

Second Draft: April 14, 2000
Comments welcome

NAFTA's Economic Effects on Mexico

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Abstract: Since 1994, the Mexican economy has experienced higher growth than in previous years, coinciding with a significant surge in foreign investment and trade, commonly viewed as resulting from NAFTA. The purpose of this study is to identify the effects of this preferential trade agreement, during its first six years of implementation, on some key economic variables and to determine whether the originally predicted benefits are in fact arising.

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1. Introduction

Six years after the implementation of the North American Free Trade Agreement (NAFTA), it is worthwhile examining the effects of this treaty on the Mexican economy, contrasting them with the benefits originally foreseen. The expected effects include: first, greater economic efficiency through lower production costs and consumer prices, and the removal of trade barriers; second, the enhancement of labor productivity, employment and real wages from the use of comparative advantages; and third, higher economic growth due to trade.

Some economic indicators following NAFTA's implementation in 1994 seem to confirm these predictions. For example, relative to the previous nine-year period, which began with trade liberalization, average foreign direct investment in relation to GDP more than doubled, exports' share of GDP almost doubled, and despite the severe crisis of 1995, average annual economic growth was 0.7% higher.

Notwithstanding these observations, there is no overall assessment of the effects of NAFTA on the Mexican economy. To a large extent, this omission is due to several factors such as the short time that has elapsed since the implementation of NAFTA, the tariff elimination and non-tariff barriers reduction processes still pending, as established by the agreement within a time frame ending by the year 2008, and the adverse effect of the 1995 macroeconomic crisis in Mexico. This paper seeks to fill the gap, presenting a progress report on the effects of NAFTA in light of its expected benefits. Given the aforementioned limitations, our analysis is preliminary by necessity and hence, its conclusions should be interpreted with caution.

The paper is organized as follows. Section 2 characterizes NAFTA within the context of the "outward looking" development model adopted by Mexico since 1985, the year in which trade liberalization began. Section 3 reviews the studies predicting the benefits of NAFTA and those

that have analyzed the actual results. Section 4 looks at the empirical evidence to identify NAFTA's effects on a series of key macroeconomic variables, taking into account the trade opening of 1985 and the liberalization of the capital account of 1989. Some comparisons with other countries are also presented.

Section 5 proposes a simple econometric model to measure the effects of NAFTA on the variables that economic studies suggest would be mainly affected by this agreement: foreign investment, foreign trade, productivity, wages, employment and production. Our model is simple from an econometric standpoint and can be interpreted as the result of a formal exercise of utility maximization. Section 6 applies Ordinary Least Squares to the model of Section 5 to quantify the effects of NAFTA. Finally, Section 7 contains concluding remarks and suggestions for further research.

2. NAFTA in Retrospect

NAFTA represents a deepening of the “outward looking” development model adopted by Mexico since 1985 and, as such, seeks benefits similar to those provided by other measures that comprise this process of structural change. An essential contribution of NAFTA lies in its nature as an international agreement, which makes it difficult to return to protectionist practices.

In 1985, Mexico drastically reduced the number of categories subject to import permits; the following year, it joined the GATT, agreeing to eliminate official prices, and in 1988 it reduced the structure and top tariff levels. In 1989, new rules allowed automatic authorization of the foreign investment flows and introduced flexible arrangements, identified as “neutral investment”, to extend the limits to foreign investment without considering it as such. Four years later, the foreign investment regulations became law, thereby eliminating requirements (for example, zero trade balance), and the authorities’ discretionary power was reduced.

The trade opening and the liberalization of the capital account became the pillars of the new development model. Both reforms sought to reverse the “import substitution” model of the four previous decades, whose limitations included the proliferation of non-competitive industries and a bias in favor of capital-intensive production processes. This protectionism led to the contraction of non-oil exports during 1977-1983, and to a lack of diversity and inferior quality of Mexican products.

NAFTA was signed in December 1992, ratified by the United States Congress in November 1993 after several months of heated debate and political uncertainty, and implemented on January 1, 1994. Its objective is to gradually eliminate barriers on trading of goods and services and investment with the United States and Canada. It is a preferential trade agreement based on

itemized rules of origin, administered by the governments of the three countries. For most goods, tariffs were eliminated almost immediately or in uniform annual stages of five or ten years and only a minimum percentage was extended to fifteen years. Most of the products will reach a zero tariff rate by the year 2003.

NAFTA was broad in scope. In addition to the gradual elimination of tariffs, the treaty contains clauses to abolish most non-trade barriers, open up government purchases, liberalize foreign investment, eliminate barriers for service companies, promote competition within countries, and protect property rights. It also provides three dispute settlement mechanisms.

Perhaps the most complicating aspect in evaluating NAFTA is the macroeconomic crisis that began in December 1994, barely 11 months after the trade agreement was implemented. From December 19, 1994 to the end of 1995 the peso depreciated 123.3%, and in 1995 the economy suffered its worst recession since the 1930s, with GDP contracting 6.2%.

3. Previous Findings

The benefits of trade are widely documented in economic literature. Over 200 years ago, the father of economics, Adam Smith, noted in “The Wealth of Nations” that trade is one of the best means for promoting economic efficiency, since it facilitates the division of labor. Smith wrote that “as long as a country has advantages that another wants, it will always benefit the latter to purchase a product from the former rather than produce it”.¹ Competition generates a greater diversity of higher-quality goods at lower prices. In this manner, the benefits of the trade opening, such as that undertaken by Mexico since 1985, arise regardless of whether the rest of the countries follow suit. The result is specialization, with the economy as a whole and millions of consumers emerging as winners.

Sánchez (1992) describes the expected benefits of NAFTA on the basis of the theoretical arguments of Viner (1960) and Meade (1955). There are two main positive effects. First, increased economic efficiency is expected from three sources: if NAFTA leads to a net creation of trade, if tariff elimination translates into lower prices for the consumer, and if economies of scale are achieved. Second, in a labor abundant county, larger trade and investment will induce a greater utilization of labor, higher labor productivity and, hence, higher real wages.

Blanco (1994) notes that NAFTA’s benefits will not be short term in scope. He points out four mechanisms through which the agreement will generate favorable long-term effects: improved profitability for exports, enlargement of markets, increased efficiency, and capital accumulation and economic growth along the lines developed in Lucas (1988) and Romer (1986).

¹ The Wealth of Nations, p 403.

From an empirical standpoint, Kessel and Samaniego (1992) study the effects of Mexico's trade opening since 1985, on total factor productivity in the manufacturing sector, assuming constant returns to scale. Based on statistical data from the manufacturing divisions, they found a positive correlation between foreign investment and productivity, and a similar link between the trade opening and productivity. According to the authors, these relationships explain an almost three-percentage-point gain in total factor productivity observed from the 1981-85 period to the 1986-89 period.

Sup Kim (1997) analyzes the same problem as Kessel and Samaniego, but distinguishes between technological changes and those stemming from economic efficiency. From a sample of 42 branches of production, he found that, as a result of the trade opening, 72% experienced an increase in technology and 19% an improvement in efficiency.

Katz (1998) describes the regional reallocation of manufacturing production in Mexico as a result of the trade opening, observed particularly since 1988. The central and northern regions of Mexico have increased their share. This reflects the fact that they are making the most of their geographical proximity to the United States. The Federal District (Mexico City and the surrounding suburbs) and the adjacent states have lost some of their share and the large urban areas have become service providers.

Numerous studies have sought to quantify the expected benefits of NAFTA in terms of real income, employment, foreign investment, sectoral and geographic reallocation and the quality of the environment, among others. Most of the studies are based on econometric forecasts and computable general equilibrium models (CGEM).²

For example, Kouparitsas (1997) quantifies the long-term effects of NAFTA, using a CGEM for Mexico, the United States, Canada and the rest of the world. In the simulations projected until the year 2025, Mexico is the country that will benefit the most from NAFTA, the United States will benefit little and Canada and the rest of the world will obtain practically no gain. Specifically, Mexico's steady state GDP increases by 3.6 percent.

As opposed to multiple prospective studies, there are few papers that formally analyze the actual results of NAFTA. Some exceptions are:

On the basis of a bilateral trade model with monthly data from January 1980 to January 1996, Gould (1996) concludes that isolating the effect of the devaluation of the Mexican peso, NAFTA's contribution to the growth of U.S. exports to Mexico was seven percentage points and that of Mexican exports to the United States only two percentage points. He notes, however, that NAFTA helped limit capital flight from Mexico during the economic crisis and encouraged the return of foreign direct investment and economic growth.

Using a "gravity equations" model with quarterly data from 1980 to 1996, Gould (1998) recalculates NAFTA's impact and finds that the contribution to annual growth of U.S. exports to Mexico was 16.3 percentage points and that of U.S. imports coming from Mexico was 16.2 points. He concludes that the change in expectations regarding the sustainability of free trade in Mexico is one of the main benefits of NAFTA, which in turn spurred foreign direct investment in export-oriented industries.

The United States International Trade Commission (USITC 1997) examines the effects of NAFTA on 200 industries in the U.S., based on econometric analysis. Additionally, using

² For a review of different studies until 1992, see Blanco (1994).

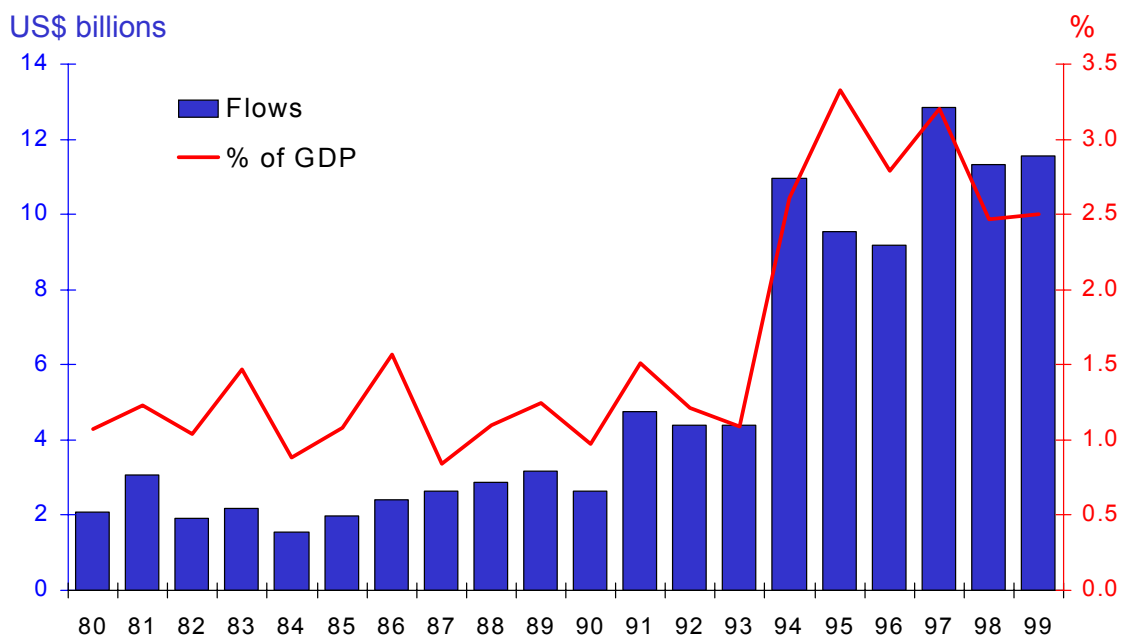
qualitative analysis on 68 industries, it identifies effects not detected by the econometric results. Three years after NAFTA took effect, the Commission finds that the treaty had significant effects on the U.S. trade level with Mexico, but not with Canada. The econometric analysis concludes that exports from the United States to Mexico increased significantly as a result of NAFTA in only 13 industries, and that those from Mexico to the United States did so in 16 industries. The qualitative analysis shows that in only nine sectors did NAFTA have a significant effect on U.S. trade.

Finally, based on annual data from 1980 to 1998, Krueger (1999) examines the issue of NAFTA's possible creation or diversion of trade. She notes that in the Mexican case, other developments, such as the real depreciation of the peso and prior trade liberalization "appear to have dominated whatever effects NAFTA may have had on trade patterns to date". She mentions that exports of those commodity categories to the United States that have grown have been the same as those that grew rapidly with the rest of the world. Krueger concludes that there is more evidence of trade creation than of diversion as a result of NAFTA.

4. The Empirical Evidence

This section analyzes the empirical evidence in order to identify qualitatively the possible effects of NAFTA. The first relevant result is the significant increase in foreign direct investment (FDI) since 1994. As can be seen in graph 1, the average annual investment flows rose from 3.3 billion U.S. dollars during 1985-1993 to 10.9 billion U.S. dollars during 1994-1999. The average ratio of FDI to GDP rose from 1.2% to 2.8% between these two periods. In contrast, the 1985 trade liberalization does not show any clear effect on FDI, as the economy was struggling with the foreign debt problem and, in 1986, oil prices fell dramatically. The opening of the capital account in 1989 and the beginning of NAFTA negotiations in 1991 contribute to explain the increase in nominal FDI during 1991-1993.

Graph 1
Foreign Direct Investment



Source: Banco de México and INEGI

Was the FDI surge due to NAFTA or was it a reflection of a more generalized phenomenon characterizing most emerging economies? The case in point is the increased capital inflows to Latin America in the 1990's, after the resolution of the foreign debt problem. Table 1 compares FDI flows in terms of GDP for the eight largest Latin American economies since 1980. From 1985-1993 to 1994-1998, all countries in the sample enjoyed increases in their FDI ratios. However, Mexico's ratio increased only 1.7 percentage points, an advance smaller than the gains of Peru, Chile, Venezuela and Ecuador, and not much higher than those of the other countries.

Table 1
Foreign Direct Investment / Gross Domestic Product
 (%)

Year	Argentina	Brazil	Chile	Colombia	Ecuador	Mexico	Peru	Venezuela
1980	0.3	0.8	0.8	0.5	0.6	1.1	0.1	0.1
1981	0.5	1.0	1.2	0.7	0.4	1.2	0.5	0.3
1982	0.3	1.1	1.6	0.9	0.3	1.0	0.2	0.4
1983	0.2	0.8	0.7	1.6	0.4	1.5	0.2	0.1
1984	0.2	0.8	0.4	1.5	0.4	0.9	-0.4	0.0
Avg. 80-84	0.3	0.9	0.9	1.1	0.4	1.1	0.1	0.2
1985	1.0	0.6	0.9	2.9	0.4	1.1	0.0	0.1
1986	0.5	0.1	1.8	1.9	0.7	1.6	0.1	0.0
1987	0.0	0.4	4.3	0.9	1.2	0.8	0.1	0.0
1988	0.9	0.8	4.0	0.5	1.5	1.1	0.1	0.1
1989	1.3	0.3	4.7	1.5	1.6	1.2	0.1	0.5
1990	1.3	0.2	2.2	1.2	1.2	1.0	0.1	0.9
1991	1.3	0.3	2.4	1.1	1.4	1.5	0.0	3.6
1992	1.9	0.5	2.2	1.7	1.4	1.2	0.3	1.0
1993	1.2	0.3	2.3	1.9	3.3	1.1	1.6	0.6
Avg. 85-93	1.1	0.4	2.7	1.5	1.4	1.2	0.3	0.8
1994	1.3	0.6	5.1	2.1	3.2	2.6	6.1	1.4
1995	2.0	0.7	4.5	1.2	2.6	3.3	3.4	1.3
1996	2.4	1.4	6.8	3.6	2.6	2.8	5.3	3.1
1997	2.8	2.5	6.9	5.3	3.5	3.2	3.1	6.3
1998	2.1	4.1	6.4	3.0	4.2	2.5	3.1	4.7
Avg. 94-98	2.1	1.9	5.9	3.0	3.2	2.9	4.2	3.3

Source: IMF

Based exclusively on Table 1, it is impossible to single out Mexico from the other Latin American economies, in terms of the growth of FDI since 1994. However, this does not mean that NAFTA did not play a role in the increase of FDI flows to Mexico. A plausible explanation is that, during the last six years, most Latin American countries were undertaking deep processes of structural change that made them attractive for FDI. That was the case of the privatization program in Peru and the opening of the oil industry in Venezuela.

We can conjecture that NAFTA was the main driving force of FDI, as it is, by far, the most important structural change in this country.

Table 2
Gross Foreign Direct Investment by Sector
(Balances in US\$ Millions)

Sector	1980	%	1985	%	1990	%	1995	%	1999*	%
Agriculture	8	0.1	6	0.0	90	0.3	228	0.4	302	0.3
Mining	420	5.0	276	1.9	484	1.6	745	1.2	971	1.1
Industrial	6,560	77.6	11,379	77.8	18,894	62.3	34,317	56.3	55,031	60.1
Retail	755	8.9	1,125	7.7	2,060	6.8	6,186	10.2	9,576	10.5
Services	717	8.5	1,842	12.6	8,782	29.0	19,469	31.9	25,674	28.0
Total	8,459	100.0	14,629	100.0	30,310	100.0	60,945	100.0	91,553	100.0

* Figures as of September, annualized

Source: Secofi

From a sectoral standpoint in Mexico, table 2 shows that both the trade opening and NAFTA could help explain the growing share of the non-industrial sectors in FDI. For example, in 1999 the retail and services sectors absorbed 38.5 percent of FDI, 2.7 and 18.2 percentage points more than in 1990 and 1985, respectively.

Table 3
Gross Foreign Direct Investment by Country of Origin
 (Balances in US\$ Millions)

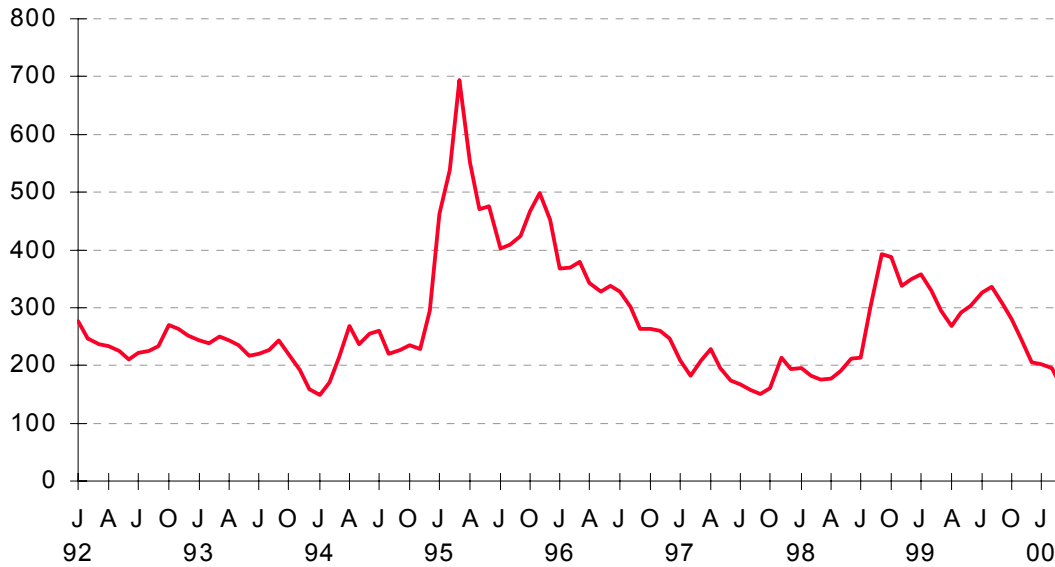
Country	1980	%	1985	%	1990	%	1995	%	1999*	%
United States	5,837	69.0	9,840	67.3	19,080	62.9	36,712	60.2	55,776	60.9
Great Britain	254	3.0	452	3.1	1,914	6.3	3,411	5.6	5,506	6.0
Japan	499	5.9	895	6.1	1,456	4.8	2,476	4.1	4,653	5.1
Germany	677	8.0	1,181	8.1	1,956	6.5	3,090	5.1	3,995	4.4
Netherlands	--	--	--	--	392	1.3	2,167	3.6	3,898	4.3
Canada	127	1.5	230	1.6	417	1.4	1,563	2.6	2,474	2.7
Switzerland	474	5.6	789	5.4	1,347	4.4	2,087	3.4	2,226	2.4
France	102	1.2	248	1.7	946	3.1	1,802	3.0	2,142	2.3
Spain	203	2.4	384	2.6	692	2.3	1,023	1.7	1,727	1.9
Sweden	127	1.5	236	1.6	350	1.2	439	0.7	606	0.7
Italy	25	0.3	35	0.2	53	0.2	80	0.1	152	0.2
Others	135	1.6	340	2.3	1,709	5.6	6,096	10.0	8,399	9.2
Total	8,459	100.0	14,629	100.0	30,310	100.0	60,945	100.0	91,553	100.0

* Figures as of September, annualized

Source: Secofi

Based on a classification by country of origin, table 3 shows that the trade opening and NAFTA have led to some diversification of FDI sources. For example, in 1999 the relative importance of the United States in FDI was 60.9 percent, which implies a 2.0 and 7.3 percentage point reduction relative to 1990 and 1985, respectively. In contrast, countries with a low individual weight, grouped under the category of "others" had a 9.2% share, a 3.6 and 6.9 percentage point gain over the same period.

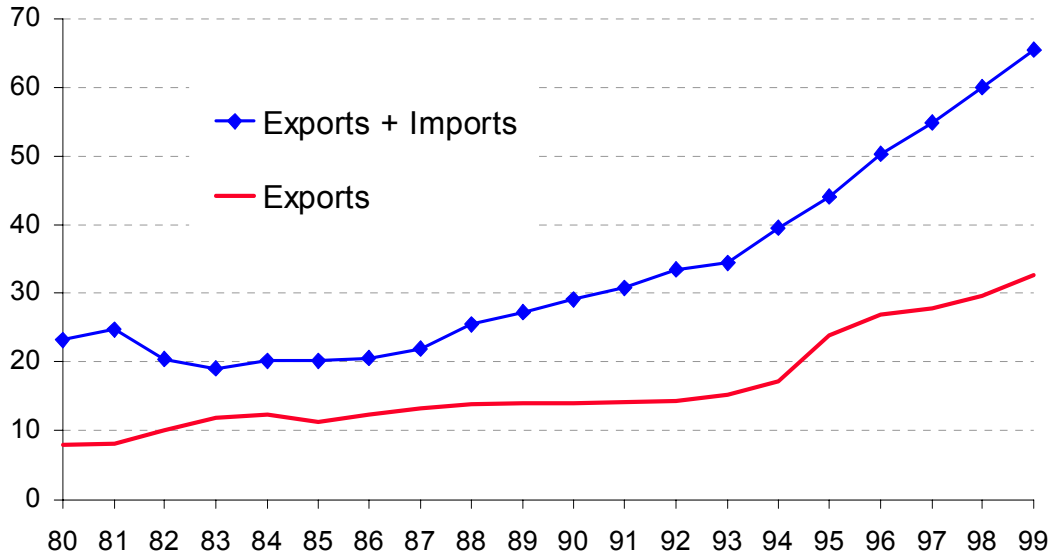
Graph 2
Mexican Brady Par Bonds
 (Stripped spread vs U.S. Treasury bill, basis points)



Source: J.P. Morgan

Did the larger flows of FDI to Mexico result in a lower cost of capital? Graph 2 shows the stripped spreads for Brady par bonds, compared to U.S. Treasury bills. There is no noticeable effect of NAFTA on the cost of capital, as measured by this indicator, except perhaps for a transitory dip during the fourth quarter of 1993 and January 1994. The behavior of the spreads is strongly influenced by the macroeconomic crisis of 1995 and the contagion effect from the Asian and Russian crises from mid 1998 through 1999.

Graph 3
Foreign Trade in Goods and Services
(% of GDP)



Source: Banco de México and INEGI

A second significant effect of NAFTA seems to be the increase in the share of foreign trade in economic activity. Graph 3 shows the performance of both foreign trade in goods and services—defined as the sum of imports and exports—as well as exports, both measured as a percentage of GDP. From 1993 to 1999, foreign trade went from 34.4% to 65.5%, and exports rose from 15.3% to 32.7%.

Table 4
Foreign Trade (Exports+Imports) / GDP
 (%)

Year	Argentina	Brazil	Chile	Colombia	Ecuador	Mexico	Peru	Venezuela
1980	8.3	18.2	36.9	24.8	40.6	20.0	33.7	50.9
1981	10.4	17.3	31.7	21.7	35.0	20.2	28.3	48.6
1982	14.8	14.3	30.2	21.7	32.6	22.4	28.3	44.4
1983	11.5	18.9	33.8	19.2	29.7	25.4	30.0	31.3
1984	10.5	20.5	36.1	21.7	32.2	25.7	26.6	40.3
Avg. 80-84	11.1	17.8	33.7	21.8	34.0	22.7	29.4	43.1
1985	13.5	17.3	40.8	21.0	28.3	24.5	28.3	36.7
1986	10.6	13.5	41.1	25.0	34.1	29.8	20.2	27.2
1987	10.8	14.0	44.9	26.0	38.7	32.9	13.9	41.5
1988	11.1	14.6	49.3	25.1	37.8	32.1	16.6	36.9
1989	17.5	13.6	53.3	26.8	41.2	31.4	14.8	47.7
1990	11.4	11.2	51.0	30.3	41.5	31.3	18.4	50.5
1991	10.3	12.9	47.3	29.2	43.0	29.5	16.4	47.5
1992	11.4	14.4	46.1	30.1	41.0	29.8	18.4	44.8
1993	12.2	14.8	43.6	32.5	38.7	29.1	18.5	43.8
Avg. 85-93	12.1	14.0	46.4	27.3	38.3	30.0	18.4	41.8
1994	14.0	14.2	44.1	29.7	42.9	33.3	20.3	42.1
1995	15.5	13.7	47.0	29.4	47.2	53.1	22.6	40.3
1996	17.0	13.1	46.5	27.8	45.1	56.3	22.6	47.7
1997	18.8	14.1	46.0	24.7	50.2	54.9	23.6	42.3
1998	18.7	14.0	44.1	24.7	47.7	58.5	22.2	34.1
Avg. 94-98	16.8	13.8	45.6	27.3	46.6	51.2	22.3	41.3

Source: IMF

In contrast with the generalized increase in FDI flows to Latin America, table 4 shows the distinctive behavior of the ratio of foreign trade to GDP in Mexico, vis-à-vis other countries. Mexico clearly stands out by its relative increase in foreign trade, a natural result of the elimination of trade barriers. To the extent that NAFTA was partly responsible for the expansion of FDI, it also explains why a large proportion of these flows has been directed to export-oriented industries.

Table 5
Foreign Direct Investment / Foreign Trade (Exports+Imports)
 (%)

Year	Argentina	Brazil	Chile	Colombia	Ecuador	Mexico	Peru	Venezuela
1980	3.9	4.4	2.1	1.9	1.5	5.3	0.4	0.2
1981	4.8	5.6	3.7	3.4	1.2	6.1	1.8	0.6
1982	1.8	7.4	5.5	4.3	0.9	4.6	0.7	0.9
1983	1.5	4.3	2.0	8.3	1.3	5.8	0.7	0.4
1984	2.2	3.9	1.1	7.0	1.2	3.4	-1.7	0.1
Avg. 80-84	2.8	5.1	2.9	5.0	1.2	5.1	0.4	0.4
1985	7.7	3.7	2.1	14.0	1.4	4.4	0.0	0.3
1986	5.1	0.9	4.3	7.7	2.1	5.3	0.4	0.1
1987	-0.2	2.8	9.6	3.4	3.0	2.6	0.5	0.1
1988	8.2	5.8	8.1	2.1	4.1	3.4	0.5	0.4
1989	7.7	2.1	8.7	5.4	4.0	4.0	1.0	1.0
1990	11.4	1.9	4.3	4.1	2.8	3.1	0.7	1.8
1991	12.5	2.1	5.0	3.8	3.2	5.1	-0.1	7.5
1992	16.7	3.7	4.8	5.5	3.4	4.1	1.8	2.3
1993	9.6	2.0	5.3	5.8	8.5	3.7	8.8	1.4
Avg. 85-93	8.7	2.8	5.8	5.7	3.6	4.0	1.5	1.7
1994	9.5	4.0	11.5	7.1	7.5	7.8	30.2	3.3
1995	13.2	5.1	9.6	4.1	5.6	6.3	15.0	3.2
1996	14.1	11.1	14.5	13.0	5.7	5.0	23.4	6.5
1997	14.7	17.4	15.0	21.3	7.0	5.8	13.2	14.8
1998	11.0	29.3	14.4	12.0	8.8	4.2	13.9	13.7
Avg. 94-98	12.5	13.4	13.0	11.5	6.9	5.8	19.1	8.3

Source: IMF

Table 5 shows that the average ratio of FDI to foreign trade in Mexico during 1994-1998 is only slightly higher than the corresponding value of the pre-NAFTA period. This confirms the premise that most FDI has had a foreign-trade orientation. Conversely, the substantial rise in FDI to foreign trade ratios confirms that foreign investment was due to other elements of structural change, such as privatization programs.

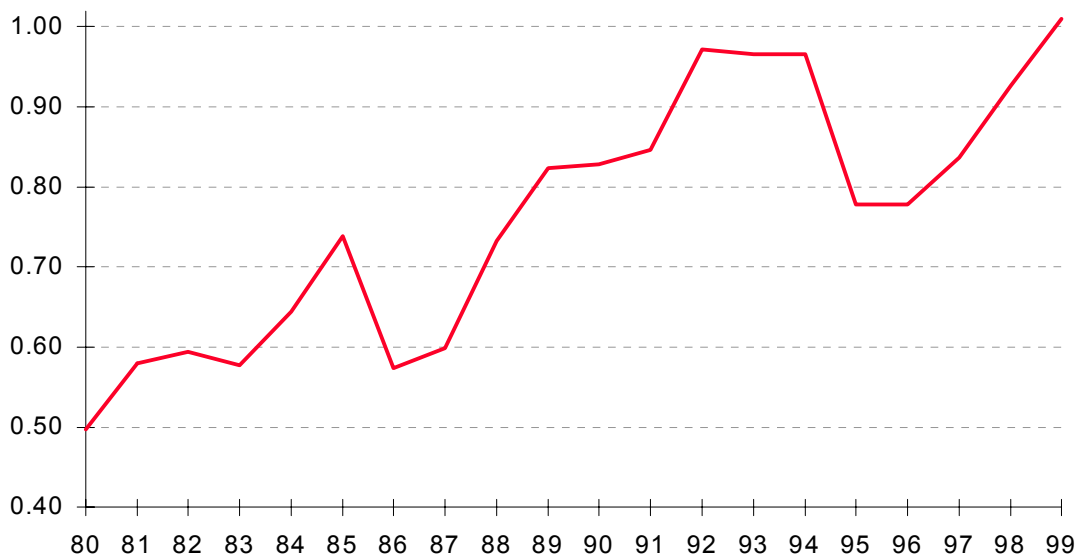
Table 6
Export and Import Growth
 (%)

	RER Index (P/USD)	Exports							Imports					
		Total	Maquila	Oil	Non-maq., non-oil	Agric.	Mining	Manuf.	Total	Consumer	Intermediate	Capital	Maquila	Non-maq., non-oil
1981	78.18	29.26	27.24	39.57	9.04	-2.98	33.83	10.91	28.90	14.70	24.76	46.40	27.56	29.02
1982	115.83	3.21	-11.85	13.07	-14.04	-16.79	-26.97	-10.19	-37.42	-45.99	-34.58	-40.56	-11.43	-39.75
1983	130.84	7.89	28.86	-2.79	32.45	-3.62	4.53	51.83	-30.35	-59.53	-17.77	-51.21	42.98	-39.98
1984	115.31	12.13	34.69	3.65	20.65	22.89	2.94	22.09	34.33	38.17	38.26	17.12	32.81	34.81
Avg. 81-84	110.04	17.30	24.87	16.72	14.42	-1.48	1.69	22.68	-8.95	-29.77	-2.47	-20.77	28.97	-14.32
1985	115.69	-8.05	3.86	-11.05	-9.19	-3.56	-5.34	-11.03	15.35	27.55	12.94	23.01	2.06	19.44
1986	150.07	-18.51	10.85	-57.29	42.82	48.94	-0.12	45.49	-8.58	-21.76	-8.00	-6.66	13.73	-14.45
1987	151.15	26.58	25.84	36.82	20.45	-26.47	13.01	34.56	12.09	-9.30	18.72	-10.95	26.56	7.02
1988	121.90	11.20	42.80	-22.23	16.60	8.25	14.63	18.04	49.27	150.32	43.59	53.07	41.79	52.37
1989	115.35	14.60	21.52	17.35	8.18	5.01	-8.41	9.59	23.80	82.07	19.72	18.42	19.46	25.47
1990	109.67	15.75	12.52	28.28	11.82	23.29	2.01	10.69	19.64	45.73	12.10	42.38	10.65	22.93
1991	100.00	4.86	14.13	-19.17	11.67	9.72	-11.37	12.99	20.13	14.43	19.66	26.48	14.16	22.10
1992	91.46	8.22	17.98	1.72	2.79	-10.84	-34.85	6.14	24.34	32.73	20.49	34.56	18.28	26.21
1993	86.36	12.32	16.99	-10.69	17.73	18.38	-21.88	18.49	5.21	1.27	8.50	-4.33	17.98	1.52
Avg. 85-93	115.74	8.63	19.97	-8.25	16.00	7.45	-7.30	18.86	17.20	28.10	16.06	16.92	19.99	16.38
1994	89.76	17.34	20.21	0.36	20.13	6.96	28.20	21.69	21.39	21.27	21.62	20.49	24.47	20.35
1995	130.00	30.65	18.40	13.13	47.29	49.95	52.76	46.91	-8.69	-43.91	3.38	-34.71	27.91	-21.41
1996	117.89	20.69	18.70	38.36	18.52	-10.55	-17.58	22.37	23.49	24.78	23.05	25.58	16.52	27.42
1997	104.22	15.03	22.33	-2.84	13.74	6.57	6.39	14.41	22.73	40.10	18.75	38.40	19.10	24.61
1998	105.33	6.36	17.53	-36.99	6.12	-0.82	-2.44	6.73	14.18	19.11	13.55	14.64	17.13	12.71
1999	96.61	16.38	20.09	39.05	10.12	9.17	-2.95	10.30	13.31	9.60	12.82	18.47	18.45	10.67
Avg. 94-99	107.30	17.56	19.40	5.91	18.33	9.13	4.87	19.35	12.35	5.06	14.11	9.04	19.76	9.25

Source: Banco de México

Another method of analyzing the impact of NAFTA on Mexico's foreign trade is by looking at the growth rates of exports and imports. Table 6 shows that the rise of the real exchange rate in 1986 and 1995 largely explains the transitory boom of non-oil, non-maquiladora exports and the contraction of imports of this sector in those years. However, excluding 1986 and 1995, average annual growth rates of non-oil, non-maquiladora exports in 1994-1999 surpassed those in the 1985-1993 period by 3.72 percentage points. Furthermore, since 1996 growth of non-oil, non-maquiladora exports and imports has been, on average, 0.06 percent higher and 11.1 percent lower, respectively, than during the 1988-1991 period, despite a stronger real appreciation of the peso in the 1996-1999 period.

Graph 4
Ratio of Maquiladora Exports to Non-maquiladora Non-oil Exports



Source: Banco de México

To complete the picture of foreign trade, graph 4 shows the rising trend of the ratio of maquiladora exports to non-oil, non-maquiladora exports in the last two decades. This ratio may be interpreted as an indicator of the modernization of the export sector, since maquiladoras involve advanced technology transfer. The upward trend is temporarily interrupted in 1986 and 1995, years of high real depreciation of the Mexican peso, and hence, higher non-oil, non-maquiladora exports. However NAFTA does not appear to have influenced this indicator.

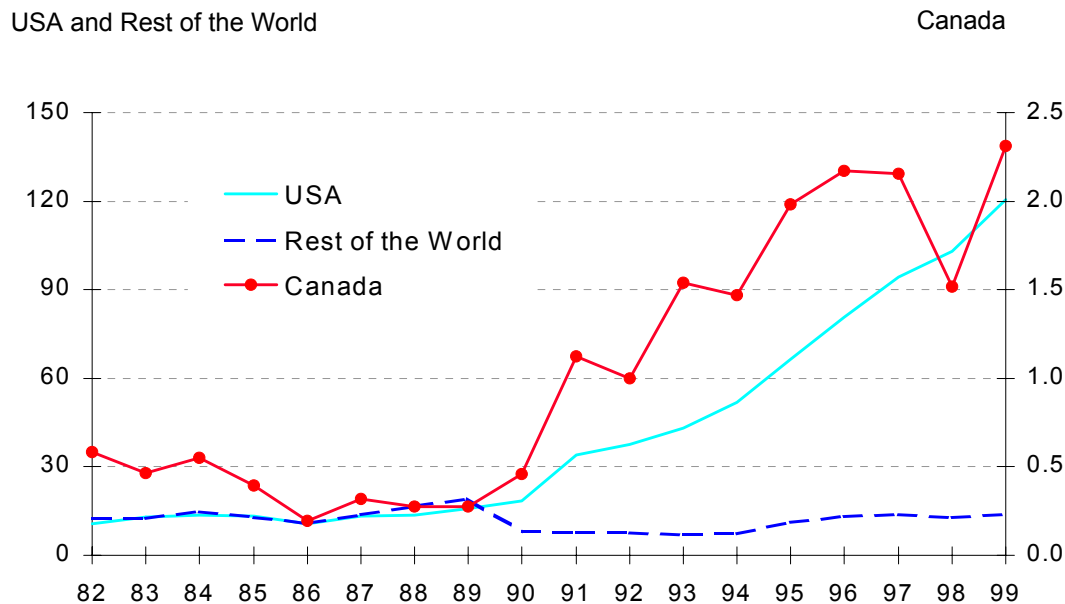
Table 7
Export and Import Breakdown
(%)

	Exports						Imports				
	Maquila	Oil	Non-maq., non-oil	Agric.	Mining	Manuf.	Consumer	Intermediate	Capital	Maquila	Non-maq., non-oil
1980	13.97	57.91	28.12	8.47	2.84	16.81	11.61	63.86	24.53	8.29	91.71
1981	13.75	62.53	23.72	6.36	2.94	14.42	10.33	61.81	27.86	8.20	91.80
1982	11.75	68.50	19.76	5.13	2.08	12.55	8.92	64.61	26.47	11.61	88.39
1983	14.03	61.72	24.25	4.58	2.02	17.66	5.18	76.28	18.54	23.82	76.18
1984	16.85	57.05	26.10	5.02	1.85	19.23	5.33	78.51	16.16	23.55	76.45
Avg. 80-84	14.07	61.54	24.39	5.91	2.35	16.13	8.27	69.01	22.71	15.09	84.91
1985	19.04	55.19	25.78	5.27	1.91	18.60	5.89	76.87	17.24	20.84	79.16
1986	25.89	28.93	45.18	9.62	2.34	33.22	5.04	77.36	17.60	25.93	74.07
1987	25.74	31.27	42.99	5.59	2.09	35.31	4.08	81.94	13.98	29.27	70.73
1988	33.06	21.87	45.08	5.44	2.15	37.48	6.84	78.82	14.34	27.81	72.19
1989	35.05	22.39	42.55	4.99	1.72	35.85	10.06	76.22	13.72	26.83	73.17
1990	34.08	24.82	41.11	5.31	1.52	34.28	12.26	71.42	16.32	24.81	75.19
1991	37.09	19.13	43.78	5.56	1.28	36.94	11.68	71.14	17.19	23.58	76.42
1992	40.44	17.98	41.58	4.58	0.77	36.23	12.46	68.94	18.60	22.43	77.57
1993	42.12	14.30	43.59	4.83	0.54	38.22	12.00	71.09	16.91	25.16	74.84
Avg. 85-93	32.50	26.21	41.29	5.69	1.59	34.01	8.92	74.86	16.21	25.18	74.82
1994	43.15	12.23	44.62	4.40	0.59	39.64	11.99	71.22	16.79	25.79	74.21
1995	39.10	10.59	50.31	5.05	0.69	44.57	7.36	80.63	12.00	36.13	63.87
1996	38.46	12.14	49.40	3.74	0.47	45.19	7.44	80.35	12.21	34.10	65.90
1997	40.90	10.25	48.85	3.47	0.43	44.95	8.49	77.74	13.77	33.09	66.91
1998	45.19	6.07	48.73	3.23	0.40	45.10	8.86	77.32	13.82	33.94	66.06
1999	46.63	7.26	46.11	3.03	0.33	42.75	8.57	76.98	14.45	35.48	64.52
Avg. 94-99	42.24	9.76	48.00	3.82	0.48	43.70	8.79	77.37	13.84	33.09	66.91

Source: Banco de México

As seen in Table 7, NAFTA reinforced the trend toward a greater share of manufacturing exports within the total of non-oil, non-maquiladora exports. These went from an average of 34.0 percent during the 1985-1993 period to 43.7 percent in the 1994-1999 period. On the other hand, the higher share of intermediate good imports since 1994 reflects the growing role of foreign trade in the production processes.

Graph 5
Exports to USA, Canada and Rest of the World
(US\$ Billions)

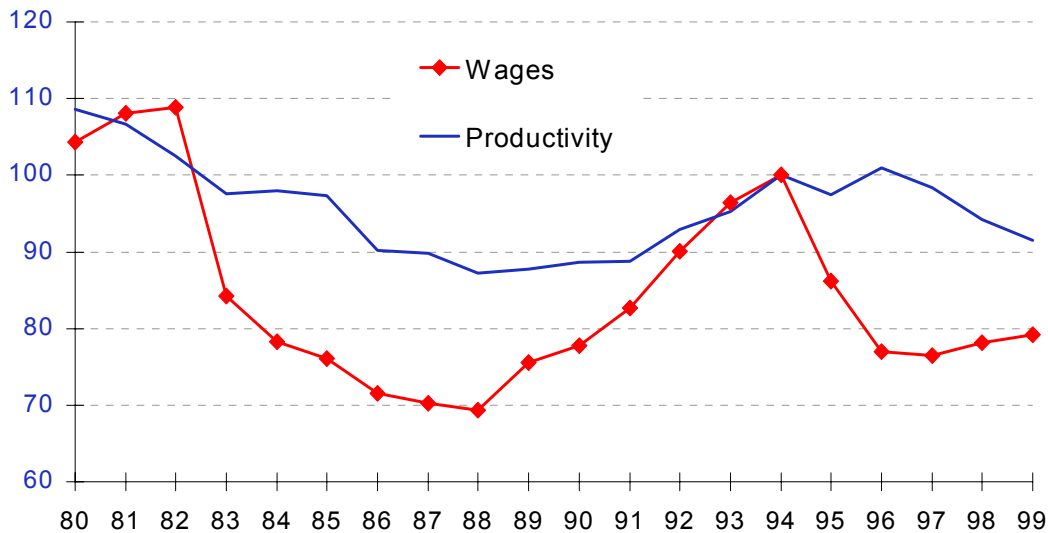


Source: Banco de México

Graph 5 shows that the strong growth in trade flows since NAFTA's implementation dominates any indication of trade diversion, which in any case could have moderately occurred in the three years prior to NAFTA. This illustrates Krueger's conclusion (1999) in the sense that there is more evidence of trade creation than trade diversion from NAFTA.

NAFTA should confirm the benefits obtained in another zero-tariff preferential trade agreement, the one signed between Mexico and the United States in 1966 creating the maquiladora industry. From 1980 to 1999, average annual growth of exports from this sector reached 19.1 percent, 7.2 percentage points above that of total exports. In this same period, employment growth in the maquiladora industry was 718 percentage points higher than overall employment in the economy.

Graph 6
Real Wages and Labor Productivity in the Manufacturing Sector
(1994=100)



Source: Banco de México

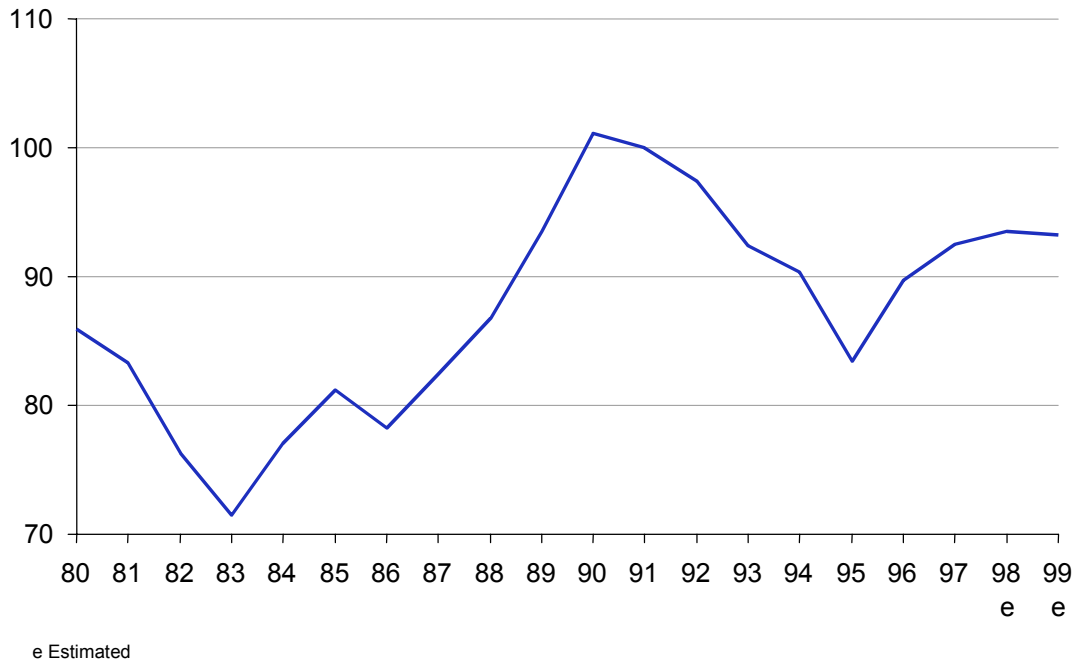
Surprisingly, since NAFTA took effect, no clear increase in labor productivity or in real wages has occurred. Graph 6 shows the performance of these two indicators in the manufacturing industry. After the 1995 crisis, NAFTA seems to have involved a significant absorption of cheap labor, thereby slightly reducing productivity in this sector. Real wages since 1996 have been stagnant at lower levels than in 1995.

However, some information points to the possible indirect benefits of NAFTA on wages and labor through FDI. According to data from the Trade Ministry (SECOFI), from 1994 to 1998, companies with foreign investment generated 31.7 percent of new jobs and wages were 48% higher than those paid by companies without foreign investment.

We estimated the effect of NAFTA on overall productivity based on total factor productivity (TFP), defined as the ratio of output to the sum of inputs. Thus, TFP growth rate is given by the difference between the production growth rate and a weighted average of growth rates of different inputs. To obtain a measure of TFP, we follow Kessel and Samaniego (1992), using constant weights equal to the ratio of inputs to GDP in 1980, instead of relative prices before and after NAFTA. This approach has the benefit of measuring productivity changes rather than relative price changes derived from trade liberalization.

We used labor and capital in the manufacturing sector as inputs, and production in the manufacturing sector as the production variable, to construct each input productivity index, and then used the 1980 weighted share of each input to derive a TFP index. Capital stock data for 1980-1997 comes from Banco de México. For 1998 and 1999, the capital stock data has been estimated according to historic depreciation rates and investment flows for both years, as reported by Banco de México.

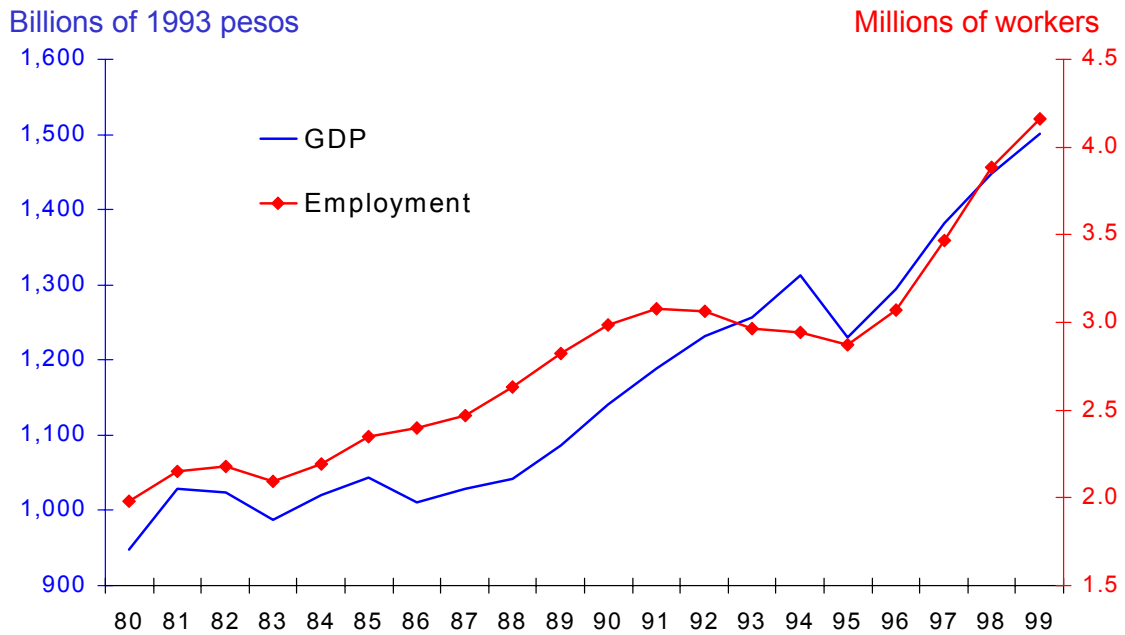
Graph 7
Total Factor Productivity in the Manufacturing Sector
(1991=100)



Source: Banco de México

Graph 7 exhibits TFP in the manufacturing sector of Mexico. TFP does not show a clear effect of NAFTA, partly as a result of the 1995 macroeconomic crisis, and partly because of the excessive use of cheap labor explained above.

Graph 8
GDP and Manufacturing Employment



Source: Banco de México

Finally, graph 8 indicates that since NAFTA's implementation and with the exception of the 1995 crisis, average GDP growth has been higher than in the previous 15 years. In addition, employment has risen considerably since 1996. The rapid economic recovery seems to be explained, in part, by Mexico's integration into world trade, a process to which NAFTA has made a significant contribution.

5. An Econometric Model

This section presents a simple econometric model to measure the effects of NAFTA on six variables suggested by the economic literature and empirical evidence as clearly affected by this treaty: foreign direct investment, exports, wages, productivity, employment, and output. The model is a system of recursive lineal relationships, and is thus exempt from simultaneous equation bias.³ The equations proposed can be interpreted as the result of a theoretical model of utility maximization. GDP in the United States and, for purposes of simplification, the real exchange rate are taken as exogenous. All variables are expressed in growth rates.

Foreign direct investment (I) is a function of its past values, and is expected to respond positively to: labor productivity in the manufacturing sector (Q) in the previous period, wages in constant dollars (W) lagged one period, exports (X) in the previous period, and NAFTA (DN), expressed as a dummy variable that takes the value of one from 1994 onward and of zero otherwise. FDI is expected to depend negatively on the real exchange rate (E) in the previous period:

$$1) I_t = \alpha + \alpha_1 I_{t-1} + \alpha_2 Q_{t-1} + \alpha_3 W_{t-1} + \alpha_4 X_{t-1} + \alpha_5 E_{t-1} + \alpha_6 DN + u_t$$

Exports (X) are a function of their past levels, and are expected to respond positively to U.S. GDP (Y*) expressed in 1996 dollars, foreign direct investment (I), the real exchange rate (E), and a trade liberalization dummy variable (D86) that takes the value of one from 1986 onward and zero otherwise:⁴

$$2) X_t = \alpha + \alpha_1 X_{t-1} + \alpha_2 Y^*_t + \alpha_3 I_t + \alpha_4 E_t + \alpha_5 D86 + u_t$$

³ Recursivity was attained by replacing certain endogenous variables with their lagged values, taken as instruments, while in many cases, lagged values also have a natural interpretation.

Total factor productivity in the manufacturing sector (T) depends on its value in the previous period, and positively on U.S. GDP (Y*), exports (X) in the previous period, foreign direct investment (I) in the previous period, and NAFTA (DN):

$$3) T_t = \alpha + \beta_1 T_{t-1} + \beta_2 Y^*_{t-1} + \beta_3 X_{t-1} + \beta_4 I_{t-1} + \beta_5 DN + u_t$$

Labor productivity in the manufacturing sector (Q) is a function of its past values, and is affected negatively by the real exchange rate (E), and positively by exports (X) in the previous period, total factor productivity (T) lagged one period, and NAFTA (DN):

$$4) Q_t = \alpha + \beta_1 Q_{t-1} + \beta_2 E_t + \beta_3 X_{t-1} + \beta_4 T_{t-1} + \beta_5 DN + u_t$$

Wages paid in the manufacturing sector in constant dollars (W) hold a positive relation with labor productivity in the manufacturing sector (Q), exports (X), total factor productivity (T) and NAFTA (DN):

$$5) W_t = \alpha + \beta_1 Q_t + \beta_2 X_t + \beta_3 T_t + \beta_4 DN + u_t$$

Employment in the manufacturing sector (L) is a function of its past values, and holds a positive relationship with exports (X) in the previous period, U.S. GDP (Y*), and NAFTA (DN), and a negative relationship with the real exchange rate (E):

$$6) L_t = \alpha + \beta_1 L_{t-1} + \beta_2 X_t + \beta_3 E_t + \beta_4 Y^*_t + \beta_5 DN + u_t$$

⁴We are taking 1986 as the beginning of the effective trade liberalization period, as trade opening policies occurred in mid 1985.

Manufacturing output (y) is assumed to be positively determined by labor in the manufacturing sector (L), exports (X), and NAFTA (DN), and negatively determined by the real exchange rate (E):

$$7) \quad y_t = \beta + \alpha_1 L_{t+1} + \alpha_2 X_t + \alpha_3 E_{t+1} + \alpha_4 DN + u_t$$

Finally, GDP (Y) is positively determined by output in the manufacturing sector (y), foreign direct investment (I), exports (X) and U.S. GDP (Y^*), and negatively determined by the real exchange rate (E):

$$8) \quad Y_t = \beta + \alpha_1 y_{t+1} + \alpha_2 I_t + \alpha_3 X_t + \alpha_4 Y^*_{t+1} + \alpha_5 E_t + u_t$$

6. Estimates and Analysis of Results

This section applies Ordinary Least Squares (OLS) to the recursive lineal equation model described in the previous section to measure the effects of NAFTA on: FDI, exports, the following variables in the manufacturing sector: labor productivity, total factor productivity, wages, employment, and output; and GDP. To identify possible differences in NAFTA's impact, we estimated separately the export equation for maquiladora exports and for non-oil, non-maquiladora exports.

In the estimated equation, all variables except dummies are in log first-differences, to adjust for cointegration in the time series.⁵ Data correspond to annual series from 1980 to 1999. Mexican data were taken from the Structural Economic Information System of Banco de México (SINIEE) and INEGI's Economic Information Bank. Data for the United States came from the U.S. Department of Labor (consumer price index) and the U.S. Office of Economic Analysis (GDP).

Exports are expressed in current U.S. dollars. Labor productivity is defined as the ratio of manufacturing output to manufacturing employment. Total factor productivity in the manufacturing sector is derived as presented in section 4. The real exchange rate (RER) is calculated as an index, based on purchasing power parity, using the consumer price indexes (CPI) of Mexico and the United States. Manufacturing wages in constant dollars are obtained using the CPI and wages in pesos by dividing the latter by the RER. Employment corresponds to the number of total jobs in the manufacturing sector. GDP for the U.S. is in 1996 dollars and Mexico's manufacturing output and GDP are in 1993 pesos.

⁵ All series in log levels responded to first-order co-integration using the Augmented Dickey-Fuller (ADF) test. The first difference adjustment was sufficient to remove co-integration at 5% confidence level, except wages at 15%.

In table 8 we present the parameter estimates obtained from the OLS regressions. The numbers in parenthesis below the parameter estimates are the p -statistics, and the last two rows in the chart contain the coefficient of multiple determination adjusted for degrees of freedom, R^2 , and the F-statistic. The low number of observations reduces the statistical efficiency of the parameter estimators and, the results should therefore be viewed with caution.

Foreign Direct Investment

Equation 1 estimates that the effect of NAFTA on the FDI growth rate is 25.4 percent each year, which means that six years after NAFTA took effect, FDI has increased almost fourfold. In addition, for each percentage point increase in lagged labor productivity, FDI growth rate rises by 3.64 percent, which reflects the importance of this variable in decision-making by foreign investors.

Contrary to what was expected, the growth rate of the dollar cost of labor has a positive effect on FDI. This relationship may reflect the fact that as investment flows increase, the peso tends to appreciate in real terms thereby, pushing dollar wages up. However, given that wages in Mexico are substantially lower than those in the United States, we would not expect a marginal increase to have a negative impact on FDI.

Exports

Equations 2a and 2b describe maquiladora and non-oil, non-maquiladora exports, respectively. Given the recursive nature of the model, the effect of NAFTA on exports is transmitted through FDI.

In equation 2a, one percent change in FDI growth rate in the previous period increases the maquiladora export growth rate by 0.11 percent. At the same time, a strong effect of U.S. GDP

can be observed: for every one percent increase in economic growth rate in the United States, the maquiladora export growth rate rises 2.43 percent, which reflects the dependence of exports with respect to the U.S. economy.

The negative sign on the current RER coefficient may be interpreted as reflecting that the higher the cost of imported inputs, the lower the advantage relative to other foreign competitors in the export market.

In equation 2b, FDI has an effect on non-oil, non-maquiladora exports, similar to that of maquiladora exports. The coefficient indicates that for each percentage point increase in FDI growth rate in the previous period, the non-oil, non-maquiladora export growth rate rises 0.12 percent.

The effect of the U.S. GDP growth rate on non-oil, non-maquiladora export growth rate is slightly greater than that of the maquiladora sector: an increase in U.S. GDP implies a 2.83 percent rise in non-oil, non-maquiladora exports, whereas in the case of maquiladoras, the effect was 2.43 percent.

On the other hand, trade liberalization increases the export growth rate of this sector 12 percent each year, where as in the maquiladora case, the parameter estimate is not statistically significant. This reflects the fact that the positive benefits of the maquiladora sector began long before the mid 1980s.

The impact of a one percent increase in the growth rate of manufacturing labor productivity on the non-oil, non-maquiladora export growth rate is 1.25 percent. The effect of RER growth rate in the previous period on non-oil, non-maquiladora exports turned out as expected: a one percent increase in the RER growth rate raises this sector's export growth by 0.59 percent.

Total Factor Productivity

Equation 4 shows that the coefficients of NAFTA and the trade liberalization dummy variable are insignificant, reflecting the disruptive impact of the macroeconomic crisis on output. By introducing a dummy variable for the 1995 macroeconomic crisis, the coefficient of the trade liberalization dummy variable becomes significant and on average, for every year since 1986, trade liberalization has increased the TFP growth rate 2.9 percent.⁶ This result is consistent with similar findings by Kessel and Samaniego (1992).

The effect of FDI on TFP is captured, indirectly, through the maquiladora sector: a one percent increase in the growth of these exports causes a 0.36 percent rise in the TFP growth rate, supporting the argument that the maquiladora sector embraces a higher degree of advanced technology. Similarly, a one percent rise in U.S. GDP growth increases TFP growth by 0.78 percent, confirming the strong ties between both countries and the importance of the export sector on TFP.

Manufacturing Labor Productivity

In equation 3, the effect of NAFTA on labor productivity growth rate is not statistically significant, which can be explained by the substantial absorption of employment derived from depressed wages. The results uncover a negative effect of the RER on productivity: for each one percentage point increase in the RER growth rate, there is a 0.10 percent reduction in labor manufacturing productivity growth. Thus, the possible positive effects of NAFTA on labor

⁶ In the same regression (not presented here), the estimated effect of the 1995 crisis is an 8.9 percent decrease in the TFP growth rate, the actual drop was 8.0 percent.

productivity are offset by the devaluation, and as of 1996, by an increase in employment in the manufacturing sector proportionally greater than that of manufacturing GDP.⁷

Real Manufacturing Wages

Equation 5 reveals a strong relationship between manufacturing wages and the maquiladora sector. Thus, a one percent increase in the growth rate of maquiladora exports spurs a 1.41 percent rise in real manufacturing wages. This is consistent with empirical evidence, since the maquiladora sector pays higher salaries in comparison to the non-maquiladora, non-oil sector. In addition, since NAFTA has not yet implied a clear modernization effect on the export sector, there has not been a positive effect on real wages derived from this trade agreement. The effect of the TFP growth rate on wages is as expected: a one percent increase in this variable raises real wages growth by 1.81 percent.

Manufacturing Employment

Equation 6 estimates that a one percent increase in the U.S. GDP growth rate results in a 0.78 percent change in manufacturing employment growth, while a one percent increase in non-oil, non-maquiladora export growth rate raises manufacturing employment growth by 0.14 percent. As expected, the RER growth rate has a negative impact: an increase of one percent in this variable translates into a reduction of 0.09 percent in the manufacturing employment growth rate.⁸

⁷ In another regression, excluding the NAFTA dummy, we obtained similar results for the rest of the parameters of the equation presented herein.

⁸ NAFTA, FDI and real wages did not turn out statistically different from zero. Hence, they were not included in the final equation.. Their inclusion does not alter the signs or significance of the remaining explanatory variables.

Manufacturing Output

In equation 7, NAFTA has a positive effect on the manufacturing output growth rate: for every year since 1994, a 1.9 percent increase in the latter can be attributed to NAFTA. As expected, the RER has a negative effect, thus a one percent depreciation (increase in the RER) lowers the manufacturing output growth rate by 0.22 percent.

The positive sign on employment and non-oil, non-maquiladora exports coefficients implies that a one percent increase in these variables' growth rates translates into manufacturing production growth hikes of 0.32 and 0.13 percent, respectively. The negative sign on maquiladora exports suggests that this sector and total output move anti-cyclically, and that maquiladora exports tend to be insulated from domestic macroeconomic conditions.⁹

Gross Domestic Product

In equation 8, manufacturing output growth rate has a significant impact on aggregate output. A one percent increase in the manufacturing production growth rate translates into a 0.39 percent increase in the GDP growth rate, while the same variable in the previous two periods has a positive effect of 0.15 percent on the GDP growth rate. It is through manufacturing production and FDI that the model captures the main NAFTA effects on aggregate output. A one percent increase in FDI growth rate increases GDP growth rate by 0.02 percent.

The effect of the U.S. GDP growth rate, although positive, is not significant. One possible reason is that the weak relationship between U.S. and Mexican GDP throughout the 1980s offsets the

⁹ While manufacturing output decreased both in 1986 and 1995 by 5.7 and 5 percent, respectively, maquiladora exports grew 10.3 and 16.9 percent during the same years, respectively.

positive association observed in the 1990s¹⁰. Finally, the real exchange rate has a negative effect on GDP. For each percentage point rise in RER, the GDP growth rate falls by 0.10 percent.

¹⁰ For example, using 1989-1999 as our sample, the coefficients of the (same) regression of GDP on U.S. GDP, FDI and RER growth rates were (t-statistic in parenthesis) 0.890 (2.4666), 0.027 (3.5834) and -0.137 (-5.0246), respectively.

Table 8
OLS Regressions*

Independent	Dependent Variable								
	(1) I	(2a) X m	(2b) X nm,no	(3) T	(4) Q	(5) W	(6) L	(7) y	(8) Y
Intercept	0.2168 (0.2594)	0.0743 (0.0364)	0.0022 (0.9678)	-0.0886 (0.0019)	-0.0098 (0.3238)	0.2150 (0.0099)	-0.0299 (0.0715)	0.0256 (0.0442)	0.0069 (0.4920)
I (-1)	-0.5845 (0.0050)	0.1104 (0.0719)	0.1188 (0.0847)						
Q (-1)	3.6362 (0.0940)		1.2540 (0.0925)		0.5342 (0.0184)				
W (-1)	0.8135 (0.0542)								
Xm (-1)	-4.0875 (0.0042)			0.3640 (0.0022)					
X nm,no (-1)	2.1365 (0.0137)		-0.4281 (0.0202)		0.1020 (0.0696)		0.1431 (0.0048)	0.1314 (0.0021)	
E (-1)	-1.1528 (0.1284)	0.2363 (0.0300)	0.5878 (0.0011)	0.2463 (0.0047)					
DN	0.2535 (0.1173)			-0.0160 (0.3771)	-0.0170 (0.2305)	-0.2453 (0.0046)		0.0190 (0.0636)	
D86			0.1196 (0.0335)	0.0124 (0.5615)					
E		-0.2996 (0.0168)		-0.1041 (0.0847)	-0.1013 (0.0244)		-0.0925 (0.0188)	-0.2170 (0.0001)	-0.1064 (0.0045)
Y *		2.4319 (0.0183)	2.8315 (0.0249)	0.7821 (0.1174)			0.7816 (0.0305)		0.2650 (0.2494)
I		0.0749 (0.1579)							0.0174 (0.0595)
L (-1)							0.9215 (0.0000)		
Q						-1.7142 (0.1323)			
T (-1)				0.4200 (0.0059)	-0.2990 (0.0250)				
X m						1.4113 (0.0086)		-0.1855 (0.0035)	-0.0709 (0.1636)
X nm,no						-0.5596 (0.1286)			
L (-2)							-0.3590 (0.0138)		
T						1.8147 (0.0248)			
L								0.3236 (0.0152)	
y									0.3911 (0.0005)
y (-2)									0.1568 (0.0073)
R2	0.59	0.67	0.64	0.75	0.50	0.69	0.87	0.91	0.93
F	4.52	7.97	6.13	8.44	4.38	9.15	21.84	34.30	34.13

* OLS corrected for heterocedasticity using White's transformation and for serial correlation in errors if applicable. Numbers in parenthesis indicate the probability of type I error.

7. Conclusions

This paper analyzed the effects of NAFTA on key economic variables suggested by the theory and predictive studies: foreign investment, foreign trade, productivity, wages, employment, and output. The assessment is based on data available for the first six years of NAFTA and, therefore, the results should be interpreted as preliminary.

The qualitative analysis concludes that the main effects of NAFTA have been the substantial increase in FDI and the increasingly greater role of foreign trade in economic activity. With respect to the former, the greater certainty in the permanence of the trade opening stemming from NAFTA, has spilled over into the participation of FDI from countries other than the United States and Canada, as well as investment earmarked for sectors other than manufacturing. In terms of the importance of foreign trade in economic activity, the rise in non-oil, non-maquiladora exports, explained in part by NAFTA, contributed to the rapid economic recovery of 1996.

The econometric analysis confirms the conclusions from the qualitative analysis. Measuring the direct effect of NAFTA on certain variables such as exports, wages or GDP can result in insignificant estimators. These findings may be explained by the fact that it is still early days of NAFTA. They are also consistent with previous studies (Krueger, 1999) in the sense that trade liberalization during the mid-1980s, and RER variations, seem to have dominated the expected NAFTA effects on the Mexican economy. Nevertheless, our results show that NAFTA may have had significant indirect effects on exports, employment and output.

We estimated that NAFTA has led to a 25 percent annual rise in FDI growth rate. In turn, for each percentage point rise in FDI growth rate, there has been a 0.11 and 0.12 percent increase in the maquiladora and the non-oil, non-maquiladora export growth rate, respectively.

The effect of NAFTA on labor productivity and total factor productivity in the manufacturing sector was not statistically different from zero. This was explained, in part, by the absorption of cheap labor derived from the real depreciation of the peso with respect to the dollar, low investment rates during the 80s, and the obsolescence of existing capital in the face of trade opening.

According to our estimates, NAFTA tends to boost the manufacturing production growth rate by 1.9 percent each year, and FDI has a small but significant impact on GDP growth rate.

Therefore, our findings support Gould (1998) in the sense that if NAFTA had not been signed, it is likely that the levels of FDI observed since 1994 would have been lower, the non-oil, non-maquiladora export sector less dynamic, and the 1995 employment and GDP contraction, substantially more severe.

In summary, the quantitative and qualitative analyses confirm the occurrence of various positive effects of NAFTA that were originally foreseen. Specifically, we cannot reject the hypothesis that NAFTA has significantly contributed to expanding FDI, trade, employment and output. However, as a result of the 1995 macroeconomic crisis, we only found weak evidence of higher overall efficiency, labor productivity or real wages resulting from NAFTA.

Finally, the preliminary nature of this study requires that future research take off in various directions, with particular emphasis on expanding the number of observations, further comparisons with other countries, and on effecting a breakdown by sectors and regions.

8. References

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