Sustainable Industrial Development? The Performance of Mexico's FDI-led Integration Strategy

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List of Acronyms

FDI	Foreign Direct Investment
FTAA	Free Trade of the Americas Agreement
IMF	International Monetary Fund
INEGI	Instituto Nacional de Estadistica Geographia e Informatica
NAFTA	North American Free Trade Agreement
OECD	Organisation for Economic Cooperation and Development
PROFEPA	Procuradia Federal de Proteccion al Ambiente
SMEs	Small and Medium Size Enterprises
SOEs	State Owned Enterprises
TRIMS	Trade Related Investment Measures
TRIPS	Trade Related Intellectual Property Rights
WTO	World Trade Organization

I. Introduction

For more than a decade, the centerpiece of Mexico's global integration strategy for economic development has been to increase foreign direct investment (FDI) and exports in its manufacturing sector. Mexican macro-economic and industry policies were tailored to create a climate conducive to foreign investment, including constraining inflation through high interest rates and keeping wage growth in check. The anti-inflation policy also generated an overvalued exchange rate, which made imports of productive inputs cheap.

The hope was that FDI would increase the competitiveness of the manufacturing sector, which would in turn stimulate growth and industrial restructuring in the Mexican economy as a whole. Moreover, through the transfer of foreign technology and management skills, FDI-led growth would improve industry environmental standards. Closing a virtuous circle, sustainable growth was to remedy the severe income disparities that plague Mexico, both by providing jobs in manufacturing and by stemming the flow of poor migrants from rural to urban areas and across the border.

This report examines the performance of FDI in manufacturing between 1994 and 2002 against both the narrower goal of increasing exports and the larger, domestic-linkage goals of promoting sustainable industrial development.

We define sustainable industrial development in terms of three parameters: 1) growth of endogenous productive capacities, especially the capacity for innovation; 2) improvement in the environmental performance of industry; and 3) improvements in living standards and a reduction of inequality, especially via growth in the quantity and remuneration of jobs in the manufacturing sector. We also examine trends in internal and cross-border migration.

The report has two central findings. First, the integration strategy achieved many of its goals, including increasing FDI inflows, productivity and manufactured exports. However, the large growth of the manufacturing sector has generated a persistent—and growing—trade deficit. Exports grew fast but imports grew faster. Unbalanced import-dependence and the trade deficit it generates suggest that the integration strategy as currently constituted may not be financially or economically sustainable in the long term.

Second, FDI-led integration with the regional and global economy has done little to promote sustainable industrial development in Mexico. Domestic growth and investment were stagnant and, except for a few "bright spots," hoped-for spillovers, industrial restructuring, job growth, and environmental improvements did not materialize. Relying heavily on cheap labor and imports for productive inputs, the foreign manufacturing sector remains largely disconnected from the domestic Mexican economy.

The paper is structured as follows. Section II examines the goals and promises of the FDI-led liberalization and integration strategy. It first sketches the "pendulum swing" towards *Apertura* and away from the emphasis on import-substitution that preceded it. It

then outlines the central policy framework for integration, especially in relation to foreign direct investment. Finally, it describes the "promise of FDI" in terms of economic theory and examines the empirical evidence as to whether and when the promise is fulfilled.

Section III examines the performance of the integration strategy against two broad economic goals: first, FDI inflows and growth of manufacturing exports; and second; domestic investment, economic growth and industrial restructuring.

Section IV examines the performance of the integration strategy against the goals of sustainable industrial development, including backward linkages and the capacity for innovation, the environmental impacts of the manufacturing sector, and the impacts of manufacturing growth on employment, wages, inequality and migration.

Section V concludes by summing up the report's four central findings:

- The FDI-dependent, export-oriented manufacturing model of development in Mexico is vulnerable to financial instability and loss of competitiveness.
- The integration strategy has generated a form of development in which the domestic economy is largely cut off from growth in the export sector.
- Environmental performance has worsened because of scale effects and the inadequacy of Mexican government commitment to environmental regulation.
- The strategy performed very poorly in terms of job growth and exacerbated, rather than reduced, wage inequality.

II. FDI-Led Liberalization: Goals and Promises

A. Historical Context: From ISI to Apertura

Mexico has often swung like a pendulum in response to economic crises. The first swing, toward import substituting industrialization (ISI), followed the Great Depression and World War II. By 1980, Mexico was the flagship of ISI policies in Spanish America. In the early 1980s, Mexico began a swing in the other direction, towards economic openness and integration. By the turn of the century Mexico had joined GATT, NAFTA and the OECD and was a strong advocate for global trade liberalization at the WTO.

When World War II came to an end, the gap in per capita income between North and South became an area of grave concern in the developing world. In response, the priority for developing countries became raising the incomes of their populations. Rather than relying on foreign capital and global markets by liberalizing their trade and investment regimes, many developing countries, including Mexico, chose to chart a path toward development that promoted industrial self-sufficiency and growth in domestic markets. ISI performed remarkably well in Mexico and other Latin American countries for over three decades.

By 1950, ISI had already become commonplace in Latin America, but the work of two economists in that year became the classic ISI doctrine. Raul Prebisch and Hans Singer observed that Latin American countries had been unable to profit from international trade because the terms of trade did not favor the agricultural and mineral products that were relatively more abundant in the region. It was thus perceived that Latin America and other developing regions would be locked in poverty. The Prebisch-Singer hypothesis, as it became known, defined terms of trade as the dollar price of Latin American exports divided by the dollar price of Latin American imports. According to this hypothesis, deteriorating terms in trade were due to three factors (Cardoso and Helwege 1993; Bruton 1998):

- The demand for industrial goods expands more rapidly than the demand for primary goods, due to the fact that industrial goods are more income elastic. In addition, a 3 percent increase in world income does not raise the demand for corn by 3 percent (Engel's law).
- Products from the industrialized countries have more value-added because their exports are often a result of technology and innovation. Indeed, in some cases this translated into synthetic substitutes for primary commodities.
- The structure of labor markets favored industrialized countries. In developed countries, productivity growth stemmed from technological change driven by rising wages and prices generated by monopoly power in firms and labor. Developing countries had lower productivity growth as a result of surplus labor, weak unions, and competition among exporters.

Many economists argued that developing economies should re-structure industry away from agricultural and extractive sectors for export to manufacturing for both domestic

and export markets. Mexico was no exception. In Mexico and elsewhere, the tools of ISI focused on a number of key policies, including the reliance of major public outlays for infrastructure, planning, tariffs, import licensing, quotas, exchange rate controls, wage controls, and direct government investment in key sectors (Cardoso and Helwege, 1993; Bruton, 1998). From the beginning of World War II until the early 1970s, this strategy performed well in Mexico. Indeed, this period is often referred to as Mexico's "Golden Age." During this time the economy grew at an annual rate of over 6 percent, or over 3 percent in per capita terms. The engine of growth was the development of a strong manufacturing sector.

Manufacturing growth in Mexico was a function of a developmental state. Mexico industrialized through building public infrastructure, conditional government support and import substitution (Moreno and Ros 1994). Government subsidies and import protection, in addition to loans from national development banks, were given to Mexican industry in exchange for concrete results, including local content requirements, price controls, technological innovation, capacity, and exports (Anderson 1963; Blair 1964).

Through this process, Mexico created "national leaders" in the form of key state owned enterprises (SOEs) in the petroleum, steel and other industries. These sectors were linked to chemical, machinery, transport and textiles industries that also received government patronage (Baer 1971; Amsden 2000). Indeed, in the first decades after World War II, these sectors received over sixty percent of all investment, public and private (Aguayo Ayala 2000). By the 1960s, manufacturing was a large and growing share of total production in Mexico. In 1940, agriculture was 22 percent of total output and manufacturing was 17 percent (Reynolds 1970). By the early 1970s, agriculture was just over 10 percent and manufacturing was almost 23 percent.

In addition to SOEs and state patronized private industries, Mexico established export-processing zones called *maquiladoras* in the mid-1960s. Maquiladoras are "in-bond" assembly factories where imports of unfinished goods enter Mexico duty-free, and the importer posts a bond guaranteeing the export of the finished good. Many maquiladoras are located in the U.S.-Mexico border region, and include electrical and non-electrical machinery, much of the transport industry, and some apparel. The SOEs, state patronized private enterprises, and maquiladoras supplied growing internal and external markets for their production.

By the late 1970s, Mexico seemed to be on the path to first world economic status. In the minds of many, the discovery of massive amounts of Mexican oil in 1976 all but secured that path. From 1976 to 1980, total Mexican GDP grew by an annual average of more than 8 percent. Assuming that such growth would continue for years to come, the Mexican government and private sector embarked upon a period of almost gluttonous borrowing and public expenditure.

Besides generating a large external debt, the borrowing binge, couple with a fixed nominal exchange rate, resulted in rising inflation, growing real exchange rate appreciation, and renewed current account deficits (Kehoe 1995). From 1970 to the early

1980s, Mexico's foreign debt rose from $3.2 billion to more than $100 billion (Otero 1996). When oil prices suddenly dropped in 1982, a time of high world interest rates, Mexico announced that it was unable to meet its debt obligations—a "watershed event" for most developing countries (Rodrik, 1996). A major devaluation plunged Mexico into economic crisis.

Between 1982 and 1985, Mexico tried and failed to respond to the crisis with another shot in the arm of the ISI model. The administration of de la Madrid (1982-1988), initiated the Program of Immediate Economic Reorganization (PIRE). First, the plan aimed to restore financial stability through peso devaluation and a cut in the government's deficit. In addition, the government adjusted the minimum wage and the wages of public employees to keep them below inflation.

On the trade front, the initial strategy was to further restrict trade. In 1982, tariffs were increased to 100 percent of the value of all imports, licenses were required for importing all goods, and foreigners were allowed no more than 49 percent ownership of Mexican enterprises. In addition, Mexico signed a loan agreement with the International Monetary Fund (IMF) for $3.7 billion, and borrowed $5 billion from commercial banks in the US. Another $2 billion came from the Paris Club, an informal group of (mostly) European governments with large claims on other governments in the world economy (Lustig 1998).

The de la Madrid administration believed stability would be restored through a drastic reduction in the deficit and by a large devaluation of the peso. It was further predicted that these policies would reduce inflation and create a necessary trade surplus (Lustig 1992). Nonetheless, by 1985 Mexico faced a balance of payments crisis once again: fiscal discipline had swayed, IMF funding had ended, a massive and costly earthquake hit Mexico City, and oil prices started a sharp dive (Kehoe, 1995). Once again, the value of the peso depreciated sharply and set the stage for a new experiment in Mexican economic policy (Ten Kate 1992).

Faced with the possibility of another crisis, De la Madrid nudged the pendulum in the other direction and experimented with neo-liberalism. He named his effort *Apertura*—"opening" Mexico to foreign trade and investment. The de la Madrid government lowered the portion of imports subject to license requirements from 100 percent in 1983 to 35 percent in 1985 (General Agreement on Tariffs and Trade (GATT) 1993). During *Apertura,* tariff rates were also lowered. The maximum tariff rate in 1982 was 100 percent. By 1986, there were 11 tariff rates and the maximum rate fell to 45 percent. Further reductions became locked in when Mexico became a signatory to the General Agreement on Tariffs and Trade (GATT) at the end of 1986.

B. New Goals, New Policies

While De la Madrid nudged gently towards economic openness, the administration of Carlos Salinas de Gortari (1988 to 1994) firmly shoved the pendulum towards neo-liberal integration.

The situation that Salinas inherited was a grave one. Yet another financial crisis had struck in 1987 and Mexican society was bifurcated. Millions of people lived in extreme poverty while many in the elite echelons of society were watching their wealth evaporate. To Salinas, something drastic had to be done. Both the macroeconomic stabilization efforts from 1983 to 1985, and the trade policies from 1985 to 1987 had failed to generate economic reforms. This time, the Mexican government decided to bundle both issues together into a grand strategy.

Salinas had three main goals to completely reorient the Mexican economy: 1) achieve macroeconomic stability, 2) increase investment, and 3) modernize the economy (Mexico 1989). These goals were laid out in Mexico's National Development Plan for 1989 to 1994. The promise of the plan lay in the manufacturing sector. By opening the economy and reducing the role of the state in economic affairs, Mexico would build a strong and internationally competitive manufacturing sector. Fueled by foreign investment, the development strategy would:

- Increase competitiveness and growth in the manufacturing sector through new efficiencies that would lead to an increase in exports;
- Increase foreign exchange earnings and FDI and thus provide the country with new international reserves and stability;
- Upgrade the manufacturing sector with new technologies transferred by transnational corporations that would locate to Mexico;
- Create new employment, thereby attracting workers from less efficient rural areas to manufacturing centers and explicitly providing a disincentive to leave the country for work in the U.S. The goal, Salinas said, was that Mexico would begin to "export goods, not people" (Winn, 1997).

Meeting these goals required a top-to-bottom revamping of Mexico's foreign and domestic economic policies. Domestically, the government negotiated a series of economic "pacts". Signed by representatives of labor, agricultural producers, and the business sector, the pacts included cuts in the fiscal deficit, a further tightening of monetary policy (in the form of higher interest rates to tame inflation and the exchange rate), further trade liberalization, and a commitment by industry not to raise prices and by trade unions not to press for wage increases above inflation (Lustig, 1998). Between 1988 and 1994, the policies related to the pacts reduced inflation from an annual rate of 159.2 percent in 1987 to 7.1 percent in 1994, while raising GDP by 23.1 percent. The new climate set the stage for a debt reduction agreement signed by Mexico and its foreign creditors, and for an increase in World Bank and IMF support (Lustig, 1992).

Foreign policy centered an a further embrace of the *Apertura* policy and liberalization of trade and investment. Coupled with the pacts, these policies solidified Mexico's transition to neo-liberalism. Nowhere was this about face more evident than in Mexico's stance towards regional economic integration. During his initial presidential campaign run in 1979, future US President Ronald Reagan proposed the negotiation of a trade accord among the North American nations. At that time, Mexico was stiffly opposed-–an

opposition that lasted through the 1980s (Barry 1995). However, after unsuccessful attempts to craft deals with Japan and Europe, it was Mexican President Carlos Salinas who approached the Bush administration in 1990 about the possibility of a North American Free Trade Agreement (NAFTA) (Winn 1992).

Negotiated during 1991 and 1992, NAFTA went into effect on January 1, 1994. All tariffs among Mexico, Canada, and the United States are to be phased out over a fifteen-year period, with most tariffs and quantitative restrictions lifted by 2004. In addition to the lifting of tariff restrictions, NAFTA also considerably liberalized investment (Wise 1998). The agreement also had "side" agreements on trade-related aspects of labor and environmental standards. On the heels of NAFTA, Mexico signed or committed to a flurry of bilateral and regional trade agreements. In 1994 alone, Mexico signed agreements with Costa Rica, Colombia Venezuela, and Bolivia.

One step below the economy-wide level was a series of changes in domestic regulations on foreign investment intended to prepare for and align with Mexico's new international commitments. In 1989, Mexico reformed its 1973 "Law to Promote Mexican Investment and Regulate Foreign Investment" by allowing 100 percent foreign ownership in many new sectors, making it quicker and easier to get the approval for new investment projects, and relaxing requirements tied to exports and local content quotas (UNCTC 1992) . In 1993, these reforms were wrapped into a new "Foreign Investment Law," where performance requirements were completely phased out (Dussel, 2000).

To make investments less cumbersome for foreign firms, Mexico also reformed its technology transfer requirements. Until 1973, Mexico's "Technology Transfer Law," was geared toward strengthening the bargaining positions of the recipients of foreign technology. All technology transfers had to be approved by the Ministry of Trade and Industrial Promotion, which monitored the extent to which technology transfer could be assimilated, generated employment, promoted research and development, increased energy efficiency, controlled pollution, and enhanced local spillovers.

In 1990, the Salinas administration put forth a new technology transfer law relinquishing all government interference in the technology process to the parties involved in FDI. Government-enforced conditions on technology transfer were phased out, and technology agreements no longer needed government approval (but must be registered). Moreover, the law now contains strict confidentiality clauses (UNCTC, 1992).

These efforts were expanded upon and locked into place under NAFTA in 1994-- at least pertaining to investment by the U.S., the biggest investor in Mexico, as well as Canada. Under NAFTA (Article 1106), all performance requirements for foreign investors, including local content, export requirements, technology transfer, etc., are to be gradually eliminated by 2004 (Dussel, 2000). However, in some sectors performance requirements are simply extended to and permitted in the North American region as a whole (Moran, 1998; Dussel, 2000; (Correa 2003). For example:

- In the auto sector, 62.5 percent of automobile parts and components are required to be sourced from the NAFTA parties;
- 9 of 10 circuit board assemblies need to be packaged in NAFTA countries;
- All motherboards for computers manufactured in NAFTA countries must be North American;
- For photocopiers, printers, and fax machines, sub-assembly has to be produced in North America (seen as an equivalent to an 80 percent domestic content requirement);
- In order to qualify for preferential status, television tubes must be produced inside NAFTA countries.

In addition, NAFTA gives foreign investors the right to settle disputes through binding international arbitration for compensatory damages due to performance requirements and other forms of regulation that are deemed to be "tantamount to expropriation" (Moran, 2001).

In the 1990s, Mexico became party to a number of new investment rules agreed to under the WTO, including Trade-Related Investment Measures (TRIMS) and Trade in Intellectual Property Rights (TRIPS). Both TRIMS and TRIMS limit the ability of Mexico to impose performance requirements on foreign investors. TRIPS also creates obstacles to the transfer of knowledge through reverse engineering of products.

These trade and investment policies set the stage for FDI in the manufacturing sector to be the engine of Mexican development. There were also changes in domestic policies in order to align the manufacturing sector with the new, neo-liberal macroeconomic, trade, and investment policies. In a marked split from the past, Mexico's overarching approach to industrial policy took a "horizontal" approach. Rather than targeting a handful of firms and industries as it had done under ISI, the state was to treat all firms and sectors equally without preference or subsidy. In a horizontal fashion, the state liberalized imports along with exports, phased out subsidies and price controls, and privatized many SOEs (Dussel,1999; 2003). More specifically, the Mexican government:

- Provided information services for production and marketing of exports to the manufacturing sector as a whole;
- Eliminated price controls;
- Shifted the emphasis of Mexico's development banks toward lending at market rates rather than in preferential terms chosen by the state;
- Promoted the establishment of industrial clustering to take advantage of and create local spillovers;
- Provided regional consulting services and specialized courses for 100 percent Mexican owned SMEs;
- Through its development banks, offered loans and guarantees for demonstration projects and processes to facilitated linkages and spillovers;
- Tightened government policies toward organized labor by limiting contract negotiations solely to government friendly unions.

Since the manufacturing sector was to become a low-wage export platform, Mexico also formed a new Program for Industrial and Foreign Trade Policy (PROPICE in Spanish) to manage the integration process and to provide buffers to the vulnerabilities that accompany it. PROPICE reiterated that the goals are to increase productivity, competitiveness, and employment in manufacturing, as well as improve income distribution. PROPICE also stressed the importance of building corresponding supplier networks through small and medium-sized enterprises (SMEs), and recognized the need to prepare for competitive shocks from other, lower-wage producers such as China.

Mexico's pendulum swing toward economic integration was all but completed under the two presidential administrations serving after Salinas. However, it has not been a smooth arc. Positive macro-economic results from 1987 to 1993 had led most politicians and analysts to believe that Mexico was well on the way to recovery and industrial restructuring.

In January, 1994, Mexico left the G-77 organization of developing nations and joined the "club of rich countries," the OECD. However, in December Mexico spun into another peso crisis that shocked politicians, analysts, and pundits. The shock was followed by investment panic (Edwards 1998). In hindsight, Mexico's stabilization strategies from 1987 to 1994 were said to have led to an overvaluation of the exchange rate, a poor macroeconomic situation, and lack of growth (Dornbusch 1994). Simply stated, Mexico had an overvalued peso and when reserves dried up, investors fled and the peso sank (Dornbusch 1994; Sachs 1995; Pastor 1998)

Like de la Madrid, then new president Ernesto Zedillo (1994-2000) sought the international community's help to finance domestic reforms. The United States, the IMF, and the Paris Club again provided international financial assistance, this time to the tune of $53 billion. On the domestic front, real spending was reduced, fiscal policy was tightened, monetary growth was limited, and the exchange rate was floated to allow for further depreciations if necessary. This package halted peso devaluation, at least for the time being, and restored the confidence of the all-important foreign investors (Pastor, 1998). President Vicente Fox continued the economic policies of his last two predecessors, signing numerous bilateral trade pacts with other nations, pushing for a hemisphere-wide agreement (FTAA) and hosting the fifth ministerial meeting of the WTO in 2003.

C. The Promise of FDI

In putting FDI at the center of its "liberalization-for-development" strategy, Mexico followed a formula prescribed by mainstream economic theory and the IMF, as well as many of the world's leading development organizations. Faced with drags on domestic savings, investment and market growth, developing countries have been urged for a decade to rely on foreign investment to trigger economic growth by producing for global markets. FDI was—and largely still is—seen as a jumpstart towards broad-based economic development.

"The overall benefits of FDI for developing country economies are well documented," claims a 2002 report undertaken for the OECD's Committee on International Investment and Multinational Enterprises (OECD 2002, p. 5). Based on consultations with OECD member governments and business, labor and NGO advisors, the report, titled *Foreign Direct Investment for Development, Maximising Benefits, Minimising Costs,* nicely sums up conventional wisdom about the promise of FDI:

> Given the appropriate host-country policies and a basic level of development, a preponderance of studies shows that FDI triggers technology spillovers, assists human capital formation, contributes to international trade integration, helps create a more competitive business environment and enhances enterprise development. All of these contribute to higher economic growth, which is the most potent tool for alleviating poverty in developing countries (OECD, 2002, p. 5).

In addition, the report goes on, FDI "*may* help improve environmental and social conditions in the host country by, for example, transferring 'cleaner' technologies and leading to more socially responsible corporate policies" (*ibid,* emphasis added).

The more qualified endorsement of FDI's social and environmental benefits likely stems from the OECD's own commissioned work in this area, including by one of the authors of this paper, which shows that the environmental impacts of FDI may be positive, negative, or neutral, depending on the industrial and institutional context (OECD 2002; Zarsky 2002). But caution is also warranted in assessing the relationship between FDI and economic growth. An examination of recent studies shows that, in this case too, the benefits of FDI are far from well documented.

1. The "Contagion" of Knowledge—Efficiency Spillovers

The sources of FDI are transnational corporations (TNCs), primarily firms headquartered in developed countries (Table 1). TNCs invest overseas both by buying existing companies and productive capacity (mergers and acquisition) and by creating new ones, usually through the creation of a local affiliate (greenfield). To make FDI profitable, a TNC must have some distinctive asset—technology, global marketing capacities, management skills, etc—not possessed by domestic firms (Blomstrom and Kokko 1996).

Table 1

World's Largest non-Financial TNCs, 2000
(ranked by foreign assets)

Rank/Company	*Country*	*Industry*	*Foreign assets ($Usmillions)*	***Foreign as percent of total assets***
1. Vodaphone	United Kingdom	Telecommunication	221,238	99%
2. General Electric	United States	Electrical/electronic equipment	159,188	36%
3. ExxonMobil	United States	Petroleum	101,728	68%
4. Vivendi Universal	France	Diversified	93,260	66%
5. General Motors	United States	Motor vehicles	75,150	25%
6. Royal Dutch/Shell	UK/ Netherlands	Petroleum	74,807	61%
7. BP	United Kingdom	Petroleum	57,451	76%
8. Toyota Motor	Japan	Motor vehicles	55,974	36%
9. Telefonica	Spain	Telecommunication	55,968	64%
10. Fiat	Italy	Motor vehicles	52,803	55%

Source: UNCTAD, World Investment Report, 2002, Table IV.2

The firm is thus able to earn a "rent"—and, at least in theory, the host country gets "spillover" benefits of the superior asset(s).

"Efficiency spillovers", which occur through the transfer of technologies and management practices, are increasingly seen as the primary way in which to gauge the contribution of FDI to economic growth. Dubbed a "contagion" effect, knowledge is diffused to local firms and workers, raising the efficiency, productivity and marketing skills of domestic firms (Findlay 1978). While knowledge diffusion is postulated for TNC investment in both developed and developing countries, it is the transfer from industrialized to developing countries that is of greatest interest because of its potential positive impact on global economic development.

Efficiency spillovers can occur through several routes, including the copying of TNC technology by local firms and the training of workers who then find employment in local firms or start their own. The most important conduit, however, is the linkage between MNC affiliates and their local suppliers (Lall 1980)**.** MNCs generate spillovers when they:

- Help prospective suppliers set up production facilities;
- Demand that suppliers meet high quality standards and develop capacities for product innovation—and provide training to enable them to do so;
- Provide training in business management;
- Help suppliers find additional markets, including in sister affiliates in other countries.

To what extent do MNCs actually undertake these activities in developing countries? Put another way, what is the empirical evidence that FDI has generated hoped-for technology spillovers? Studies have been of two types: 1) statistical studies which examine trends in key macro-variables, such as domestic investment (gross fixed capital formation) and productivity; 2) case studies of particular industries, such as autos (Moran, 1998) and high-tech (Amsden 2003).

The evidence in developed countries can shed light on whether FDI in fact generates spillovers and the conditions under which they do—or don't. The limited evidence generally suggests that, in developed countries, the productivity of domestic firms is positively correlated with the presence of foreign firms. Spillovers seem to exist, though some studies have found no independent growth effect and there is no consensus on the magnitudes (Lim 2001; Carkovic and Levine 2002). Moreover, tax policies and other incentives to attract FDI distort firm technology and investment choices and generating *negative* spillovers—a loss in the efficiency of local firms (Blonigen and Kolpin, 2002).

The evidence for developing countries is mixed. Some studies have found clear evidence of spillover effects, while others have found limited or even negative effects (Table 2). An IMF study found "overwhelming" evidence of productivity increases through technology transfer (Graham 1995). However, a later literature review took a much more nuanced view, finding that a host of country- and industry-specific variables determined whether FDI generated technology transfer and diffusion in developing countries (Kokko 1994). In their case study of Taiwan, Amsden and Chu (2003), found that government policies, especially support for research and development, were crucial in nurturing spillovers from foreign to nationally owned firms.

A few statistical studies have found evidence of positive spillovers in Mexico. Aitken, Hanson and Harrison (1997) found that the presence of foreign firms apparently catalyzed exports of domestic firms; and Kokko (1994) found increases in the productivity of Mexican firms producing for export (Kokko, Tansini et al. 1996; Aitken 1997; Aitken and Harrison 1999). Moran's case study (1998) found ample evidence of positive spillovers from FDI in Mexico's auto industry. On the other hand, Dussel (1999)

found little evidence of spillovers from FDI in Mexico's high tech (computers and peripherals) industry (see Section IV A).

Some studies find that FDI generates *negative* rather than positive spillovers. Krugman (1998) argues that, generally, domestic investors are more efficient than foreign investors in running domestic firms—otherwise, foreign investors would have purchased them. However, in a financial crisis, such as the crisis which swept East Asia in the late 1990s, domestic firms may be cash-constrained and be available for purchase at "fire-sale" prices. Krugman concludes that a superior cash position, rather than efficiency-enhancing technology or management, drives FDI (Krugman 1998).

Razin, Sadka and Yuen (1999) argue that FDI is driven by the information advantage of foreign investors, who are able to gain—and leverage--inside information about the productivity of firms under their control. With their superior information, foreign firms can inflate the price of equities sold in domestic stock markets. The expectation of future stock market opportunities then leads to over-investment and inefficiency (Razin 1999).

Overall, of the eleven studies reviewed for this paper, only three found unambiguously that FDI generates efficiency spillovers in developing countries. Two found the opposite, while six found that FDI may or may not generate spillovers, depending on local production, policy or financial conditions (Table 2). The evidence suggests that there is no automatic or consistent relationship between FDI and efficiency spillovers, either for developing countries as a whole or for all industries within a county. Realizing the promise of FDI to transfer technology and diffuse knowledge depends on conducive policy, institutional and market environments.

Like the benefits of FDI itself, however, there is little consensus on what constitutes a "conducive" policy. Moran (1998) argues that a liberal trade and investment regime allowing MNCs maximum flexibility has the best chance of increasing the efficiency of local firms and integrating them into global supply chains. On the other hand, Moran also found that export requirements worked to stimulate MNC investments in Mexico which generate spillovers (Moran 1998). Amsden and Chu (2003) conclude that the most important ingredient in capturing spillovers and indeed, in increasing productive capacity in "latecomer" states is a strong state acting to nurture domestic firms through effective, market-friendly and performance-related subsidies.[1]

2. Growth Effects: Crowding In or Crowding Out Domestic Investment?

The central promise of FDI is that it promotes economic growth, not only by its own contribution to capital accumulation but by stimulating or "crowding in" domestic investment. By increasing the productivity and efficiency of local firms, efficiency spillovers themselves can help to stimulate domestic investment.

But the "crowding in" effect of FDI on investment may be gained whether or not there are technology spillovers or even if little value beyond labor is added in local production.

Table 2

Does FDI Generate Spillovers in Developing Countries?

Author/Study	*Year*	*Yes, No, Maybe*	*Explanation*
Aitken, Hanson & Harrison	1997	Yes	Foreign firms act as export catalysts for domestic firms (Mexico)
Aitken & Harrison	1999	No	No evidence of spillovers (Venezuela)
Amsden & Chu	2003	Maybe	Government industry policies must actively promote nationally owned firms (Taiwan)
Blomstrom & Kokko	1996	Maybe	Depends on industry and country characteristics, especially policy environment
Kokko	1994	Yes	Increases productivity of domestic exporting firms (Mexico)
Graham	1995	Yes	Increases productivity of domestic firms
Kokko, Tansini and Zejan	1996	Maybe	Productivity gap between foreign and domestic firms must not be too big (Mexico and Uruguay)
Krugman	1998	No	Domestic investors are more efficient but foreign investors have superior cash position.
Lensink & Morrissey	2001	Yes	Reduces costs of R&D and promotes innovation (Lensink and Morissey 2001)
Moran	1998	Maybe	Need liberal investment climate to encourage integration of local firms into MNC global sourcing and production network
Razin, Sadka, and Yuen	1999	Maybe	Foreign investors can speculate on domestic stock prices, leading to over-investment and inefficiency.

Assembly operations, for example, where workers put together components made elsewhere, can still drive domestic investment and growth via increases in local consumer demand.[2]

On the other hand, TNCs may undermine local savings and "crowd out" domestic investment by competing in product, service and financial markets and displacing local

firms. The loss of domestic firms can undermine market competition, leading to inflated prices and lower quality products. Domestic investment can also be crowded out if macro-level policies to attract foreign capital—such as high interest rates—raise the domestic cost of capital. In contrast to domestic firms, TNC affiliates typically have access to foreign and international sources of finance, including internal corporate sources.

In addition, while FDI may increase foreign exchange earnings, there is a risk that it will contribute to crises in the balance of payments by repatriating profits and by increasing the rate of imports faster than the rate of exports.[3]

Taken together, the risk is that FDI could lead to an overall contraction, rather than an increase, in domestic investment and/or economic growth. Indeed, in a study that generally argues for the potential benefits of FDI, Moran (1998) cautions that "the possibility that FDI might lead to fundamental economic distortion and pervasive damage to the development prospects of the country is ever present" (p. 2).

What is the more likely "face" of FDI? A host of studies over the past decade have examined the nature of economic benefits and the conditions under which they are—or are not—captured. (Table 3) Moran (1998) reports on the findings of three separate "net assessments" of the impact of FDI covering 183 *projects* in some 30 countries over the past 15 years. Two studies found that FDI had a positive impact in 55 to 75 percent of the projects they studied. But one study found that FDI had "a clearly negative impact on the economic welfare of the host" in an astonishing 75 percent of the projects studied (p. 25).

Economy-wide studies generally have found both positive and negative impacts of FDI on domestic investment. For example, a study by the Brookings Institution covering 58 countries in Latin America, Asia, and Africa found that a dollar of FDI generates another dollar in domestic investment (Bosworth 1999). On the other hand, many studies have found that the investment and/or growth impacts of FDI could be positive *or* negative, depending on a variety of variables, mostly having to do with host country policies.

One study found that the impact of FDI is significantly positive in "open" economies, and significantly negative in "closed" economies (Marino 2000). Others have found that positive impacts depend on the effectiveness of domestic industry policies and on tax, financial or macroeconomic policies A World Bank study found that the impacts of FDI depend on the structure and dynamics of the industry, as well as host country policies(World Bank 2003). In its recent report on the role of FDI in development, the OECD concluded that the overall benefits of FDI depend on "the appropriate host-country policies and a basic level of development" (OECD, 2002, p. 9).

Table 3

Does FDI Promote Economic Growth in Developing Countries?

Study Author(s)	***Year***	***Yes, No, Maybe***	***Key Variables***
Balasubramayam, Salisu & Sapsford	1996 1999	Maybe	Trade regime must be open or neutral (Balasubramanyam, Salisu et al. 1996)
Borensztein, Gregorio & Lee	1998	Maybe	Depends on education level of workforce
Graham and Wada	2001	Yes	Raised per capita GDP in Chinese provinces with FDI concentration (Graham and Wada 2000)
Graham	1995	Maybe	MNC's market power can generate negative impacts
de Mello	1999	Maybe	Depends on degree of complementarity and substitution between FDI and domestic investment.
Lensink & Morrissey	2001	Yes	Reduces costs of R&D and promotes innovation
Loungani & Razin	2001	Maybe	Risks (Lougani and Razin 2001)
Lim	2001	Maybe	Depends on tax incentives, regulatory & legal impediments, macroeconomic instability
Marino	2000	Maybe	Open trade and investment policies
Mallampally & Sauvant	1999	Maybe	Human resource development; information and other infrastructure
Markussen & Venables	1999	Yes	Raises productivity and exports of domestic firms; generates spillovers (Markusen and Venables 1999)
Rodrik	1999	No	Reverse causality: TNCs locate, rather than drive growth, in more productive and faster growing countries (Rodrik 1999)

Several studies suggest that, to capture the benefits of FDI, a country must *already have reached* some kind of "development threshold". One found that FDI raises growth only in countries where the labor force has achieved a minimum level of education (Borensztein, de Gregorio et al. 1998). Another found "significant cross-country diversity" in terms of the catalytic role of FDI in developing countries and concluded that the key variables are "country-specific factors", including institutions and policies (deMello 1999).

Overall, of the twelve studies reviewed for this paper, three found positive links between FDI and economic growth, while one found a negative link and eight studies found that "it depends". Like efficiency spillovers, the positive benefits of FDI on domestic investment and growth depend largely on domestic policies, capabilities, and institutions.

III. The Performance of the Integration Strategy

Mexico's strategy of economic integration has performed remarkably well in terms of macroeconomic stabilization and increased foreign investment and exports. However, such achievements have yet to translate into economic growth and sustainable industrial development. This section examines the performance of the integration strategy first, against the goals of improving the attractiveness and competitiveness of Mexico for foreign investment and export-oriented manufacturing, and second, against the goals of domestic economic growth, investment and industrial restructuring.

A. FDI and Export-Oriented Manufacturing

Mexico's ability to attract FDI in the post-NAFTA period has been impressive. Indeed, the 1990s were a period of unprecedented increases in the level of FDI in the world economy as a whole—reaching $1.6 trillion in the year 2000. Yet during that time, 70 percent of all FDI stayed in developed countries. Of the FDI that did accrue to the developing world during the 1990s, almost 80 percent flowed to just 10 countries. Mexico was one of those lucky recipients, ranking third in the top 10. Among the developing nations that received the lion's share of FDI, only China and Brazil received more than Mexico during the period overall. Indeed, China, Brazil and Mexico together received 58 percent of all developing country FDI in the 1990s (UNCTAD 2002).

From 1994 to 2002, Mexico received $12.3 billion of FDI on average each year, up from only $2.5 billion annually between 1980 and 1993 (Dussel 2000). Twenty-eight percent was in the form of mergers and acquisitions, while 72 percent was greenfield investment.

The spatial distribution of FDI in Mexico has been very uneven, –tending to concentrate in urban areas clustered around Mexico City or the U.S.-Mexico border. Since 1994, Mexico City has received 60 percent of the total. Together and in descending order, Nuevo Leon, Baja California, Chihuahua, Tamaulipas, and Jalisco receive close to thirty percent of all FDI in the Mexican federation.[4]

Manufacturing and financial services accounted for close to 75 percent of all FDI inflows into Mexico between 1994-2002. (Table 4). Agriculture, mining, and construction each received less than one percent. Despite their preferential access to imports, *maquiladoras* received only 32 percent of the total between 1994 and 2002. The vast majority (72 percent) of *maquiladora* investment flowed to the automotive, electronics, and apparel assembly sectors.

Table 4

FDI in Mexico by Sector, 1994 – 2002

	Total ***(millions of $US)***	***Percent***
Agriculture/Livestock	271	0.2
Mining and Extraction	865	0.8
Manufacturing	54,632	49.5
Electricity and Water	600	0.5
Construction	973	0.9
Commerce	11,865	10.8
Transport and Communications	4,711	4.3
Financial Services	26,865	24.4
Community Services	9,510	8.6
Total	110,292	100

Source*: RNIE, 2003*

Within the manufacturing sector, nearly half of FDI went to machinery and equipment industries, which include automobiles, electronics, apparel, and textiles. Food and beverages and chemicals were the second and third largest recipients, with 18 and 13 percent of the total, respectively (Table 5).

The U.S. is by far the largest source of FDI in Mexico, accounting for 67 percent of all inflows since 1994. Financial services received the largest amount of U.S. FDI into Mexico. However, these percentages reflect an outlier year. In 2001, Citigroup purchased Banamex, for $12.5 billion, accounting for over half of all Mexico's FDI inflows in that year (UNCTAD, 2002). Excluding that year, manufacturing is the leading sector that receives FDI from the U.S. In the manufacturing sector, the biggest recipients of U.S. FDI are automobiles, electronics, and clothing.

Table 5
FDI in Mexican Manufacturing by Industry, 1994-2002

Sector	Total *(millions of $US)*	Percent
Food, Beverages, and Tobacco	9,999	18
Metal Products, Machinery, and Equipment	26,603	49
Chemicals, Petroleum and coal derivatives, rubber, and plastic	7,342	13
Nonmetallic Mineral products	574	1
Basic Metal Industries	2,730	5
Manufacturing Total	54,632	100

Source*: RNIE, 2003*

Reflecting the huge increase in FDI inflows, exports increased by more than a factor of three between 1994 and 2002, rising from $50 billion to $160 billion. Eighty-eight percent of Mexico's exports were from the manufacturing sector, distinguishing Mexico from many other Latin American countries, such as Chile, which remain heavily dependent on minerals and other primary products (UNCTAD, 2002). Metallic products, equipment, and machinery—which include autos and electronics—accounted for 72 percent of manufacturing exports and about 64 percent of all exports (Table 6). Manufactured exports grew at the rapid clip of 13.8 percent a year on average between 1994 and 2002 (Table 6).

Table 6

Exports in Mexican Manufacturing, 1994-2002

	Total *(millions of$US)*	Share	Growth Rate *(percent)*
Total Manufacturing	956,258	100	13.80
Food, Beverages, and Tobacco	30,835	3	11.30
Textiles and Clothing	79,090	8	16.50
Wood and Wood Products	8,170	1	4.70
Pulp, Paper, and Printing	9,797	1	10.80
Chemical Products	67,938	7	9.50
Non-metallic mineral products	19,995	2	11.40
Base Metals	40,060	4	6.40
Metalic Products, Equipment and Machinery	686,181	72	14.80
Other	14,193	1	11.00

Source*: INEGI, 2003*

Despite large increases in FDI and manufactured exports, the long-term stability of Mexico's integration strategy is far from assured. There are two overarching sources of instability. First, imports grew even faster than exports between 1994-2002, generating a large and persistent current account deficit (Figure 1 and Table 7). The manufacturing sector ran an average $11.4 billion deficit during the period 1994 to 2002, accounting for approximately 80 percent of the deficit. Both foreign and domestic manufacturing firms producing for export rely overwhelmingly on imported, rather than locally-sourced inputs (Table 11). Indeed, according to data provided by INEGI, the share of locally-sourced inputs in maquila plants dropped from 4.7 percent to 3.7 percent between 1990 and 2002 (Table 7).

Undoubtedly, a series of complex and interrelated factors drive the reliance on imports in Mexican manufacturing. One, however, is the fact that Mexico's exchange rate is overvalued, itself the result of a high interest, anti-inflation policy (Nadal 2003). While inflation was largely brought under control, the cost was a ballooning current account deficit (Dussel 1999).

Second, Mexico's low-wage competitiveness has begun to slide. According to the World Competitiveness Yearbook, Mexico fell from 34th place in 1998 to 41st in 2002. In another index operated by the World Economic Forum, Mexico slipped from 42nd to 45th place from 2000 to 2002. Yet another ranking, the Microeconomic Competitiveness

Table 7

Locally Sourced Inputs in Maquila Manufacturing Plants
(Value added as % of total)

	1990	***2002***
Food and Beverage	38.6	42.9
Apparel	0.9	8.0
Footwear and Leather	6.9	2.7
Furniture and Wood Products	3.1	14.6
Chemical Products	10.2	5.5
Transportation Equipment	0.8	3.3
Machinery	4.6	2.6
Electronic Assembly	1.2	3.0
Materials and Electronic Accessories	0 .01	2.2
Sporting Goods	1.1	2.2
Other	4.1	2.2
Average	**4.7**	**3.7**

Source*: INEGI, 2003*

index, put Mexico at number 42 in 1998 and 55 in 2002. Falling competitiveness has been attributed to three factors: the economic slowdown in the U.S., the relative strength of the peso, and other factors such as the emergence of China's entry in the WTO (CSIS 2003; Gerber and Carrillo 2003).

In terms of the performance of its "foreign sector," the integration strategy, in short, has an Achilles Heel. While it has achieved some of its central goals, including controlling inflation and increasing exports and foreign investment, persistent current account deficits and overvalued exchange rates suggest that the strategy is not sustainable in the long term. Mexican economist Enrique Dussel (2003) sums up the situation as follows:

> The export sector's overall inability to generate linkages with the rest of the economy—in terms of employment, learning processes, and technological innovation, among many other aspects—creates unsustainable macroeconomic conditions in the medium and long term. As soon as the economy (particularly through manufacturing) grows in terms of GDP and exports, it requires larger quantities of imports for capital accumulation. (p.270)

Figure 1

Source*: World Bank, World Development Indicators, 2003 (Bank 2003; World Bank 2003)*

Table 8

Mirror Image?
Inflation Rates and Current Account Deficits

	Inflation	*Current Account*
	(%)	*(millions of USD)*
1994	5.4	-29,662
1995	30.8	-1,577
1996	41.6	-2,508
1997	19.2	-7,665
1998	12.2	-16,072
1999	17.1	-14,000
2000	10.9	-18,161
2001	4.8	-18,067
2002	2.3	-13,915
Average	**16.0**	**-13,514**

Source*: INEGI, 2003, Banco de Mexico, 2003*

B. Growth, Investment and Industrial Restructuring

The single most telling—and troublesome—indicator of the domestic economic performance of the integration strategy is Mexico's sluggish rate of GDP growth. Between 1994 and 2002, GDP grow at an average rate of 2.7 percent per year. Indeed, GDP growth in the 1990s was less than half the 6.7 percent average growth rate under the ISI policies of the 1970s. Even in the tumultuous 1980s, GDP grew an average of 3.7 percent per year (Table 8). As Middlebrook and Zepeda (2003) conclude in a sweeping study of the liberalization program, "The strongest single indictment of Mexico's new economic model is that it has not produced robust growth" (Middlebrook and Zepeda, 2003, p. 25).

What accounts for this poor performance? While economists point to a variety of factors, the most important is the contraction of domestic investment (gross fixed capital formation). Between 1994-2002, total annual investment as a percent of GDP averaged 19.4 percent, the same as in the 1980s and down a bit from the 1970s (Table 8 and Figure 1). However, the share of FDI in total investment more than doubled, rising from 5.4 percent between 1981-93 to 12.6 percent between 1994-2002. The converse, of course, is that the share of *domestic* investment fell by half.

The manufacturing sector has apparently been hard hit by the contraction in domestic investment. From 1970 to 1982, investment in manufacturing averaged about 10 percent of GDP and accounted for nearly half of investment overall. In the 1980s, investment in manufacturing dropped off to just over 5 percent of GDP, accounting for just over a quarter of total investment. While more recent data is not available, data from 1988 to 1994 show the persistence of a contractionary trend: investment in manufacturing remained under 6 percent of GDP and accounted for about a third of total investment (Table 10).

Rather than acting to stimulate new investment, FDI and the liberalization strategy overall apparently "crowded out" domestic investment. A number of ECLAC economists argue that increases in foreign investment have come at the expense of total investment, and attribute the slow growth in Mexico to this overall "weakening of investment" in Mexico (Mattar, Moreno-Brid et al. 2002).

What caused the crowding out of domestic investment? It was not due to excessive borrowing by TNCs in domestic capital markets. Generally, TNC affiliates and domestic companies producing primarily for export have access to foreign sources of finance. According to many economists, the overarching cause was the anti-inflationary macroeconomic policy package, which generated high interest rates and an overvalued exchange rate (Nadal, 2003). A key element of the package, which aimed to suppress aggregate demand, was contractionary monetary policy. A high prime rate pushed up commercial bank interest rates, which averaged 22 percent between 1994-2002 (Table 11).

Table 9

Lackluster Domestic Performance: Investment and GDP

	Investment as a % of GDP	***FDI Share Of Investment (%)***	***GDP Growth (%)***	***Growth in GDP per capita (%)***
1970-1980	20.7	3.6	6.7	3.6
1981-1993	19.4	5.4	3.3	-0.3*
1994	19.4	12.0	4.5	
1995	16.1	16.8	-6.2	-7.9
1996	17.9	12.0	5.1	3.5
1997	19.5	12.3	6.8	5.2
1998	20.9	11.6	4.9	3.5
1999	21.2	11.1	3.7	2.3
2000	21.2	10.4	6.7	5.2
2001	19.4	19.3	0.5	-1.0
2002	18.9	7.9	0.0	-1.4
1994-2002	**19.4**	**12.6**	**2.7**	**1.4**

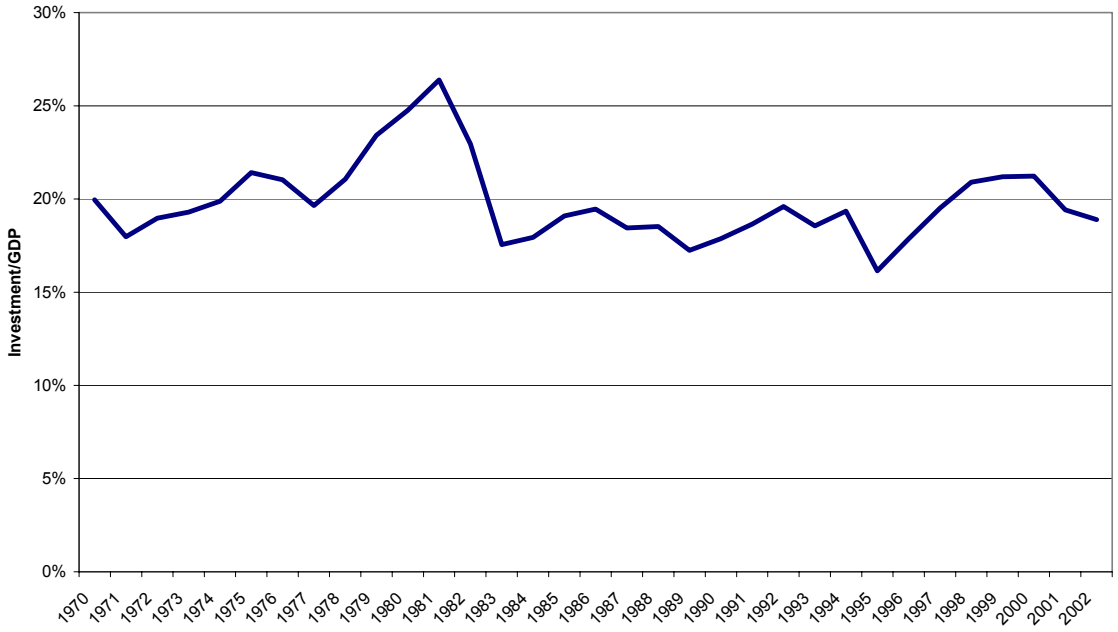
*1981-93.

Source*: World Bank, World Development Indicators, 2003;* Urquidi (2003), Table 15.2.

High interest rates choke off domestic investment directly, by raising the cost of capital, and indirectly, by leading to an overvalued exchange rate, generated by inflows of foreign capital attracted by high interest rates. Indeed, a central objective of the liberalization strategy is the attraction of foreign portfolio capital inflows to finance balance of payments gaps. Moreover, the government has made the exchange rate the anchor of its domestic price system and undertakes interventions to raise the value of the peso, even though it is supposed to float (Nadal 2003). An overvalued exchange rate makes imports, including of intermediate products, cheap relative to domestic production. Domestic producers get crowded out.

Besides high interest rates and overvalued exchange rates, Mexican policies have constricted aggregate demand by constraining wage growth through "economic solidarity pacts" (see Section II). Real wages in manufacturing outside of the *maquiladoras* have decreased by 12 percent since 1994 (INEGI 2003). While the pacts helped to control inflation, they also drove wages and incomes down (see Section IV).

Figure 2:
Total Investment in the Mexican Economy, 1970-2002



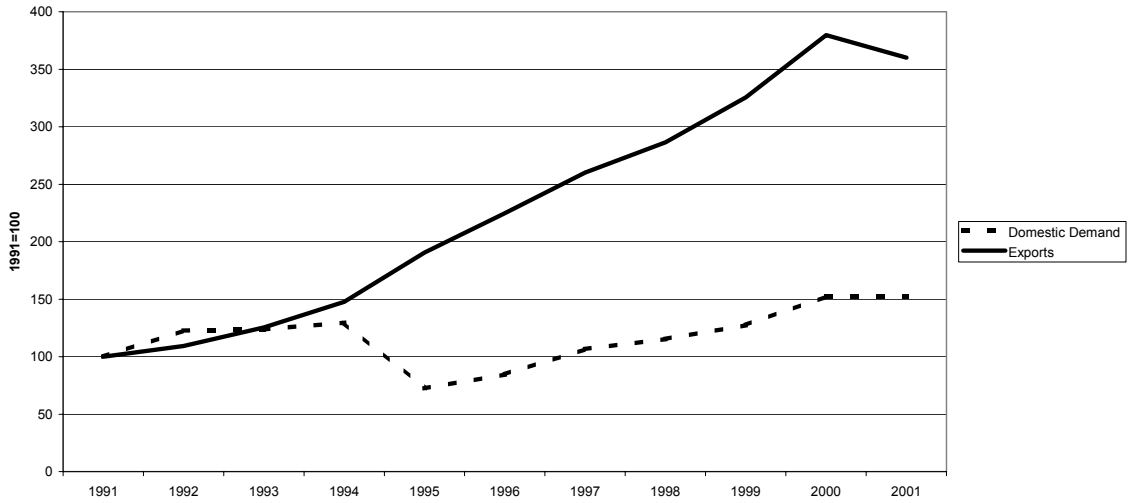
Source*: World Bank (2003)*

Domestic demand for manufactured goods plummeted after 1994 and growth remained sluggish throughout the decade. Between 1994 and 2001, domestic sales of manufactured goods rose by only 22 percent, while export sales rose by 212 percent (in 1995 dollars) (Figure 3). If export-oriented production relied heavily on domestic inputs, rather than imports, than expansion would likely have boosted domestic investment. But with the high import quotient in manufactured exports, the sluggish growth in domestic demand for manufactured goods acted as a drag on investment.

One of the "promises of FDI" and of liberalization generally is that it will raise the productivity of domestic firms, leading to growth-enhancing industrial restructuring. In Mexico, productivity in manufacturing grew by more than 20 percent since 1994, particularly in the domestic (non-maquiladora) sector (Figure 2). However, productivity growth is largely due to job-shedding, rather than industrial restructuring.

Indeed, Mexico's industrial structure has apparently changed little in the past thirty years, despite radically different import-substitution versus liberalization policies. In a calculation of the United Nations Industrial Development Organization's (UNIDO) "structural-change index," Moreno-Brid (1996) found that the composition of manufacturing industries in GDP changed little between 1970-1981 and 1984-1994. For about two thirds of industry branches, including those who changed the most, previous trends were strengthened.

Figure 3
Export and Domestic Sales of Mexican Manufactured Goods



Source: Author's calculations based on INEGI, 2003[5]

Mattar, Moreno-Brid, and Peres (2003) conclude that "more than a decade of economic reform appears not to have radically changed the momentum in the makeup of manufacturing activity that had been under way since the 1970s and the oil boom….[T]he process of transformation and modernization has concentrated on large, export-oriented companies with access to international financing" (p. 146).

Buffetted by high interest rates, an overvalued exchange rate, and a drop in domestic demand, smaller companies were the worst hit by the poor investment climate. As a whole, micro, small and midsize firms account for almost half of manufacturing employment. Between 1988-1998, the average annual growth rate for small business was only 1.2 percent, for micro firms 2.7 percent, and for midsize business 2.8 percent. Large firms, on the other hand, grew by 4.2 percent (Dussel, 2003, Table 8).

Overall, FDI and the liberalization strategy engendered a process of economic polarization and segmentation. Large foreign and domestic firms that have access to international sources of financing and produce products for export have been able to expand manufacturing production. Small and medium size domestic manufacturing firms, on the other hand, have been starved for capital and for customers.

Table 10

Investment in Manufacturing as a % of GDP

	1970-76	1977-82	1983-87	1988-94
Food, Beverage and Tobacco	5.70	6.00	2.96	4.32
Textiles and Apparel	5.35	4.91	3.01	2.64
Furniture and Wood Products	3.64	3.70	1.28	1.03
Paper and Printing	8.57	8.96	5.01	4.60
Chemical Products	24.45	11.38	7.54	7.91
Mineral Products	14.21	11.32	6.36	4.13
Basic Metal Products	19.48	35.29	10.77	12.83
Machinery and Equipment	9.60	10.50	9.09	7.47
Other manufactures	2.90	4.00	2.21	2.24
Total Manufacturing	9.90	9.69	5.50	5.76

Source: *Moreno-Brid (1999) Table 5*

Table 11

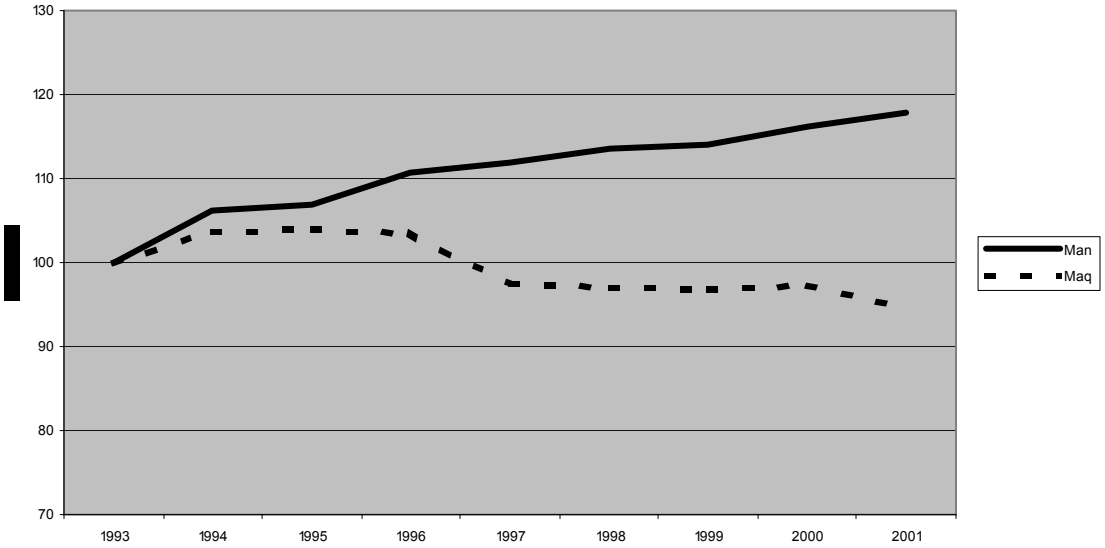
Exchange Rates and Interest Rates

	Exchange Rate (peso/dollar)	***Interest Rate (%)***
1994	3.1	14
1995	3.4	48
1996	6.4	31
1997	7.6	20
1998	7.9	25
1999	9.1	21
2000	9.6	15
2001	9.5	11
2002	9.3	7
Average	9.7	22

Source*: INEGI, 2003;World Bank, 2003;Bank of Mexico, 2003*

Figure 4

Productivity in Mexican Manufacturing



Source: IN*EGI, 2003.*

IV. FDI and Sustainable Industrial Development

Mexico's liberalization strategy in the 1990s aimed to stimulate domestic economic growth by increasing the productivity and competitiveness of export-oriented manufacturing. Eschewing past industry and macro-economic policies aimed at promoting domestic firms, liberalization policies favored foreign firms. While industry policies were mostly "neutral", macro-economic policies, especially high interest rates and an overvalued exchange rate, aimed to create a climate conducive to foreign, rather than domestic, investment. The hope was that the benefits of foreign investment, both portfolio and FDI, would "spill over" to domestic firms and boost economic growth.

There were also hopes that FDI-led growth would bring environmental and social benefits. The growth of manufacturing jobs would absorb the urban poor and farmers displaced by NAFTA, closing the yawning income inequality which plagues Mexico and stemming rural-urban and cross-border migration The more efficient, globally integrated foreign firms would transfer "clean technology" and systems for better environmental management, reducing the pollution and health risks associated with industrial development.

This section examines the performance of FDI-led liberalization against the goals of sustainable industrial development. We focus on the manufacturing sector and define sustainable industrial development in terms of three parameters:

- *Economic:* Increasing the endogenous productive capacity of Mexican firms and workers;
- *Environmental:* Raising the environmental performance of foreign and domestic firms;
- *Social:* Closing the rich-poor inequality gap, by creating manufacturing jobs.

A. Endogenous Productive Capacity

Investment is important to economic growth not only because it expands existing production capabilities but because it helps to create new ones. A central "promise" of FDI is that it will nurture the growth of local skills and knowledge. Indeed, economists increasingly view improvements in technology, efficiency and productivity, rather than capital accumulation, as the primary conduit by which FDI stimulates economic growth (Lim, 2001).

The growth of endogenous productive capacity is the fundamental economic indicator that a process of sustainable industrial development is underway. Endogenous productive capacity is the ensemble of knowledge, skills and technology by which domestic firms and workers are able to design, produce and sell products and services in domestic and/or global markets. In addition to the acquisition of know-how, that is, the ability to do what others have done, endogenous productive capacity entails the capability to innovate.

While productive capacity rests ultimately with firms and workers, government interventions and institutions can contribute to its growth. Indeed, effective policies which nurture innovation, such as public support for research and development, can themselves be considered as part of productive capacity.

1. Backward Linkages

One of the most important ways that FDI can potentially help to build endogenous productive capacity is through "backward linkages," that is, by expanding and deepening the skills of local firm suppliers, as well as by integrating them into global markets. Outsourcing by large multinational firms creates tiers of suppliers: local affiliates of the foreign firm; local direct suppliers to the foreign affiliates, often producing under long-term contract; and suppliers of local contractors. FDI, in other words, can stimulate complementary investments in firms which produce component parts and services.

In a case study of the automotive sector in Mexico, Moran (1998, pp. 53-56) found that the integration of Mexican producers into the global sourcing and marketing strategies of multinational car companies in the 1980s generated a host of spillovers to local firms and local communities. Faced with increasing competition from Japan in the 1970s, the big automakers—led by General Motors—invested heavily in Mexico, despite their discomfort with the government's export requirements. A "burst of investment" between 1979-81 exploded productive capacity: the number of engines produced alone grew to more than a million units per year. Employment in the auto industry swelled and wages and benefits were among the highest in the country.

The decision to produce for export rather than for the Mexican market led the foreign companies to transfer best production technology, as well as to introduce industry best practices, such as zero-defects procedures and production audits. According to evidence cited by Moran, the backward linkages were extensive: within five years, there were 310 domestic producers of parts and accessories, of which nearly a third had annual sales of more than $1 million. There were also spillovers of export marketing skills: only 4 of the 10 largest auto parts exporting firms in 1987 had foreign ownership.

Another study by Aitken, Hanson and Harrison (1997) found that, irrespective of geography or the export concentration in a sector, the presence of foreign manufacturing firms in Mexico acted to increase the export capacity of domestic firms. The authors conclude that the "export spillovers" must stem from ways in which the foreign firm acts as a channel for technology, management, distribution services, and information about foreign markets.

Other studies, however, are less optimistic. In a large statistical study covering 52 Mexican industries, Romo Murillo (2003) examines four types of spillover mechanisms: backward linkages, collaboration effects (e.g. joint R and D); demonstration effects; and training effects. He found that foreign presence is positively related to demonstration and to training effects, but negatively correlated with demonstration effects. Most important, he found no evidence that foreign presence is linked to technical spillovers. Romo Murillo argues that studies done after 1985 found evidence only on market access, not technical spillovers (Romo Murillo 2002).

The reason for the failure of recent statistical studies to find technical spillovers from FDI stems in large part from the fact that, perhaps apart from the auto industry, Mexican suppliers remain largely out of the sub-contracting loop. In an examination of the sub-contracting process in the electronics industry in Jalisco, Dussel (1999) found a high degree of dependence on imported inputs: he estimates that the value added by Mexican firms to total production is only about 5 percent. The lack of backward linkages stems from many sources, included the limited access to financing by local firms and foreign firms' concerns about political stability (Dussel 1999).

In contrast to export-oriented manufacturing, local linkages are strong in manufacturing for domestic markets. While annual data does not exist, a 1995 study suggested that local suppliers provided over 80 percent of inputs in non-maquila manufacturing. The figure is likely somewhat inflated by that year's peso crisis. Nonetheless, it is safe to conclude that local content is high in domestic manufacturing.

2. Knowledge and the Capacity for Innovation

The growth of endogenous productive capacities, especially the capacity for innovation, requires investment in expanding and utilizing knowledge. Knowledge is required to absorb new technologies, be globally competitive in cutting edge industries, and to design and market new products and services, in domestic or global markets.

Especially for firms in "latecomer" countries like Mexico, investment in knowledge is the "make it or break it" variable which determines whether firms can compete in mature industries, which earn thin and declining margins. "Even if a firm starts small, " conclude Amsden and Chu (2003) in a study of Taiwan's successful high tech industry, "it must ramp up very quickly to achieve a high output level, a process that requires building assets related to project execution, production engineering, and a form of R&D that straddles or falls somewhere in between applied research and exploratory development (p. 3)

To nurture the capacity for innovation, investment by both the public and private sectors are needed in assets related to project execution, engineering and R&D. Indeed, Amsden and Chu (2003) argue that the most important factors in Taiwan's success in the high tech industry were government subsidies for R&D channeled to nationally-owned firms. The government undertook R&D in its own laboratories, initiated joint research projects with the private sector, and subsidized private R&D (Amsden and Chu, 2003, p.12).

Table 12

Capacity for Innovation in South Korea and Mexico

	Mexico	South Korea
	(average 1995 – 2000)	
Patent applications—Resident share of total	4.91%	51.0 %
R&D expenditure as % of GDP	0.36%	2.60%
Scientists and engineers per million people	225	2152
Science and technology journal articles	2024	5219
R&D Technicians per million people	172	576

Source*:* World Bank, *World Development Indicators, 2003*

How does Mexico perform against the yardstick of "capacity for innovation"? A thorough analysis of Mexico's R&D policies or other indicators is beyond the scope of this paper. But a series of snapshots comparing Mexico and South Korea are telling. In 1981, 648 scientific journal articles were published in Mexico, compared to only 168 in South Korea. Twenty years later, however, the situation was reversed. Between 1995-2000, R&D as a percentage of GDP averaged 0.36 percent in Mexico. In manufacturing, it was even lower, just 0.22 percent of GDP (Dussel Peters 2004). In South Korea, it was nearly 10 times greater, averaging 2.6 percent. In the same period, scientists and engineers per million people averaged 225, compared with 2152 in South Korea, and R&D technicians per million people averaged 172 in Mexico compared with 576 in South Korea (Table 12).

Another indicator of innovation capacity is the number of patent applications by residents. In 2000, Mexican residents applied for 451 patents, an increase of some 16 percent over 1996. Non-residents, on the other hand, applied for 66,465 patents in 2000, an increase of almost 120 percent over 1996. Indeed, the resident share of total patent applications fell by a half, dropping to only 0.67 percent in 2000 (Table 13). In South Korea, by contrast, the resident share of total applications averaged 51 percent between 1995-2000 (Table 12). In Taiwan, the resident share over the same period was 75 percent (Amsden and Chu, 2003).

Table 13

Patent Applications in Mexico (1996-2000)

	1996	*1997*	*1998*	*1999*	*2000*	*Average*
Residents	389	429	472	468	451	
Non-residents	30,305	35,503	44,249	49,532	66,465	
Total	30,694	35,932	44,721	50,000	66,916	
Resident share of total	1.27%	1.19%	1.08%	0.94%	0.67%	1.03%

Source: World Bank, *World Development Indicators,* 2003

B. Environmental Performance

Many environmental trends are worsening in Mexico. Between 1985 and 1999, rural soil erosion grew by 89 percent, municipal solid waste by 108 percent, and urban air pollution by 97 percent ((INEGI 2000; Gallagher 2003). The Mexican government estimates that the economic costs of environmental degradation during that period have amounted to 10 percent of annual GDP, or $36 billion per year. These costs dwarf overall economic growth, which amounted to only 2.6 percent on an annual basis (INEGI, 2000). Indeed, these damage cost figures were cited by the World Bank as part of the rationale for a new environmental loan for Mexico in 2002. But what about manufacturing in particular?

In this section of the report, we summarize evidence about the environmental impacts of manufacturing growth under Mexico's FDI-led integration strategy. Although overall trends are worsening, there is some evidence of environmental improvement through compositional effects and through technology transfer from foreign firms. We also examine the role of the Mexican government in promoting better environmental

performance through increased compliance with existing regulations. Finally, we consider the extent to which the largest U.S. TNCs in Mexico are embracing voluntary initiatives to improve their environmental performance under the mantle of corporate social responsibility.

1. Environmental Impacts of the Manufacturing Sector

Two recent in-depth studies evaluate the environmental impacts of export-led manufacturing growth in Mexico. Both come to similar conclusions: overall levels of industrial pollution, particularly criteria air pollution,[6] water pollution, and toxics, have increased faster than population growth and faster than the GDP of the economy as a whole in Mexico since the 1980s.

Both studies find that environmental degradation was fueled by the large increases in manufacturing growth and exports that occurred during this period. In other words, the overall "scale" of economic activity in the manufacturing sector corresponded with a growing amount of pollution. However, both studies also had two other findings: overall levels of pollution occurred somewhat slower than overall growth in manufacturing output and overall growth of exports. The relative improvements were due to "composition effects," small shifts away from pollution-intensive manufacturing ((Gallagher 2002; Schatan 2002).

Under the integration strategy, Mexico consolidated its comparative advantage in labor-intensive (as opposed to capital intensive) assembly work and sold off state-patronized industries such as steel, cement, and pulp and paper. On the whole, labor-intensive industries are less pollution-intensive than their heavily capital-intensive counterparts in the manufacturing sector. This explains why these studies have found compositional shifts away from pollution-intensive industry.

However, both studies point out that such "compositional" changes toward relatively less pollution intensive industry have been far outweighed by overall scale effects of rapid industrial growth. One of the studies predicts that for every one percent increase in manufacturing output there was a corresponding 0.5 percent increase in pollution; the other study examines criteria air pollution only and predicts a corresponding pollution growth rate of 0.7 percent (Schatan, 2002; Gallagher, 2003).

Two other studies, by the OECD and CEPAL, examined the foreign-dominated maquiladoras in particular. These studies note that although the "on-site" pollution of maquila assembly plants is relatively less pollution-intensive, maquila growth attracts rapid migration. The influx far exceeds the infrastructure capacity of host communities and has led to inadequate management of sewage and waste, insufficient supplies of water, and deteriorating air quality (OECD, 1995; Stromberg, 2002).

In addition, whereas air pollution was once seen as a crisis in only Mexico City, it is now becoming a problem in other areas as well. Guadalajara now exceeds air pollution norms for 40 percent of the year, Monterrey for 25 percent, Ciudad Juarez for 7 percent,

Mexicali for 30 percent and Tijuana for 4 percent. With the exception of Guadalajara, these trends have all worsened since 1993 (Stromberg 2002).

Although environmental trends are worsening in Mexican manufacturing, it is not due to Mexico serving as a "haven" for the relocation of pollution intensive U.S. manufacturing firms. During the NAFTA debates, the U.S–Mexico border region's *maquiladora* plants were unanimously seen as an environmental disaster. California-based furniture makers reportedly moved to Mexico to avoid installing air pollution fixtures, and Mexico reportedly made statements attempting to lure U.S. firms by making low regulatory compliance costs part of their sales pitch. These were all pointed to as evidence of the existence of a pollution haven in Mexico, a trend that would be exacerbated under NAFTA (Mayer 1998).

On the whole however, there has not been a "giant sucking sound" of dirty industry flocking to Mexico. Table 14 exhibits the shares of production and employment in the five "dirtiest" U.S. industries total industrial production and employment. These shares are calculated for both the U.S. and Mexico for 1988, 1994, and 1998. The dirty industry share of production in the U.S. did slightly decline in the over this period, but declined in Mexico as well. The U.S. is also not losing jobs to dirty production in Mexico. Employment in dirty industries in the U.S. has remained the same and has actually declined in Mexico.

Table 14:
Share of Dirty Industry in National Manufacturing

	1988	1994	1998
Mexico			
production	**30.1%**	**23.1%**	**26.5%**
employment	**7.9%**	**6.3%**	**5.9%**
US			
production	**17.0%**	**15.1%**	**14.7%**
employment	**11.3%**	**11.2%**	**11.2%**

Source: *Gallagher (2003)*

A number of other studies have attempted to empirically test whether the evidence of pollution havens in Mexico has become widespread and have come to similar conclusions. Grossman and Krueger (Grossman and Krueger 1993) performed the only such study during the NAFTA debates. In a cross-industry comparison of data in one year, 1987, the authors tested whether pollution abatement costs in U.S. industries affected imports from Mexico, as one would expect if Mexico was a pollution haven relative to the U.S. They found the impact of cross-industry differences in pollution abatement costs on U.S. imports from Mexico to be positive but small and statistically insignificant. Indeed, traditional economic determinants of trade and investment, such as factor prices and tariffs, were found to be far more significant.

A more recent study examined whether pollution abatement costs affected patterns of U.S. foreign investment into Mexico and three other countries. Also a cross-industry comparison of data in one year, this time 1990, this study had similar results to those of Grossman and Krueger. The authors found a statistically insignificant, though positive, relationship between pollution abatement costs and levels of FDI (Eskeland and Harrison 1997). Kahn (Kahn 2001) is the only study to examine this question over time. Rather than looking at the costs of pollution abatement like the previous two studies, Kahn examined pollution intensity of US trade with Mexico and other countries. Using U.S. Toxic Release Inventory data for 1972, 1982, and 1992, he found the pollution content of U.S. imports from Mexico slightly declined over the period.

Lending more support to the notion that there are some environmentally positive bright spots, three studies conclude that foreign presence in the Mexican steel industry led to better environmental performance. Gentry and Fernandez (1998) found that Dutch steel firms and the Mexican government brokered an agreement whereby the Mexican government agreed to share some of the environmental liabilities of the sector. Later, the foreign firms began investing in environmental improvements. A broader study of the Mexican steel sector found that foreign firms, or firms that serve foreign markets, were more apt to comply with environmental regulations in the steel sector (Mercado 2000).

A third study, which examined criteria air pollution in Mexican steel, found that the Mexican sector is "cleaner" per unit of output that its U.S. counterpart. This is partly due to the fact the new investment (both foreign and domestic) came in the form of more environmentally benign mini-mill technology rather than more traditional and dirtier blast furnaces. Based on this analysis, the author hypothesized that when pollution is in large part a function of core technologies, new investment can bring overall reductions in pollution-intensity. However, when pollution is a function of end-of-pipe technologies, new investment will not necessarily correspond with reductions in pollution intensity unless such technology is required and enforced by government (Gallagher, 2002).

2. Standards and Compliance—The Role of the Mexican Government

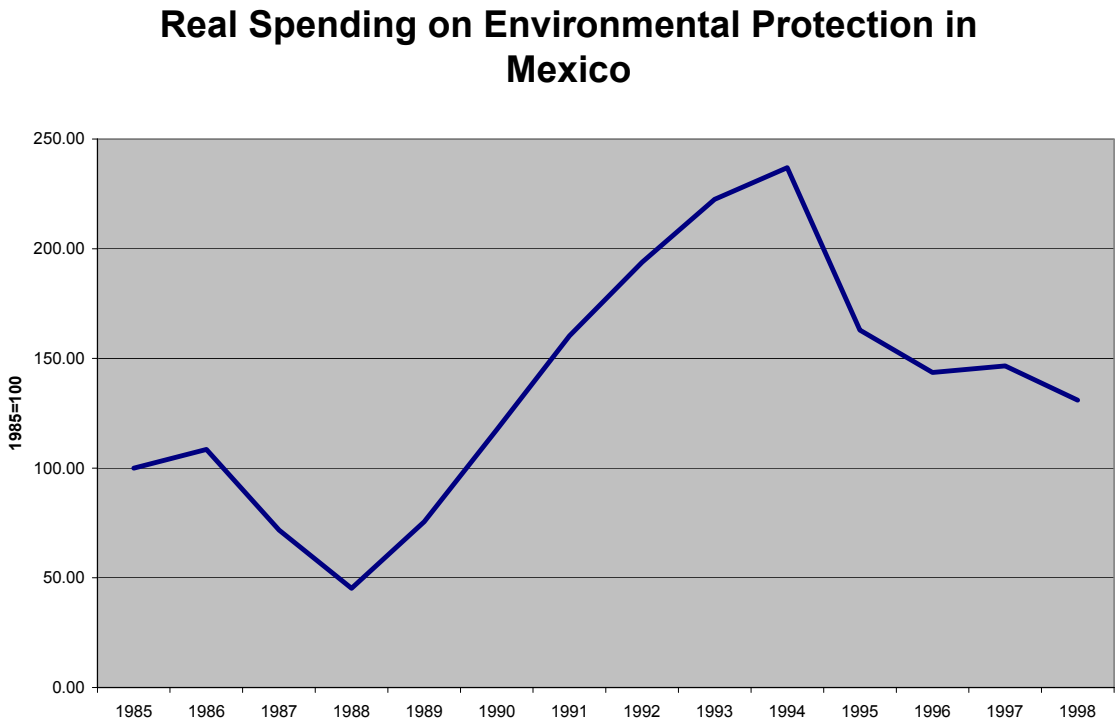
Dirty industries did not relocate to Mexico *en masse* following NAFTA. On the other hand, Mexico offered a generally laxer climate of environmental regulation for all industries than many U.S. states. In some cases, environmental standards were lower or non-existent.

In other cases, however, Mexican standards were—and are—relatively high, the result of significant evolution of environmental awareness during the 1990s. The problem is lack of enforcement, stemming in part from Mexico's macroeconomic and fiscal crises. While they may not have been drawn to Mexico because of lower environmental standards, foreign firms would have had the opportunity to perform poorly once they got there. No doubt, many did.

To assess the environmental performance of the FDI-led integration strategy in general, the issue of compliance by firms—domestic and foreign—with environmental regulation is paramount. What are the determinants of regulatory compliance in Mexico?

Two World Bank studies concluded that the key determinants of compliance by domestic and foreign firms with environmental regulations in Mexico are: 1) government pressure, including inspections; 2) local community pressure; and 3) whether or not the firm has an environmental management system (EMS). Interestingly, one of the studies found no correlation between compliance and foreign origin (Dasgupta, Hettige et al. 2000). Foreign firms, in other words, were no more likely to comply with regulation than domestic firms.

Figure 5



Source*: PROFEPA, 2002*

When foreign firms *are* in compliance, one study has shown that regulation and inspection are key drivers. A survey of 44 U.S. manufacturing firms in Mexico showed that environmental improvements such as investing in water treatment facilities were motivated by regulation and enforcement by the Mexican authorities (Gentry, 1998). A very recent study of 222 manufacturing firms in Mexico also found regulatory pressure to be the most significant driver of environmental performance. However, that same study also found firms exporting to the U.S. and Canada were more apt to be responsive to environmental concerns than non-exporting firms (Wisner and Epstein 2003).

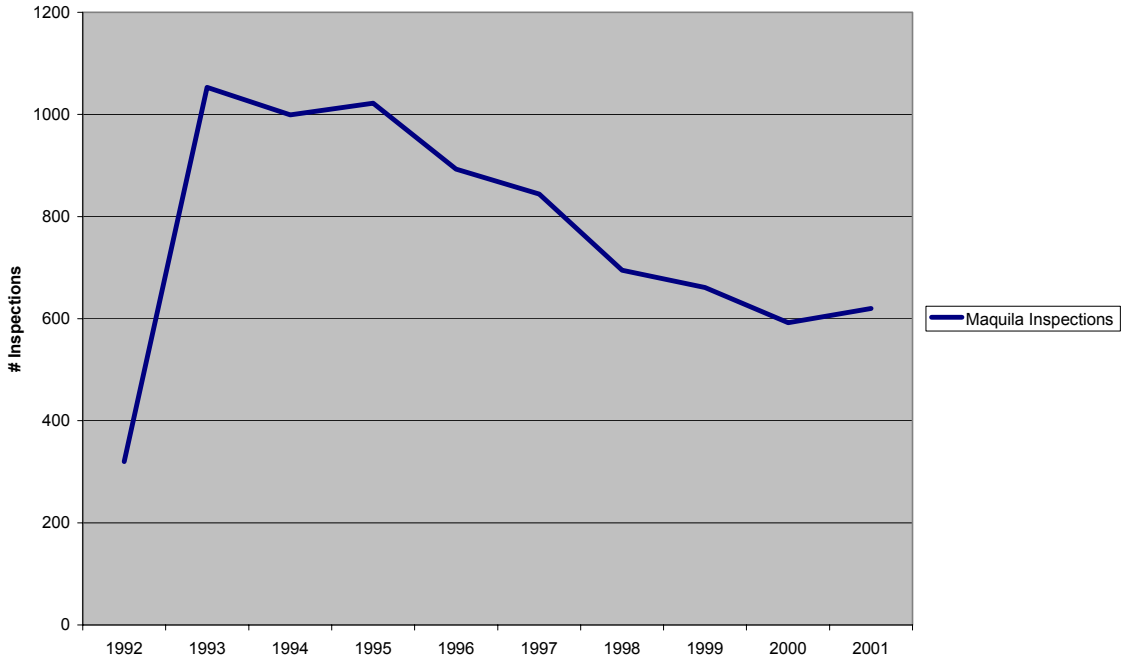
Despite its efficacy, there are signs that Mexico's commitment to regulatory pressure may be falling by the wayside. Although spending on environmental protection grew impressively between 1988 and 1993, it tapered off by 45 percent between 1994 and 1999 (Figure 5). Although such spending on the environment has grown considerably compared to earlier levels, it remains the lowest of all OECD countries. In relation to GDP, the average OECD country spends three times more than Mexico on the environment. In per capita terms, the average OECD country spends 6 times more than Mexico (OECD 1998).

Environmental inspection patterns mirror the trend in environmental spending. Although inspections got off to an impressive start in 1992, only 6 percent of establishments were inspected at the highest point. Total inspections decreased by 45 percent after 1993, and inspections in the maquila sector decreased by 37 percent (Figure 6).

The implementation of environmental management systems (EMS) has been found to correlate with firm-level environmental compliance. Although they are becoming more popular, the number of Mexican firms with EMS still remains very small. According to industry sources, 266 Mexican firms were certified to ISO 14,001, the international EMS standard, as of 2002 –only one tenth of one percent of all firms. Countries such as Brazil, Korea, Taiwan, and China have between 3 and 5 times the number of ISO certifications as Mexico (ISOWorld 2003).

Figure 6

Maquila Inspections, 1992 to 2001



Source*: Stromberg (2002)*

3. Voluntary Initiatives—Corporate Social Responsibility?

Prodded by pressures from environmental and community groups, as well as the threat of regulation, a number of companies, both foreign and Mexican, have taken voluntary initiatives to improves their environmental and social performance. Under the mantle of "corporate social responsibility," they have generated codes of conduct, implemented environmental management systems, consulted with advocacy groups, and/or produced "Sustainability Reports" disclosing information about company environmental performance.

Voluntary initiatives have helped to improve company communication with the public. How effective they are generally in improving environmental and social performance remains a subject of study (Leighton *et al*, 2002). In Mexico, a handful of studies have shown that foreign firms have transferred environmentally friendly technology and management methods to Mexico.

One study described the way that affiliates of U.S. chemical firms teamed up with the Mexican chemical industry to incorporate U.S. "responsible care" environmental policies into operations of the Mexican chemical industry (Garcia-Johnson 2000). Another study on the chemical fibres industry found that although environmental regulations and inspections were the key driver for environmental compliance in that industry, foreign participation in the industry was correlated with environmental improvements as well (Dominquez-Villalabos 2000).

Another voluntary effort in 1997 and 1998 involved a number of US firms, the World Bank, and Mexican SME (small and medium size enterprises) suppliers in the electronics and cement sectors. In an attempt to "green the supply chain," foreign firms such as Lucent, SCI Systems, and IBM (in addition to a few large Mexican firms) contributed funds toward the training and certification of their SMEs in environmental management systems. Every dollar provided by the larger "mentoring" firm was matched by the World Bank with another dollar. Although laudable as a structure for collaboration, the project's success was mixed. In some cases, the mentoring foreign firms themselves did not have an EMS, reducing their capacity to positively influence and work with their suppliers (World Bank 1998) .

There are signs that some portions of the Mexican business community are beginning to take the environment more seriously. In 1992, Mexico's National Council of Ecological Industrialists (CONIECO) was created as an organization of manufacturers and resellers of products that can help clean the environment. The Latin American chapter of the World Business Council for Sustainable Development was established in Mexico City in 1993. In 1994, the Center for Private Sector Studies for Sustainable Development (CESPEDES) was formed (Barkin 1999). And in 2002, the Mexican cement giant CEMEX received the 2002 World Environment Center's Gold Medal for International Corporate Environmental Achievement.

To what extent do foreign firms operating in Mexico take voluntary initiatives to improve environmental performance? In the absence of statistical or case studies, we examined the CSR ratings of the largest publicly traded US firms operating in Mexico undertaken by KLD Research and Analytics, Inc, a Boston-based firm that conducts research for socially responsible investment firms. KLD calculates a Broad Market Social Index (BMSI) by screening firms in the Russell 3000 Index.

KLD screens companies based on four criteria. First, firms in the Russell 3000 are screened for any involvement in alcohol or tobacco manufacturing, gambling, or nuclear power. In addition, firms are screened regarding whether they derive more than 2 percent of their gross revenues from military weapons production. If a company has any involvement in those sectors, it is automatically excluded from the index. The remaining companies are included or excluded based on assessments of strengths and weaknesses in the areas of community relations, employee relations, workforce diversity, environment, human rights, and product quality and safety.

The BMSI is a very broad, and in some ways, unsatisfying indicator. For example, it screens US firms based only on their performance in the US, not globally. And it does not allow for very fine insight into particular aspects of performance, such as environmental management. Nonetheless, it offers a general sense of whether or not a company has taken any action to be perceived as socially responsible. In some cases, TNCs adopt the same, high standards throughout their global operations, especially "leader" companies who are at the cutting edge of their industry in terms of technology and management (Zarsky and Roht-Arriaza, 2002).

Table 15 exhibits 10 of the top 26 largest firms operating in Mexico measured by the amount of sales in Mexico in 1999. The second column of the table indicates "n" if a firm does not qualify for KLD's socially responsible index, the BMS, and "y" if it does. KLD found that the three largest US firms operating in Mexico—GM, Ford, and Wal-Mart—did not meet their threshold criteria for social responsibility. Overall, 14 of the 26 (5 of the top 10) were deemed socially responsible—or 53 percent.

Though the index paints at best a crude picture, the results are not at odds with anecdotal evidence. GM and Ford have been embroiled in environmental controversies in the United States, including over climate change, hazardous wastes, and environmental regulation. Charged with discriminating against its female employees, Wal-Mart was the object of the largest US class action suit ever brought. In addition, General Motors and Ford operations in Mexico have been the subject of major controversies over labor rights, particularly (though not exclusively) in its maquiladora plants. Treatment of employees in maquiladoras is also a concern with regard to Lear Corporation, although the company's overall record is still considered socially responsible enough to be included in the BMSI (Gallagher and Birch 2004).

Table 15:

CSR of Mexico's Largest U.S. Firms

Company	Mexico Sales (millions of US$)	BMS
General Motors Corp. (GM)	7,340	n
Ford Motor Company	4,689	n
Wal Mart Stores	3,782	n
IBM	3,393	y
General Electric	3,048	n
PepsiCo	2,673	y
Motorola Inc.	2,600	y
Hewlett-Packard	1,672	y
Procter & Gamble	1,490	y
Anheuser-Busch	1,292	n

Source: Gallagher and Birch, 2004

For some companies, anecdotal evidence in the US and Mexico are at variance. Five General Electric facilities in Mexico exceed Mexican environmental standards and are certified as "Industria Limpia" (Clean Industry). At the same time, GE, which is not included in the BMSI, is targeted by the New York-based Interfaith Center on Corporate Responsibility as needing to increase the wages it pays to its Mexican workers. Procter & Gamble, which is included in the BMSI, has been targeted by NGOs for paying low prices to coffee producers in Mexico and elsewhere. It has responded to these pressures by funding schools and other community development projects rather than by purchasing fair trade coffee beans.

Some companies included in the BMSI have shown particular strengths in their Mexican operations. Pepsico falls into this category: "Frito-Lay has 450 electrically-powered vans in Mexico and Tropicana operates its own trains to transport its products, instead of delivery trucks" (KLD, 2003).

Finally, there is the possibility that companies can perform well in the US but not overseas. High tech companies, for example, generally seen as "clean and green", may generate significant health and environmental risks to workers and communities in countries which lack occupational health and safety protections and/or water management infrastructure—conditions reflected in the US 20 or 30 years ago (Zarsky 2002). IBM, for example, is currently facing lawsuits by ex-employees charging that the company knew that workplace chemicals caused their rare cancers. More than 250 workers from New York, Minnesota, and California have filed suits against the company (Reuters, 2003).

C. Rising Standards of Living?

From the perspective of most Mexicans, the overarching goal of Mexico's FDI-led integration strategy was to "make life better," that is to raise the standard of living, especially for the poor and middle class. The hope was that a boom in better-paying

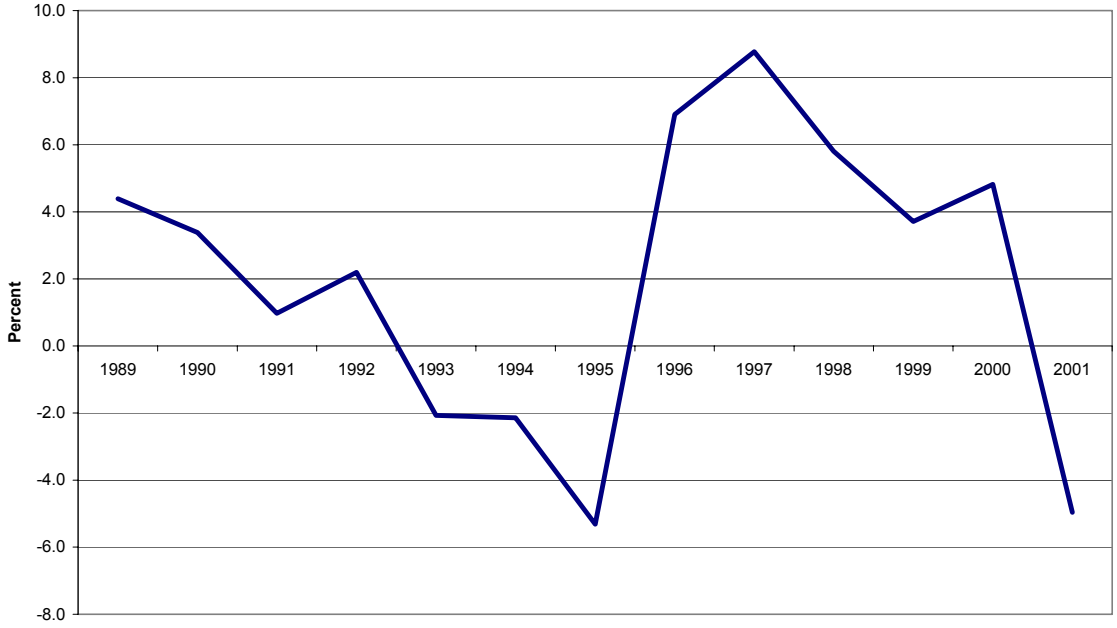
manufacturing jobs would absorb migrants from the countryside, including those displaced by NAFTA, raising incomes, narrowing the gap between rich and poor, and reducing cross-border migration.

By the end of 2002, the promise remained to be fulfilled. The jobs directly created by the growth of the export-oriented manufacturing sector have been relatively few in number, as well as low-paying and unstable. Moreover, the crowding out of domestic investment in manufacturing by FDI meant that the hoped-for boom in job growth did not materialize. In this section, we examine evidence about changes in wages and employment, income inequality, and internal and external migration patterns.

1. Wages and Employment

The bumpy growth in the manufacturing sector, especially the most recent recession, has exacerbated unemployment and underemployment in Mexico. A total of 637,000 new manufacturing jobs were created between 1994 and 2002 or about 82,500 each year. However, due in part to a demographic bulge and in part to displacement of farmers by NAFTA's agricultural liberalization, roughly 730,000 "new entrants" were added to the economically active workforce each year. A total of 6.5 million *new* workers sought jobs between 1994 and 2002. The manufacturing sector provided jobs for less than 12 percent of them. Moreover, job growth in the manufacturing sector has been on the decline since 1997 (Figure 7).

Figure 7
Annual Change in Job Creation in Mexican Manufacturing



Source: INEGI, 2003

The overwhelming majority of new jobs—nearly 96 percent—were in the *maquila* sector. The export-oriented segment of Mexican manufacturing, in other words, was dynamic but small in terms of creating jobs. In 2002, the major exporting firms and *maquiladoras* accounted for only 5.8 percent of total employment in Mexico (Dussel 2003). The hope that export-oriented FDI would be a major stimulus to job creation was based on the stimulating impact on domestic firms. But it never materialized. Stymied by the lack of investment, job growth in the domestically oriented manufacturing sector—which accounts for nearly 95 percent of employment—dried up. Moreover, jobs in the foreign sector are vulnerable to competition from Asia and to changes in global markets, especially slowdown in the U.S. economy.

There is evidence that many of the jobs that have been created in Mexico since 1994 are of poor quality. According to national employment surveys published by INEGI, 55.3 percent of new jobs in all sectors do not provide benefits. Indeed, nearly half (49.5 percent) of the employed Mexican workforce are without benefits (INEGI, 2003; referred to in Arroyo, 2003). Moreover, the minimum wage in Mexico has declined by more than 70 percent since 1982 and 7 percent since 1994 (Figure 8).

Despite an 18 percent increase in productivity, wages in Mexican manufacturing overall have declined by 13 percent since 1994**.** Manufacturing wages gained ground between 1987 and 1994 but collapsed as a result of the 1995 peso crisis. In real terms, wages in manufacturing were 24 percent lower than in 1982 (Salas 2003).

In keeping with the thrust toward low-cost/low-wage manufacturing, wages in *maquilas* are lower than in the manufacturing sector as a whole. For many years, wages in maquilas have been significantly lower than the mean manufacturing wage in Mexico, but since 1994 wages in the maquilas have been modestly rising. Real wages in maquiladoras averaged less than 80 percent of wages in non-maquiladora manufacturing between 1987 and 1994 (Alcalde 2000). Maquila wages have increased relative to non-maquila wages since 1994 but were still 14 percent below the non-maquiladora manufacturing wage in 2002 (INEGI, 2003). One study found that wage gains in Mexico have been the largest in those firms most exposed to international trade and investment (Hanson 2003). In other words, the one area where wage increases occurred in the 1990s was in the foreign enclave.

Those Mexicans who cannot find jobs and end up staying in Mexico comprise the country's large and growing informal sector of the underemployed. Official estimates of the percentage of economically active Mexicans in the informal sector range from 30 to 62.7 percent (INEGI, 2003).

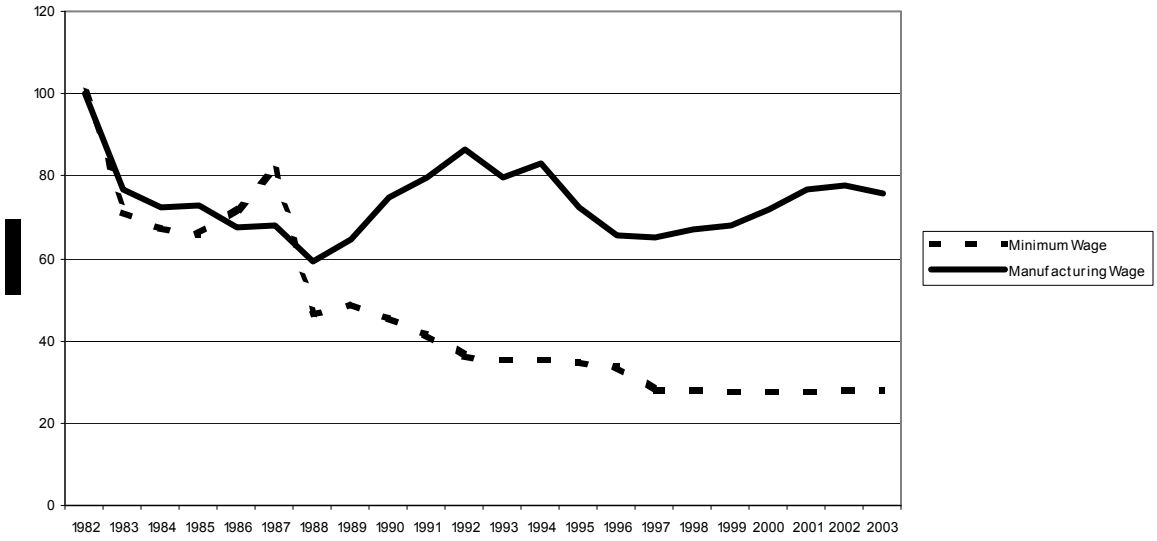
2. Inequality and Poverty

The failure of growth in the manufacturing sector to generate employment has exacerbated already high levels of inequality in Mexico. Table 16 exhibits various calculations the income distribution between 1984 and 2002 in Mexico—by income

decile and the Gini coefficient. The Gini coefficient ranges from a value of 0 if a nation has perfect equality, to 1 if a nation is very unequal. European countries, among the most equal societies, have Gini coefficients in the .23 range, while Brazil, the world's most unequal society, has a Gini coefficient close to .60. Corbacho (2002) found that Mexico's Gini ratio is close to .50 for most measures, making it one of the more unequal societies in the world.

Figure 8

Real Wages in Mexico, 1982 to 2003



Source: INEGI, various years

In 2002, the richest twenty percent of Mexicans continued to marshal more than fifty percent of total income—slightly more than in 1984--, while the poorest twenty percent continued to receive less than four percent, much the same as in 1984 (Table 16). . The Mexican government has pointed to the 2002 figures, which show small decline in income inequality for 2002. A closer look at Table 17 shows that the decline in income inequality is largely due to a 2.92 percentage point loss by the richest 10 percent of the Mexican population, and has been attributed to the stock market crash. The other 9 deciles gained by a mere .33 percent. Nonetheless, overall inequality declined by a small amount over the period we are examining.

Poverty remains widespread in Mexico. The Mexican government defines extreme poverty as households (that consist of 4.6 persons) whose incomes are between 0 and 2 "minimum wages" per day. At current exchange rates, two "minimum wages" is approximately 7.5 dollars, or $1.60 per person. In other words, households in extreme poverty in Mexico earn less than two dollars each day. Poverty, on the other hand, is defined as households that earn between 2 and 5 minimum wages per day –or $1.60 to $4 per day per person.

Table 16
Distribution of Current Monetary Income by Household Decile in Mexico

Deciles (low to high)	1984	1994	2000	2002
1	1.19	1.10	1.11	1.18
2	2.66	2.27	2.40	2.51
3	3.86	3.27	3.33	3.63
4	5.01	4.26	4.32	4.67
5	6.26	5.35	5.47	5.87
6	7.66	6.67	6.92	7.31
7	9.68	8.43	8.65	9.15
8	12.42	11.19	11.29	11.83
9	17.00	16.30	16.47	16.74
10	34.26	41.24	40.04	37.12
Poorest 2 Deciles	3.85	3.37	3.51	3.69
Middle 6 Deciles	44.89	39.17	39.98	42.46
Richest 2 Deciles	51.26	57.54	56.51	53.86
Rich-Poor Ratio (80/20)	13.31	17.07	16.10	14.60
Gini Coefficient	0.45	0.51	0.50	0.48

Source: *Author's calculations based on (INEGI, 2003, and Corbacho, 2002.*

According to official estimates by the Mexican government, the number of households in extreme poverty declined between 1984 and 1996 (the last available year). Between 1984 and 1996, extreme poverty decreased from 59 to 31 percent of the population, and total poverty from 91 to 73 percent (Dussel 2000).[7] However, these studies do not take into account the decline in purchasing power that has occurred over this period (see Figure 8). Adjusting for the real value of the minimum wage, Laos(2000) calculated that extreme poverty increased between from 30 to 38 percent of the Mexican population between 1984 and 1996, and total population in poverty increased from 58.5 to 79.5 percent.

With poverty comes marginalization. Although there have been some improvements since 1995, illiteracy, the percentage of the population without a complete primary education, and the percentage of people without electricity and running water is still extremely high by OECD standards (Table 18).

Table 18
Marginalization in Mexico

	1995	*2000*	*average*
		(percent)	
Illiteracy among population over 15	11	9	**10**
Population without complete primary education	24	28	**26**
Housing without drainage	14	10	**12**
Housing without electricity	7	5	**6**
Housing without running water	15	11	**13**
Housing with dirt floor	17	15	**16**

Source: CONAPO, 2003

3. Internal and External Migration

The economic forces described earlier in this report are both "push" and "pull" factors that contribute to migration in Mexico. As mentioned earlier, according to Mexico's national account estimates, roughly 730,000 Mexicans have entered the economically active workforce each year, totaling 6.5 million new entrants between 1994 and 2002. Only 552,000 new jobs were created in the entire economy each year on average, leaving some 2.5 million people without employment.

It thus comes as no surprise that poverty and marginalization have generated increases in both external and internal migration in Mexico. In the 1990s, approximately 300,000 Mexicans migrated to the U.S. each year—compared to less than 200,000 per year in the 1980s (INEGI, 2002). There is also a great deal of internal migration (Table 19) For example, more people left than came to Mexico City during that period**.**

Areas that attracted the most people are the industrial centers where FDI tends to agglomerate. Stimulating flows of migrants away from less productive rural areas toward urban areas with manufacturing enclaves was a stated goal of the Mexican Government. People are leaving the poorest regions such as Oaxaca, Chipas, and Guerrero and going to states such as Baja California, Chihuahua, and Tamaulipas.

Table 19
Internal Migration in Mexico

State	Immigration	Emigration	Net Migration
Aguascalientes	5.2	2.6	2.6
Baja California	11.7	3.3	8.5
Baja California Sur	9.9	4.8	5.1
Campeche	5.5	4.4	1.1
Coahuila de Zaragoza	3.6	3.5	0.1
Colima	6.7	4.9	1.8
Chiapas	1.4	2.8	-1.4
Chihuahuah	5.8	1.9	3.9
Distrito Federal	5.3	10.9	-5.7
Durango	3.1	5.8	-2.7
Guanajuato	2.4	1.9	0.5
Guerrero	2.1	5.3	-3.3
Hidalgo	5.0	4.2	0.7
Jalisco	2.9	2.8	0.1
México	6.6	4.0	2.6
Michoacán de Ocampo	2.7	3.3	-0.7
Morelos	6.4	3.7	2.7
Nayarit	4.3	5.2	-0.9
Nuevo León	4.0	2.1	1.9
Oaxaca	2.7	4.9	-2.2
Puebla	3.1	3.7	-0.6
Querétaro de Arteaga	6.5	2.9	3.6
Quintana Roo	16.3	5.0	11.4
San Luis Potosi	2.8	3.8	-1.0
Sinaloa	3.9	5.7	-1.8
Sonora	4.0	3.2	0.8
Tobasco	2.7	4.4	-1.7
Tamaulipas	7.0	3.1	4.0
Tlaxcala	5.1	3.4	1.7
Veracruz - Llave	2.8	6.3	-3.5
Yucatán	3.0	2.9	0.1
Zacatecas	3.0	4.1	-1.1

Source*: INEGI (2003)*

V. Conclusions and Directions

In this paper, we examined indicators of the performance of Mexico's FDI-led integration strategy in the 1990s against two broad sets of goals:

1) Objectives articulated by the Mexican government, including growth in FDI inflows and exports in the manufacturing sector, and domestic growth, investment and industrial restructuring;
2) The objectives of nurturing "sustainable industrial development," which we defined in terms of growth of endogenous productive capacity, improved environmental performance of industry, and reduced inequality.

We found that the strategy was successful in achieving some of the first set of objectives: FDI inflows and exports increased in the manufacturing sector, as did the productivity of Mexican manufacturing. However, our report points to four overarching conclusions:

- The FDI-dependent, export-oriented manufacturing model of development in Mexico is vulnerable to financial instability and loss of competitiveness.
- The integration strategy has generated a form of development in which the domestic economy is largely cut off from growth in the export sector.
- Environmental performance has worsened because of scale effects and the inadequacy of Mexican government commitment to environmental regulation.
- The strategy performed very poorly in terms of job growth and seems to have exacerbated, rather than reduced, income inequality and external migration.

The viability of the FDI-led integration strategy, in short, is far from assured, both because it may not be sustainable and because it does not generate sustainable industrial development. The essential problem is that the strategy confused means—macroeconomic stability and increased FDI inflows and exports—for ends, including a better life for the majority and an increase in domestic capacities for innovation and production.

The overarching question, of course, concerns the alternatives. Given market tendencies toward economic globalization, as well as neo-liberal regional and global trade and investment rules and the proximity of the colossus to the north, what "room to move" does Mexico have in terms of charting a path towards sustainable industrial development? Even if desirable, the ISI policies of the past are not feasible given current market conditions and trade and investment rules.

As a starting point, the government should embrace *sustainable industrial development* as the centerpiece of its development strategy. This would mean, first of all, that the fundamental goal would be not to increase FDI *per se* but to improve the overall climate for domestic production and investment, most importantly including investment by domestic investors in domestic firms. To do so, the high domestic cost of capital must be reduced in a way that does not re-trigger inflation. High interest rates, designed to attract foreign investment, have choked off domestic investment. Credit instruments designed specifically for micro, small and medium sized firms could generate both employment and investment, through their linkages to locally sourced inputs.

Second, a sustainable industrial development strategy would require a substantial increase in public and private investment in deepening and broadening Mexican capacities for innovation. Investment is needed in general education (primary through university), technical, engineering, scientific and business education, and industry-relevant research and development.

Third, the embrace of a sustainable industrial development strategy would mean looking to the domestic market as a basis for the growth of innovative and efficient firms. For example, R&D should be directed not only towards generating globally competitive products and industries but also those designed for domestic markets.

Fourth, appropriate policies would need to maximize the potential for efficiency spillovers from FDI, especially via the development of local supply capacities. In the past, Mexico obtained FDI spillovers largely via export performance and domestic content requirements. These policies are now ruled out by the WTO and NAFTA. Tools consistent with current trade and investment rules include tax incentives for local investment of profits and/or job training, as well as direct government support for job training and skill acquisition programs (see OECD, 2003).

Fifth, a strategy aimed at sustainable industrial development would require a vigorous commitment to minimizing the environmental damage generated by industrial growth. This would entail investing financial resources in strengthening and enforcing environmental regulations, as well as working with firms to develop performance-based environmental management systems. Environmental objectives also need to be integrated into R&D strategies to promote the design of more eco-efficient processes, products and services.

Sixth, a sustainable industrial development strategy would require reflection and debate on Mexico's overall industry strategy. What industries should Mexico nurture? Should it focus primarily on labor-intensive sectors rich in local content? Does Mexico need to have global "cutting edge" capabilities in industries such as high tech or bio-tech, in order to gain a basic knowledge and technical base for the industries of the future—or should it focus on agro-industrial industries which build on its core agricultural strengths? And what kinds of industry development tools might be effective?

A debate about industry policy and indeed, development strategy is already underway in Mexico. It is taking place against the backdrop not only of North American but larger hemispheric economic integration via the still-to-be-concluded Free Trade of the Americas Agreement. (FTAA). Through a ban on performance requirements and domestic content laws, the FTAA would proscribe for all Latin American countries the use of tools which, in an earlier era, helped Mexico develop a manufacturing base. Yet, it is clear that the neo-liberal strategy followed in the 1990s has worked more to de-industrialize than to develop manufacturing capacity in Mexico. A fulsome alternative would also require a restructuring of regional trade and investment rules to promote national capacities for development.

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[1] See also Amsden (2001).
[2] Such operations, however, have "shallow roots" and are vulnerable to being relocated to other locales where labor and other production costs are cheaper.
[3] This is precisely what happened in Mexico's manufacturing sector in the 1990s.
[4] That Mexico City received 60 percent of all FDI is questionable given the fact that while many foreign corporate headquarters are located in the capital, their factories are elsewhere in the country. Thus, the 60 percent figure could be a data collection error.
[5] Domestic demand is calculated as apparent consumption (value added plus imports minus exports)
[6] Criteria air pollutants are non-toxic air pollutants such as NOx, SOx, SO2, NO2, VOC, HC, all particulates, and carbon monoxide
[7] These figures are sometimes interpreted as being at odds with World Bank figures on poverty in Mexico. In fact, the World Bank is working with the same data (official Mexican data) but deriving different measures from it. For international comparison, the World Bank determines the number of people that live on less than one dollar per day, and the number of people who live on 2 dollars per day. For 1998, the World Bank reports that 15.9 percent of the Mexican population lived on less than one dollar per day, and 37.7 percent lived on less than two dollars per day. Remember that the range for extreme poverty in Mexico is between zero and 1.6 dollars per day. Thus, the World Bank figures for 2 dollars per day should be slightly higher than Mexico's extreme poverty figures, which they are (37.7 percent for World Bank, 31 percent for Dussel).