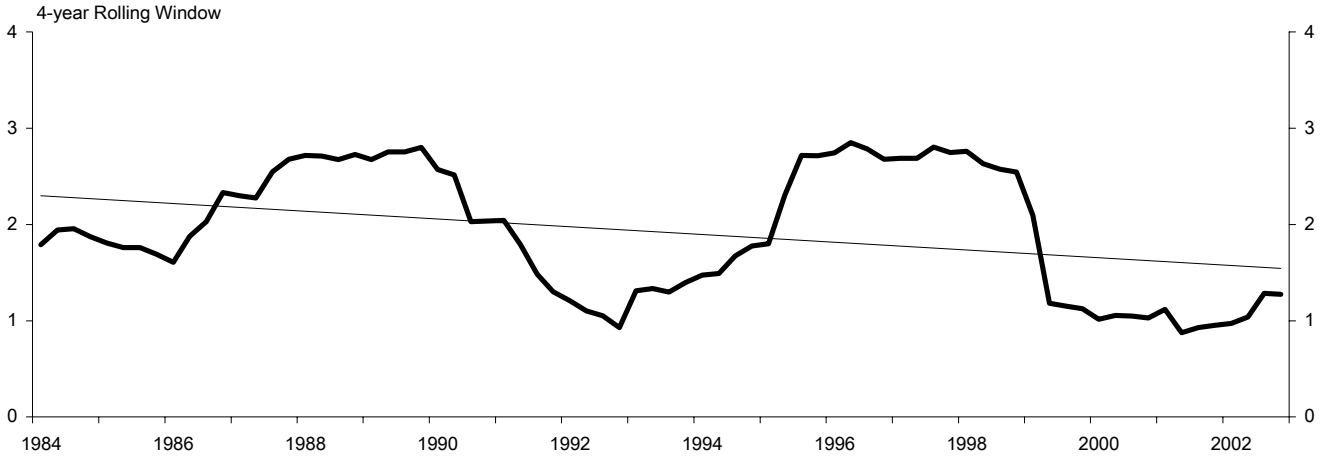


Figure 7c. Volatility of Policy Variables and Prices

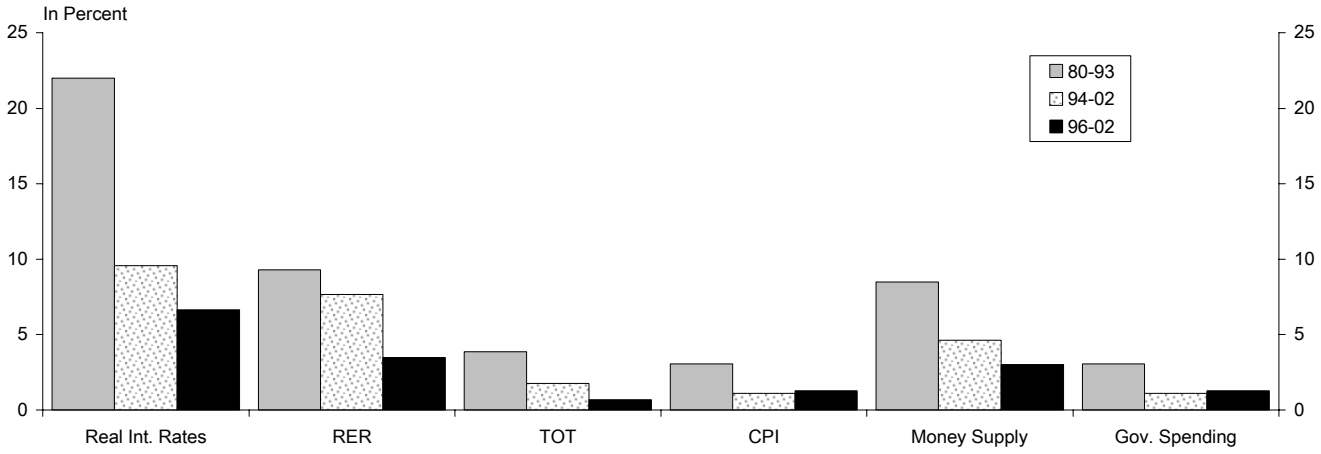


Figure 8a: Comovement of Economic Variables in Mexico and the United States

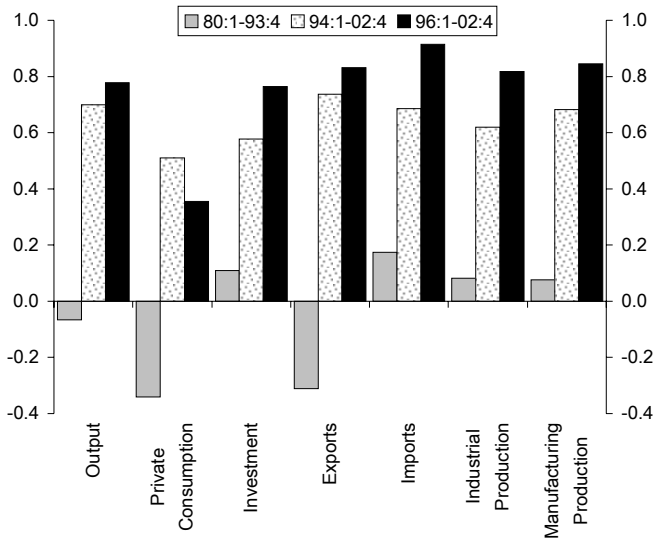


Figure 8b: Comovement of Economic Variables in Mexico and Canada

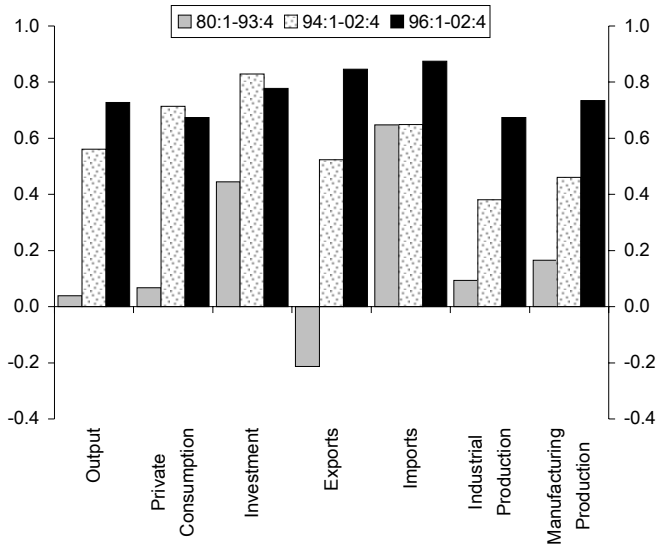


Figure 8c. Regional Factor

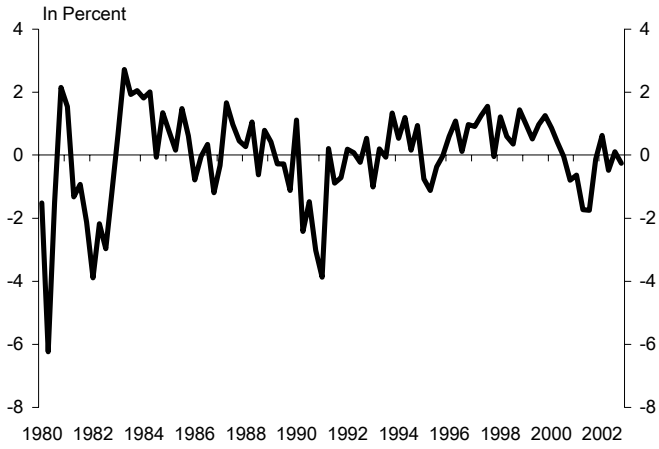


Figure 8d. Output and Country Factor

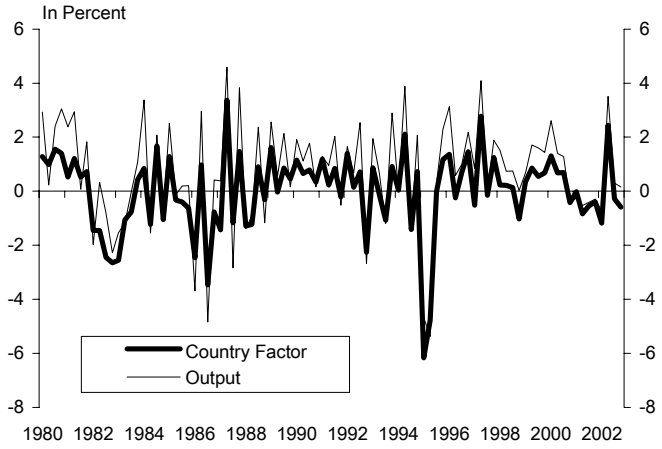


Figure 9a. Variance Explained by the Regional Factor

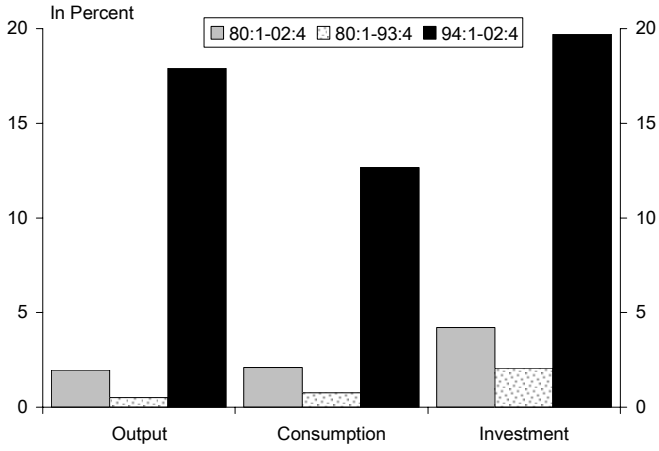


Figure 9b. Variance Explained by the Regional Factor

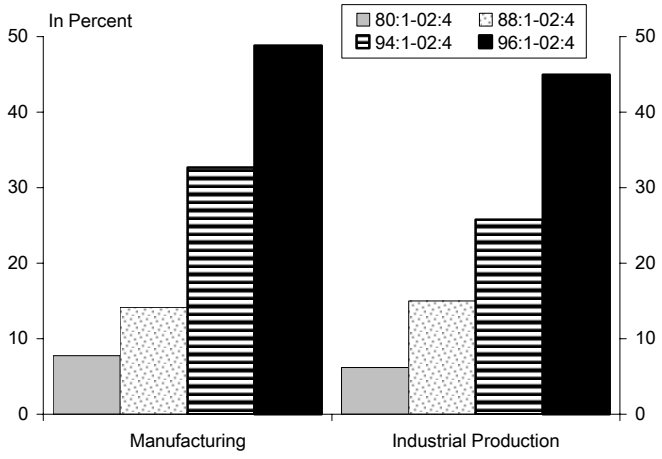


Figure 10a. Impulse Response-Mexico's Exports to US and Canada (1% increase in productivity in US and Canada)

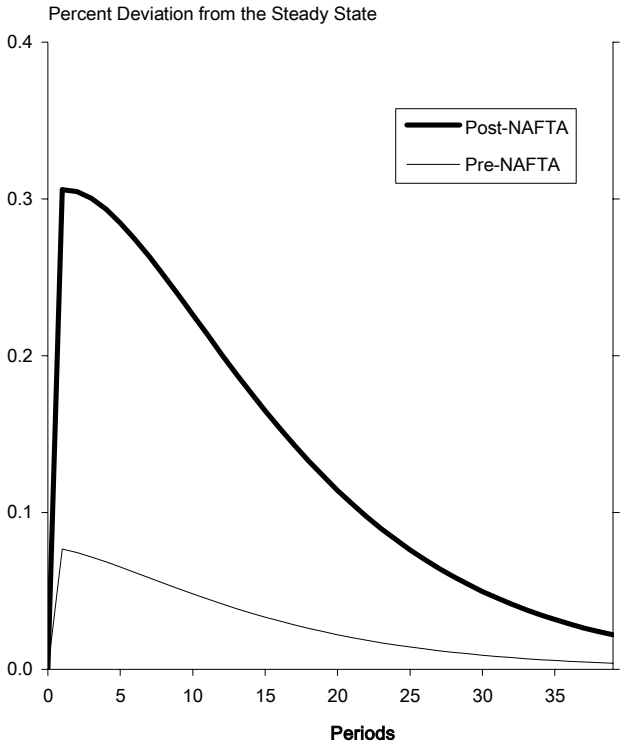


Figure 10b. Impulse Response-Mexican GDP (1% increase in productivity in US and Canada)

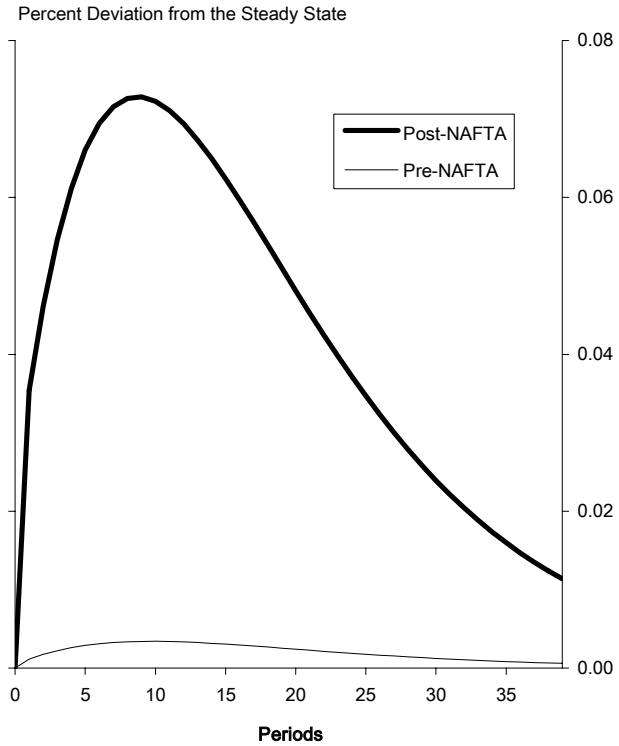


Figure 10c. Impulse Response-Mexican Consumption (1% increase in productivity in US and Canada)

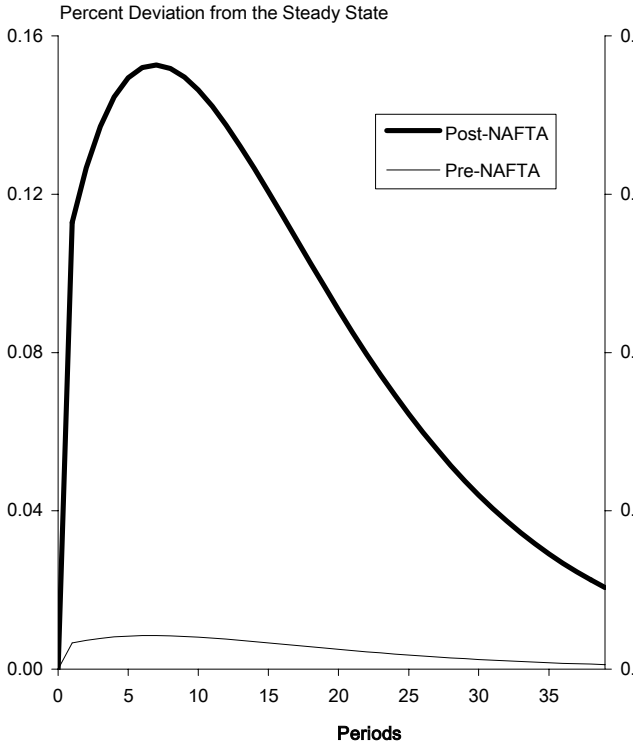


Figure 10d. Impulse Response-Mexican Investment (1% increase in supply shock in US and Canada)

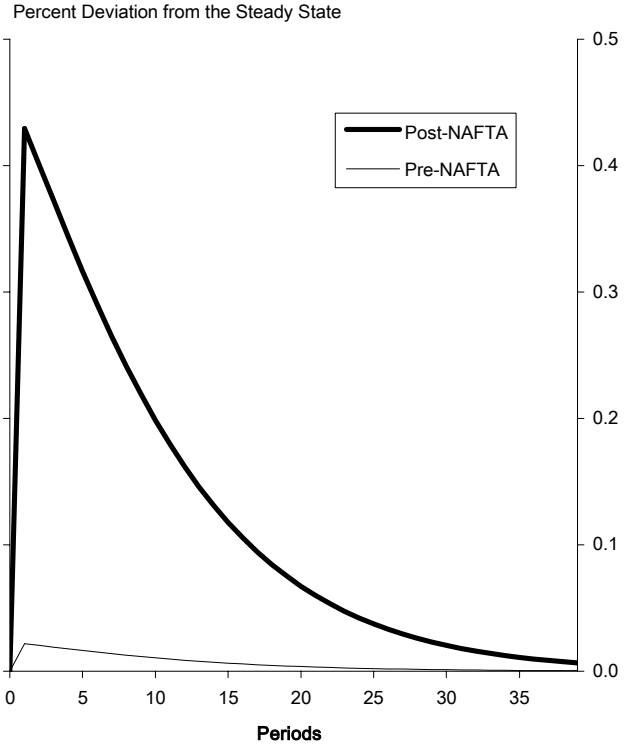


Figure 11a. Average Growth Rate of Macroeconomic Aggregates

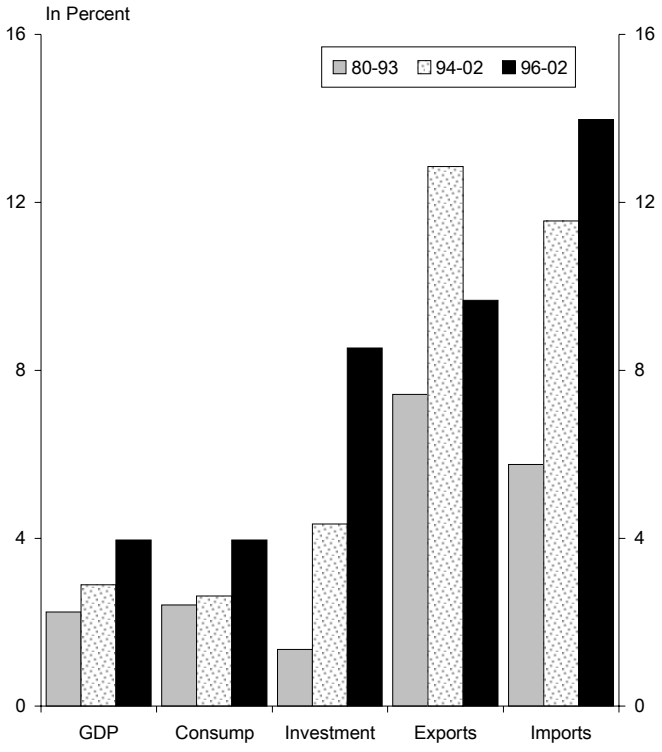


Figure 11b. Contributions to GDP Growth

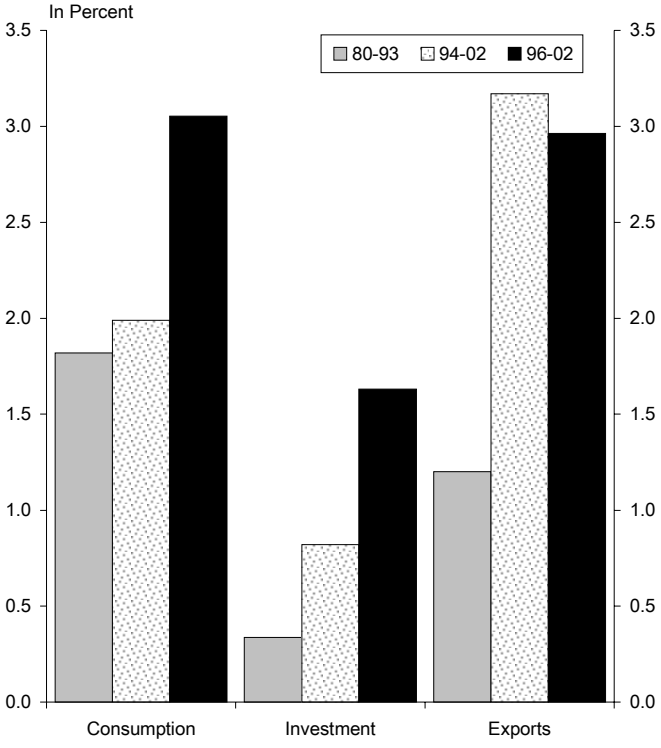


Figure 12a. Real GDP Growth

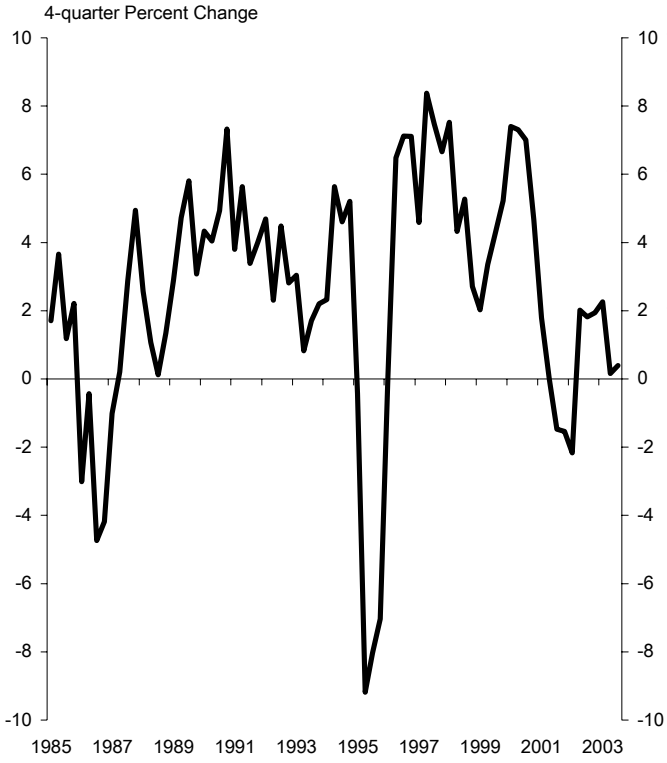
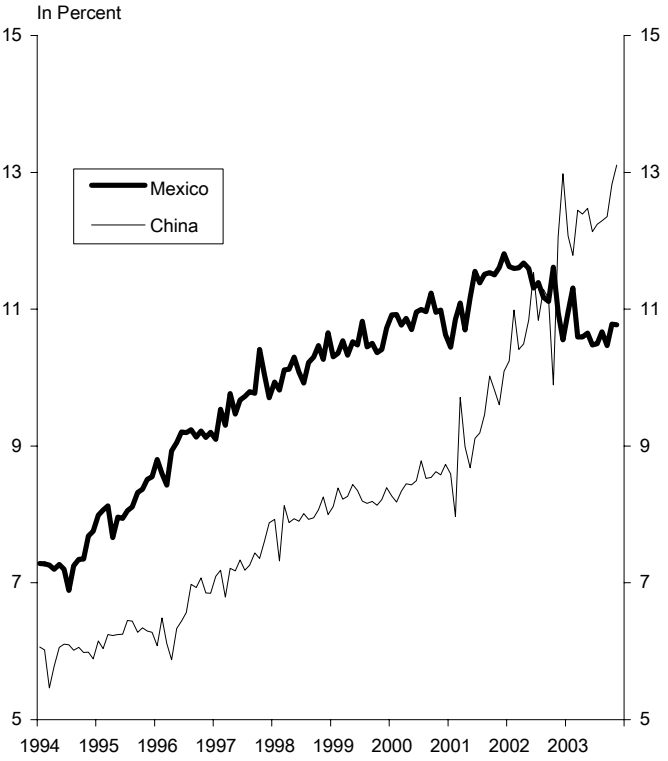


Figure 12b. Export Share in the U.S. Market, 1994 - 2003



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