Integration, Productivity, and Inclusion in Mexico: A Macro Perspective

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1. Introduction

In the three decades since it opened its economy in the 1980s, Mexico has transformed itself into one of the world's leading exporters of manufactured goods in general, and of relatively advanced product categories in particular. Manufactures now account for about 80 percent of Mexican exports, and about three-quarters of these consist of machinery and equipment broadly defined—including large volumes of automotive and electronic products, and small but growing amounts of aerospace equipment, biotechnology products, and information technology. Mexican industries have become deeply integrated into global value (supply) chains, especially within North America and increasingly with East Asia and other world regions.

Yet, paradoxically, Mexico's stunning success in exports has been accompanied by a relatively low average growth rate of gross domestic product (GDP) over the past few decades, and the country has shown no signs of convergence with the United States and other industrialized countries in per capita income or labor productivity since it liberalized its international trade and foreign investment in the late 1980s. At the aggregate level, Mexico does not rank highly in international comparisons on a variety of key indicators of technological progress, such as patenting activity, research and development (R&D) expenditures, or productivity growth. Moreover, the benefits of Mexico's export success do not appear to have been widely shared within the country, as the net employment gains in export industries have been disappointing and real wages in manufacturing have not increased significantly over the past two decades.

The incongruence between Mexico's export success and its lags in other indicators can be explained to some extent by the conceptual framework about technological innovation and economic catch-up proposed by Lee in his chapter in this book (see also Lee, 2013). As Lee observes, what ultimately drives increases in real wages and living standards is a sustained high rate of economic growth, which eventually exhausts the pool of surplus labor in a developing economy. Once real wages begin to rise, firms then have incentives to engage in innovative activities, aimed at raising the productivity of labor on the one hand and shifting toward industries that emphasize high quality over low cost on the other. In order to launch this process, a developing country should first emphasize employment by pushing exports of whatever products in which it has a comparative advantage, usually unskilled labor-intensive manufactures. In these early stages of industrial development inequality typically worsens as wage rates are initially low but productivity starts increasing. Over time, however, as wages rise and industries shift into more capital-intensive and technologically advanced directions, average living standards increase and the benefits of industrial development become more widely shared—but only if rapid growth is sustained over a long period of time instead of sporadic.

In the Mexican case, in spite of considerable success on the export front, the country has not had the kind of sustained rapid growth that is necessary to eliminate excess supplies of labor and raise real wages. Mexico's average growth rate since it opened its economy in the late 1980s is less than 3 percent per year, compared with about 6 percent in the earlier epoch of import substitution industrialization policies, and notably less than what has been seen in the emerging market nations such as Korea and China in which real wages have increased. This slow average growth resulted initially from a series of boom-bust cycles and periodic crises in the 1980s and

1990s, but more recently has been the outcome of macroeconomic stabilization policies that have been designed to avoid crises but have done so by effectively restraining the accumulation of capital and growth of output in the domestic economy (Moreno-Brid and Ros, 2009). In addition, the growth stimulus that Mexico received from exports in the early post-liberalization and post-NAFTA years (1987-93 and 1994-2000, respectively) has been considerably dampened since 2001 (Ibarra and Blecker, 2014). As a result of slow average growth, real wages have not increased, incentives for innovation have been blunted, and the gains from export success have not been widely shared.

Nevertheless, Mexico's openness to trade and its participation in global and regional value chains have led to significant industrial upgrading and the beginnings of local innovative efforts in certain segments of the economy, as demonstrated in the chapter by Carrillo. The days when labor-intensive apparel sweatshops were typical of Mexico's maquiladora export industries are gone; apparel factories and other low-skilled activities have largely moved on to lower-wage nations. As Mexico's exports have become concentrated in various types of machinery and equipment, its export industries have undergone a dramatic upgrading, resulting in rising skill levels and educational requirements for the labor force and—to a much more limited extent—increased R&D activity within a subset of firms.[1]

The rest of this chapter is organized as follows. Section 2 describes the main economic policies that have both propelled and circumscribed Mexico's export success and industrial development over the past few decades. Section 3 discusses the transformation of the country's trade profile and industrial structure, and discusses why productivity growth and technological innovation have remained so limited at the aggregate level. Section 4 assesses the evidence regarding the inclusivity of the Mexican model of economic integration and export promotion. Finally, section 5 concludes by summarizing the policy lessons that the Mexican case may imply for other Latin American nations seeking to escape from the middle-income trap via an economic integration strategy.

2. The policy framework

This chapter was written at a time when the Mexican government was attempting to implement a new reform agenda in areas such as energy, telecommunications, and education. But for the past three decades, Mexico's policy framework has been dominated by a series of measures aimed at opening up what was once a relatively closed economy.[2] As it emerged from the debt crisis of the 1980s, Mexico adopted a *de facto* industrial development strategy based on trade liberalization, regional and global integration, and the privatization of significant parts of the domestic economy (Lustig, 1998; Moreno-Brid and Ros, 2009). The new approach expressly rejected the state-led development strategy of the former import substitution regime as well as the more state-managed form of export-led growth adopted in many East Asian countries (see Amsden, 1989, and the chapter by Lee), and instead allowed market forces to dictate the pace and composition of the country's industrial evolution.

The attitude at the time when Mexico launched its economic integration policies was best described by the aphorism, "the best industrial policy is no industrial policy", often attributed to officials in the administration of President Carlos Salinas (1988-94). Nevertheless, various

government policies (or the lack thereof) remained important conditioning factors that helped to determine which sectors, industries, and regions benefited more from the new export-oriented industrial development, while the opening to foreign trade and investment flows allowed external conditions to have a magnified impact on the domestic economy (Blecker, 2009).[3] At the same time, the incomplete nature of many domestic reforms has allowed relatively narrow interests to capture many of the gains from the liberalization and privatization processes, while limiting the inclusivity of the nation's economic model (Levy and Walton, 2009). Although there is still an ambivalence about embracing anything that could be called "industrial policy" (Moreno-Brid, 2013), there is now a growing recognition among policy makers that liberalization and integration alone cannot lift the country out of the middle-income trap.

2.1 Trade and integration policies

Mexico began to phase in dramatic reductions in tariffs and non-tariff trade barriers (for example, import licensing requirements) in the mid-to-late 1980s, especially after it joined the General Agreement on Tariffs and Trade (GATT) in 1986. Restrictions on foreign direct investment (FDI) were also liberalized in the late 1980s and early 1990s. Then, Mexico joined the North American Free Trade Agreement (NAFTA) with the United States and Canada in 1994, marking the first time in the modern era that a major developing nation had formed a free trade area with major industrialized nations. NAFTA eliminated most tariffs over a 15-year period, but certain sectors deemed strategic in each country (including agriculture and pharmaceuticals in the United States and energy in Mexico) remained subject to existing regulatory regimes and were not fully opened to free trade.

Almost as soon as NAFTA went into effect, however, both Mexico and other countries took steps that effectively reduced the degree of preferential treatment that the three NAFTA members had accorded to each other. The World Trade Organization (WTO) was formed in 1995, only a year after NAFTA, and Canada, Mexico, and the United States were all founding members. WTO reductions in multilateral (most-favored-nation or MFN) tariffs effectively diluted the tariff preferences Mexico had received in the U.S. and Canadian markets via NAFTA, and also reduced Mexico's own trade barriers with countries outside North America. Subsequently, Mexico signed free trade agreements and other market-opening pacts with many other countries in Latin America and beyond. As of July 2014, Mexico had 10 trade agreements in effect with a total of 43 countries in addition to NAFTA.[4] Mexico helped launch the Pacific Alliance trade initiative in 2011, along with Chile, Colombia, and Peru, and joined the negotiations for a Trans-Pacific Partnership (TPP) in 2013. Also during the past two decades, the United States has signed free trade agreements with numerous other countries, including Korea, Singapore, Chile, Colombia, Peru, the Dominican Republic, and most Central America nations, among others, thus giving these countries tariff preferences in the U.S. market similar to those granted earlier to Mexico under NAFTA. Moreover, the entry of China into the WTO and its acquisition of "permanent normal trade relations" (MFN status) in the United States in 2001 marked a watershed in Mexico's ability to compete in the U.S. market, as will be seen in the next section. Thus, what began as an effort at mostly regional (North American) integration in the early 1990s ultimately ended up exposing Mexico to global competition both in the U.S. market and domestically.

Although Mexico thus has pursued many different routes to reducing trade barriers, NAFTA remains especially important for the limitations it imposes on the types of micro-level policies that the Mexican government can use. Many kinds of industrial promotion activities that have been widely used in both Latin America and East Asia, especially those that would favor national firms over foreign ones, are expressly forbidden by NAFTA. NAFTA also imposed a property-rights regime consistent with U.S. corporate interests, under which many types of regulations can run afoul of the "expropriation" clause (broadly interpreted by some NAFTA dispute resolution panels to encompass any "taking" of potential profit opportunities, for example, through environmental regulations). Mexico cannot impose performance requirements on foreign companies, except insofar as they must satisfy NAFTA rules of origins in order for their products to count as North American goods for purposes of receiving tariff preferences. These provisions were accepted by Mexico in the NAFTA negotiations partly because of U.S. insistence, and also because the Mexican government hoped that the benefits in terms of enticing foreign corporations to produce in Mexico would outweigh any costs. Nevertheless, Mexico still retains some policy space, especially through education and training policies that can upgrade the skills of the labor force along with the provision of infrastructure and tax breaks, all of which are permitted by NAFTA as long as they are applied in a nondiscriminatory fashion to foreign and national firms alike.[5]

Long before it began to adopt broad economic opening measures in the late 1980s and early 1990s, however, the Mexican government created incentives to lure manufacturing assembly operations to Mexico through what became known as the "maquiladora" program. Launched in 1965, this program exempted imports of intermediate goods from Mexican tariffs provided that the imported inputs were used to assemble finished or semi-finished products for export. The program was assisted by U.S. trade laws that exempted the value of U.S.-produced intermediate inputs from U.S. tariffs on the imported (assembled) finished goods, so that in effect U.S. tariffs were charged only on the value added in Mexico plus any inputs imported from third countries. The maquiladora program began as a modest effort located mainly along the U.S.-Mexican border, but eventually became a major portion of the nation's manufacturing sector accounting for about one third of that sector's employment and more than one-half of manufacturing exports as of 2006 (the last year for which separate data for the maquiladora industries were reported). By that time, the general reductions in Mexico's tariffs and the extension of tariff exemptions for imported intermediate goods to other (non-maquiladora) industries and non-NAFTA countries via the PITEX program had made the maquiladoras less distinctive, so the government stopped reporting separate statistics for them. Instead of the maquiladoras disappearing, however, the maquiladora model has essentially become generalized to most of Mexico's manufacturing export industries, which are heavily focused on assembly operations using imported inputs (Moreno-Brid et al., 2005).

2.2 Exchange rates

A full discussion of Mexico's macroeconomic and monetary policies would be beyond the scope of this chapter, but the country's exchange rate fluctuations have had a profound impact on the evolution of its trade performance and industrial development since the opening of the economy.[6] During the initial years of trade liberalization (1987-94), Mexico used the exchange rate as a nominal anchor for the price level in order to reduce the high inflation rates

that had arisen during the preceding years of the debt crisis. This exchange rate anchor was successful in reducing inflation to single-digit rates, but resulted in a dramatic real appreciation of the peso (see Figure 1) that made Mexico's products significantly less competitive precisely at a time when the country was opening its markets to foreign competition, resulting in an enormous trade deficit by around 1993-94.

[Figure 1 about here]

The peso then collapsed during the financial crisis of 1994-95, after which the Banco de México moved toward an inflation-targeting monetary policy and a managed float for the peso in (inflation targets were first proposed in 1999 and became official policy in 2001). The peso again appreciated strongly in real terms up to around 2001-2, at which time its real value was close to or above (depending on the measure) what it had been in 1993-94. This real appreciation is seen not only in the peso's value relative to the U.S. dollar, but also in the IMF's multilateral real effective exchange rate (REER) index and a bilateral index with the Chinese yuan (Figure 1). This renewed overvaluation of the peso contributed to a period of reduced dynamism in Mexican exports in the early 2000s, as will be discussed below.

The peso has generally depreciated in real terms since 2003, and more so since the global financial crisis of 2008-9. By 2011-12, the peso was back to about the same real value as it had in the late 1990s in multilateral terms, and at this more competitive exchange rate the country's export dynamism began to recover—although the temporary appreciation in 2013 did not help Mexican exports in that year.[7] Importantly, in recent years the peso has depreciated much more relative to the Chinese yuan than it has relative to the U.S. dollar or on a multilateral basis (because of China's deliberate revaluation policy and rising labor costs), thus helping Mexico to recuperate from its previous loss of competitiveness vis-à-vis China in the early 2000s.

2.3 Other policies and institutions

Aside from trade agreements and exchange rates, many other policy instruments and institutional factors have had a strong impact on the outcomes of Mexico's economic integration policies. For reasons of space, we can only mention a few of the most important policies and constraints here (innovation policies are covered in section 3.2, below). Mexico's infrastructure investment lags consistently behind other emerging market nations as well as the industrialized countries. A report by the McKinsey Global Institute (Bolio et al., 2014, hereafter referred to as "the MGI report") estimates that the total stock of infrastructure represents only 53 percent of GDP in Mexico, compared to a 71 percent global average. Calderón and Servén (2011) found that Mexico's infrastructure expenditures (as a percentage of GDP) were the lowest among the six largest Latin American economies as of 2001-6. In regard to education, Mexico has made strong advances in educational attainment levels (see Esquivel et al., 2010; Ros Bosch, 2013). Nevertheless, it still lags significantly behind the leading East Asian countries on most indicators of educational achievement, especially in the scientific and technical fields (see the chapters by Deyo and by Larrañaga and Rodríguez in this volume).

Another important constraint is finance: Mexico ranks below the Latin American average (and far behind East Asian countries such as Korea and China) on the metric of domestic credit to the private sector as a percentage of GDP. As the MGI report notes, "large Mexican

corporations get access to global capital markets at rates similar to those available to large US companies.... But this has not been the case for small and medium-sized companies" (Bolio et al., 2014, p. 58). Finally, Mexico faces continued challenges in what might be broadly defined as the "business environment". For example, the Organisation for Economic Co-operation and Development (OECD, 2009) ranks Mexico as having among the highest costs of contracting in the world. Nevertheless, Mexico's ranking in some comparisons of international competitiveness has improved in recent years. The World Economic Forum (2013) ranks Mexico 55th out of 148 countries for 2013-14, up from 58th out of 142 two years earlier. The World Economic Forum (2013, p. 276) also reports that the five "most problematic factors for doing business" in Mexico are corruption, crime and theft, inefficient government bureaucracy, tax regulations, and access to financing, while the least problematic factors (i.e., more positive areas) for Mexico include the work ethic and education of the labor force, political stability, and monetary factors (such as inflation and foreign currency regulations).

3. Integration, productivity, and innovation

3.1 Trade flows and industrial integration

What makes Mexico of interest as a potential role model for other Latin American nations is above all its tremendous success in exports of manufactures. During a historical period in which many South American nations have reverted to being primarily exporters of primary products, the growth of Mexico's manufactured exports has been nothing short of stunning. Mexican manufactured exports grew (in real, inflation-adjusted terms) at an average annual rate of 14 percent in the first seven years of its trade liberalization policies (1987-93) and an even faster 16 percent annual clip during the first seven years of NAFTA (1994-2000).[8] Manufactures accounted for less than one-third of total Mexican exports in the 1960s and early 1970s (even including the nascent maquiladoras, which began to export in 1966), but averaged more than 80 percent of total exports during the entire post-NAFTA period (1994-2012) (Ibarra and Blecker, 2014).

As of 2012, the manufacturing share of Mexico's exports as reported by the World Bank was 74 percent, which placed Mexico in the first ranks of nations globally as a manufacturing exporter.[9] By this measure Mexico was very close to the European Union and Turkey, only slightly behind Korea, and ahead of India and the United States—and far above the Latin American and Caribbean average or the larger South American countries. Indeed, Mexico's share of manufactures in total exports was higher than that of three out of the four BRIC countries (only China's share was higher, but China is a natural resource scarce country that exports relatively few primary commodities). However, while Mexico has remained highly specialized in manufactured exports to date, the growth of these exports has slowed down notably since 2001: the average growth rate of manufactured exports in 2001-12 was only 3 percent in real terms, during a period of slower growth in Mexico's primary export market (the United States) and increased Chinese penetration of that market (Ibarra and Blecker, 2014).

A similar pattern of dynamic export gains for Mexico in the early years of trade liberalization and NAFTA followed by a slowdown after 2001 is found in the data on bilateral U.S.-Mexican trade. As shown in Table 1, U.S. nonpetroleum imports from Mexico grew at a

remarkable 25.2 percent annual rate (in real terms) between 1993 and 2000.[10] At the same time, the share of Mexico in total U.S. nonpetroleum imports increased from 6.7 percent in 1993 to 11.4 percent in 2000. The initial success of the regional integration process is also visible in the Mexican trade data for the immediate post-NAFTA period. The share of the United States in total Mexican exports rose from an already high 82.7 percent in 1993 to 88.7 percent in 2000, while the U.S. share of total Mexican imports increased from 69.3 to 73.1 percent between the same two years (Table 2). Thus, the intensity of Mexico's intra-regional trade within North America increased significantly during the early years of NAFTA.

[Tables 1 and 2 about here]

During the 2000-7 period, however, the average annual growth rate of U.S. nonpetroleum imports from Mexico slowed to only 5.6 percent, while the growth rate of U.S. imports from China (all of which are nonpetroleum) was almost four times as high at 20.4 percent (Table 1). As a result, the Mexican share of U.S. nonpetroleum imports remained roughly constant (11.3 percent in 2007 versus 11.4 percent in 2000), while the Chinese share more than doubled from 9.1 to 19.7 percent between 2000 and 2007. Mexico held its position in the U.S. market better than most other nations at that time, because the jump in China's share during this period came more at the expense of other countries rather than Mexico. Nevertheless, numerous studies using a variety of methodologies have shown that significant amounts of potential Mexican exports were displaced by competing Chinese products in the U.S. market, implying that the Mexican share would likely have grown notably larger in the absence of the extraordinary growth of Chinese exports to the United States during that period.[11]

Perhaps the most dramatic sign of a post-2000 decline in North American regional integration was the drop in the U.S. share of Mexican imports from 73.1 percent in 2000 to 49.5 percent in 2007 (Table 2). During the same period, the Chinese share of Mexican imports jumped from 1.7 to 10.6 percent and the other Asian share increased from 10.0 to 17.6 percent. In contrast, the U.S. share of Mexican exports dipped more modestly from 88.7 to 82.1 percent between 2000 and 2007, so Mexico continued to be highly dependent on the U.S. market for its export sales. It should be noted that the reduced export dynamism and decreased regional (North American) integration in 2000-7 occurred—with suitable allowance for lagged effects—around the time when the peso was most overvalued.

Mexican exports performed relatively better during the most recent phase (2007-13), largely because a depreciated peso combined with rising global fuel and transportation costs made Mexico once again a more competitive location for industrial production (so-called "reshoring"). Although overall U.S. nonpetroleum imports grew very slowly (only 1.5 percent per year) in this period as a result of the Great Recession and slow recovery thereafter, imports of such goods from Mexico grew faster than this average rate and slightly faster than imports from China (4.4 percent for Mexico versus 4.3 percent for China). Also in this last phase, the U.S. share of total Mexican imports remained around 49 percent while the Chinese share rose further from 10.6 to 16.1 percent, and the U.S. share of Mexican exports continued to decline gradually (to 78.8 percent, the lowest level since the adoption of NAFTA). Thus, Mexico's efforts to diversify its export markets via other trade agreements may have begun to bear some modest fruit, but the reduction in the U.S. share of Mexican exports could also be partly a result of the

slowdown in U.S. economic growth in this period.

Overall, these data reveal a striking shift in Mexico's pattern of international integration since around 2000. When Mexico originally opened up its economy and joined NAFTA, it initially developed a heavily regional or bilateral pattern of trade within North America: Mexico imported mostly U.S.-produced capital and intermediate goods, and exported assembled products manufactured with these inputs back to the U.S. market. Since 2000, however, Mexico has exhibited more of a triangular pattern of trade, in which its imports come increasingly from East Asia while its exports are still sold mainly in the United States.

In spite of this shift in the trade pattern, NAFTA does appear to have resulted in a lasting increase in the degree of integration of industrial production in Mexico and the United States. The correlation coefficient for the growth rates of the two countries' monthly indexes of industrial production (shown in Figure 2) was only 0.23 for the period 1981-93, prior to NAFTA, but rose to 0.59 percent in 1994-2013 after NAFTA went into effect, even including the years of the peso crisis and recovery.[12] If we focus on the years after NAFTA *and* the recovery from the peso crisis, this correlation increased further to 0.83 in 1997-2013. Given the much larger size of the U.S. economy, we can infer that the Mexican industrial sector derives its dynamism mainly from the U.S. industrial sector and not vice-versa.

[Figure 2 about here]

The high correlation of Mexican and U.S. industrial production is consistent with the incorporation of Mexican industries into global and regional value chains targeted mainly at the U.S. consumer market. Further evidence of Mexico's incorporation into international value chains comes from its high degree of reliance on imported inputs (parts and components) for its export production. Ibarra and Blecker (2014) estimate that the elasticity of imports of intermediate goods with respect to manufactured exports is about 0.6 to 0.7, implying that for every 10 percent increase in Mexico's manufactured exports, imports of intermediate goods rise by about 6 to 7 percent. Furthermore, Mexico's exports are highly concentrated in industries in which global value chains are prevalent. As of 2012, about 76 percent of Mexico's manufactured exports consisted of transportation equipment (principally automobiles and auto parts), computers and electronic products, and other machinery and equipment. Most of the export growth in recent years has occurred in transportation equipment, which expanded by a remarkable 52 percent (in chained 2009 dollars) between 2007 and 2012.[13]

Deeper industrial integration with the United States turned out to be a boon for Mexico in the late 1990s. In the period 1997-2000, after the recovery from the peso crisis, the two countries' average annual growth rates of industrial production were almost identical, at 5.3 percent for the United States and 5.4 percent for Mexico. However, during the 2001-13 period, average annual industrial growth dropped to 0.7 percent per year in the United States and 1.2 percent in Mexico. Moreover, as Figure 2 shows, this slowdown in industrial growth began even before the Great Recession of 2008-9. Thus, the integration of Mexican industries into North American supply chains has continued to date, but has proved to be much less beneficial for Mexico since U.S. industrial growth slowed down in the early 21st century.

3.2 Productivity and innovation

In spite of Mexico's relative success on the export side, its productivity growth has continued to lag behind many other major emerging market nations. Figure 3 compares the annual average growth rates of real GDP per employed person, in constant 1990 purchasing power parity (PPP) dollars, for a sample of emerging market nations from Asia and Latin America for the period 1990-2012. Mexico's productivity growth rate of only 0.8 percent per year ranks near the bottom among this group of comparator countries. However, Mexico's low average growth rate of productivity for total GDP is partly a reflection of the shift of labor into services, in which productivity grows more slowly (or has been falling, depending on the time period examined),[14] especially because a large portion of Mexican services production is in the informal sector in which productivity is low and slow-growing.

[Figure 3 about here]

In order to compare productivity growth rates for the trade-related parts of GDP, we also present data in Figure 3 for the manufacturing sector.[15] As expected, Mexico's growth rate of labor productivity (real value added in constant pesos per employed worker) in manufacturing is higher than for overall GDP (2.1 versus 0.8 percent per year). However, productivity growth is higher for manufacturing than for overall GDP in most of the countries shown, so Mexico remains toward the lower end of the sample. Among the 16 countries included in this database (which includes Taiwan but excludes China), Mexico is ahead of only three countries (the Philippines, Brazil, and Colombia) in manufacturing productivity growth and behind the other 12 covered (the highest of which, Korea, registers 8.5 percent annually).

Although Mexico's productivity growth is thus quite disappointing, the average growth rate of productivity for the whole economy masks considerable unevenness between different segments of the country's highly dualistic economy. According to an analysis of Mexican economic census data for the period 1999-2009 in the MGI report (Bolio et al., 2014),[16] real value added per occupied person (in constant 2003 pesos) grew at a 5.8 percent annual rate in large firms (those with more than 500 employees), a 1.0 percent annual rate in medium-size firms (11-500 employees), and a –6.5 percent annual rate (i.e., there was falling productivity) in small firms (10 or less employees). The last group of firms, most of which can probably be considered informal enterprises, accounted for 42 percent of total employment in this sample in 2009 (up from 39 percent in 1999), while large firms accounted for only 20 percent (the same as in 1999). Thus, as of 2009 the vast majority (80 percent) of the nonagricultural private labor force was working in firms that had either mediocre or negative productivity growth during the preceding decade. This accounts for why the overall average growth rate of productivity (0.8 percent for all firms covered in these economic censuses) is so low, but it also shows that there is a modern segment of the Mexican economy in which productivity growth is quite rapid.

Whereas the MGI report covers labor productivity in all nonagricultural firms (and hence includes services and other industries, such as transportation, mining, and utilities, in addition to manufacturing), an earlier study by López-Córdova and Moreira (2004) focused on total factor productivity (TFP) in the manufacturing sectors of Mexico and Brazil. For Mexico, this study found that "all firm-level gains [in TFP] occurred in traded industries, as productivity in firms in

nontraded industries actually declined", and that the reallocation of resources toward traded goods production contributed significantly to aggregate TFP gains in manufacturing (López-Córdova and Moreira, 2004, p. 589). They also found that "foreign firms were 13 percent more productive than their local counterparts in Mexico", after controlling for other industry characteristics (p. 598). López-Córdova and Moreira did not find that exporting *per se* or the use of imported inputs contributed significantly to productivity growth (in fact the latter had a negative effect on TFP growth for foreign firms). However, they concluded that exporting selects for the more productive firms (i.e., the more productive firms are the most successful in exporting, and hence grow faster than other firms), and that the resulting reallocation of resources toward such firms increases average productivity and the average TFP growth rate in manufacturing.

There are several possible ways in which Mexico could accelerate its overall productivity growth. First, given the enormous disparities in productivity levels and growth rates between the large, modern firms and the rest of the economy, much could be accomplished simply by expanding the share of the former in the total economy—or else by enabling small and medium-sized enterprises to acquire more advanced technology and more efficient production methods. Second, Mexico needs to continue improving its technology in all enterprises, large and small.[17] The two routes by which a country can improve its technology are diffusion (adopting more advanced technologies already developed elsewhere) and innovation (developing new or improved products and methods of production). In the aggregate, Mexico's R&D expenditures are currently only about 0.5 percent of GDP, which puts the country well behind the leading emerging market nations such as Korea and China as well as the advanced industrialized countries, and Mexico also does not rank highly in patenting activity (see data in the chapter by Stallings in this volume). Although the macro-level evidence thus seems to suggest that Mexico has been proceeding mainly by the first route (diffusion/adoption of existing technologies), at the micro level there is evidence of an increasing amount of technological innovation occurring inside Mexico (as covered in the chapter by Carrillo).

This discrepancy raises the obvious question of why the innovative activities documented by Carrillo at the micro level do not have a greater impact on the aggregate statistics for R&D, productivity, or other indicators of technological progress. One important reason is the dualism discussed above: the vast majority of the smaller, low-productivity firms are incapable of innovating; mostly the larger ones and perhaps a few of the smaller or medium-sized ones have the potential to be able to innovate. However, even among the larger firms and multinational enterprises (MNEs), the vast majority are not currently engaged in innovative activities. Carrillo's survey of MNEs in Mexico (which includes both foreign and domestically owned firms) shows that only 28 percent are conducting innovation in Mexico, while 72 percent are not. Trade liberalization and economic integration have induced Mexican producers to focus on upgrading their production facilities and product quality, but until recently—and still for most firms today—this upgrading has been accomplished primarily through the adoption of foreign technology rather than by domestic innovation (Carrillo et al., 2012).

Another important factor is that government policies designed to promote R&D in Mexico are both recent in time and still limited in scope and budget. According to Villavicencio (2012, pp. 35, 43), "La política de innovación en México como tal empezó hace apenas una

década.... [E]s hasta el nuevo milenio que aparecen políticas para fomentar la innovación en las empresas, incitando asimismo la inversión privada en la I+D y la cooperación con instituciones académicas y centros públicos de investigación". Villavicencio documents how one new institution, the federal Fondo Sectorial de Innovación (created in 2002), has funded R&D activity in various sectors, but has failed to increase its efforts significantly over time as a result of both budget constraints and a limited pool of eligible proposals. Because of the limited extent of the innovative efforts to date as well as the long lags involved in achieving measurable gains in productivity from innovative activities, it may be too soon to judge what kind of aggregate impact these activities may have in the long run.

Thus, there is a significant segment of the Mexican economy that is modern and dynamic, with high and rising productivity; this segment consists mainly of the larger firms and perhaps a small portion of the small- and medium-sized ones, and within manufacturing is primarily oriented toward exports and dominated by foreign MNEs. In this sense, Mexico's economic opening strategy and its increasing integration into regional and global value chains have been successful in creating industries that are globally competitive and technologically progressive. However, this segment of the economy has not yet grown large enough to encompass more than one-fifth of the private, nonagricultural labor force, and only a subset of the modern segment of the economy is engaged in truly innovative activities. As a result, the average growth rates of productivity for the entire economy and for the manufacturing sector as a whole remain disappointingly low.

4. Inclusion: employment, wages, and convergence

One of the main objectives of Mexico's trade liberalization and economic integration strategy was to boost employment and wages in the country's industrial sector. This set of objectives was famously enshrined in Salinas' twin promises that NAFTA would enable Mexico to "export goods not people" and that it would transform Mexico into a first-world nation (which presumably would imply absolute, unconditional convergence in per capita income and real wages). Of course, the flow of migration to the United States did not diminish, and if anything it probably accelerated in the first decade after NAFTA (Hanson, 2006); it has slowed since then mainly as a result of increased U.S. enforcement of immigration restrictions and slower growth in the U.S. economy. In this section, we focus on the domestic outcomes in the Mexican labor market and income distribution (see also the chapter by Deyo for comparisons of Mexico with the East Asian countries on similar indicators).

4.1 Employment

Because manufactures account for the vast majority of Mexico's exports, we focus on manufacturing employment here. Figure 4 pieces together the best available data for employment in the manufacturing sector of Mexico between 1988 and 2013. Total employment in Mexican manufacturing grew by about 900,000 jobs in the first five years of NAFTA (comparing the economic census figures for 1993 and 1998), and probably about 1 million in the first seven years.[18] Although that was impressive growth in employment at the time, the number of manufacturing jobs in Mexico shrank by about 500,000 after 1998, leaving a net increase from 1993 to 2013 of only about 400,000. Given that the Mexican labor force has increased by about

950,000 per year throughout the past two decades,[19] we can see that the long-term net increase in manufacturing employment since NAFTA has amounted to less than half of one year's increase in the size of the Mexican labor force, and hence has made only a small dent in the country's long-term employment needs.

[Figure 4 about here]

In relation to the composition of manufacturing employment, it is important to note that the activities that account for the lion's share of Mexico's manufactured exports do not represent a majority of its manufacturing employment. As noted earlier, three sectors (transportation equipment, computers and electronic products, and other machinery and equipment) accounted for 76 percent of manufactured exports in 2012, but these same sectors accounted for only 40 percent of manufacturing employment as of 2013.[20] Paradoxically, and in spite of Mexico's reputation for specializing in labor-intensive exports, the most successful export industries are apparently *less* labor-intensive than the industries that produce mainly for the domestic market (see also Ruiz Nápoles, 2004).

The disjuncture between exports and employment also reflects the industrial dualism discussed earlier. The MGI report (Bolio et al., 2014) identifies the manufacturing sector with the largest amount of employment (food and beverages) as one characterized by a very large number of extremely small and low-productivity firms, most of which do not export. Indeed, the only manufacturing sector in which employment has increased since 2007 is transportation equipment; employment in all other sectors has either held steady or actually fallen, with the biggest decreases registered in textiles and apparel products and computers and electronic products—both of which are sectors subject to intense competitive pressures from lower-wage countries in Asia and Central America.

There are several reasons why the employment gains from manufacturing exports have been disappointing. First, although the gross value of Mexico's exports has increased dramatically, a large portion of the increase consists of products assembled from imported intermediate goods (parts and components), leading to relatively little value added and few backward linkages to other domestic industries. The maquiladora plants were the most extreme case, as imported intermediate inputs on average accounted for more than three-quarters of the gross value of their exports (and hence value added was less than one-quarter) throughout most of the period from 1990 to 2006 (the last year for which separate data for the maquiladoras were reported). But the maquiladoras accounted for more than half of Mexico's manufactured exports in the late 1990s and early 2000s (in the years for which the requisite data are available) and for most of the employment growth shown in Figure 4. As noted earlier, Ibarra and Blecker (2014) estimated that imports of intermediate goods have an elasticity of about 0.6 to 0.7 with respect to manufactured exports in Mexico. Since these estimates are for total manufactured exports and total intermediate imports (both maquiladora and non-maquiladora), they suggest a very high dependency of all manufactured exports on imported intermediate inputs and a correspondingly low proportion of value added in those exports.

Second, although Mexico has achieved large bilateral surpluses in goods trade with the United States, reaching $112 billion in 2013, these bilateral surpluses are entirely offset by

similarly large deficits with other countries (led by a $101 billion deficit with Asia, of which $55 billion was with China alone, plus a $25 billion deficit with Europe),[21] so that Mexico gets no net stimulus to aggregate demand from its trade overall. Moreover, on a multilateral basis Mexico has a significant trade deficit in manufactures, offset mainly by a surplus in petroleum (Moreno-Brid, 2013). In 2013, Mexico had a deficit of –$12.0 billion in manufactures, offset by surpluses of $8.7 billion for petroleum products and $2.3 billion for other primary commodities (agricultural and mineral, except petroleum).[22] Thus, contrary to the conventional view that Mexico is a natural resource scarce country, it is actually a net exporter of natural resources and a net importer of manufactures (thus more like the South American nations than may otherwise be apparent). In any event, Mexico's trade deficit in manufactures signifies a net transfer of industrial employment to other countries, especially the Asian nations that supply Mexico with increasing proportions of its imports.

Third, contrary to the conventional view that Mexico's comparative advantage lies in less-skilled labor, the industries that have grown the most in the long term are ones that emphasize highly skilled rather than unskilled labor. Mexico's export industries have experienced a significant quality upgrading since trade liberalization, NAFTA, and the peso crisis, leading to rising demand for more educated workers (see, among others, Esquivel and Rodríguez-López, 2003; Verhoogen 2008). Revenga and Montenegro (1998, p. 313) observed that, "Since 1985, the largest increases in Mexico's net exports have occurred in fairly capital-intensive industries such as transport equipment and nonelectrical machinery", and this trend has continued to date. The export industries that are most intensive in less-skilled labor, such as apparel, have largely left Mexico for lower-wage locales in Asia or Central America, while the most successful export industries, such as electronics and transportation equipment, require more education and training for their workers. This industrial upgrading and the associated increases in skill requirements contribute positively to the long-term development of the Mexican economy, including its capacity for innovation, but have nevertheless meant that the net increases in manufacturing employment associated with exports have been much more limited than were expected as a result of trade liberalization and NAFTA (similar to what Deyo observes in the employment trends in Korean manufacturing in his chapter).

Finally, Mexico's slower rate of industrial growth and its loss of U.S. market share to China since 2001, discussed earlier, have contributed to the absolute decline in manufacturing employment after that time (see Figure 4). Even though Mexico's labor productivity in manufacturing has grown more slowly than that of many other countries, it has still grown faster than industrial output since the early 2000s (roughly two percent versus one percent), resulting in a tendency for manufacturing employment to fall. Thus, it is no wonder that manufacturing employment in 2013 was still about a half million below its peak from around 2000.

4.2 Wages and inequality

One consequence of the upgrading of Mexico's industrial structure was a significant increase in the wage premium for more skilled workers in the early years after trade liberalization and NAFTA. The best measure of the skill premium that is available for the manufacturing sector (where the impact of trade is greatest) is the ratio of the salaries of nonproduction workers to wages of production workers (both measured on an hourly basis).[23]

This ratio increased sharply from about 2:1 in 1987 (the year after Mexico joined GATT) to about 3:1 in 1996, and then diminished gradually to about 2.6:1 in 2013 (thus remaining substantially above its 1987 level). Similarly, Hanson (2004) found that wages increased relatively more for the more educated strata of the labor force in a comparison of broader population census data for 1990 and 2000.

The increase in wage inequality in the late 1980s and early 1990s was unexpected at the time, because most analysts expected *ex ante* that Mexico would specialize in industries that were intensive in less skilled labor. Since then, several explanations have been offered for the rising skill premium. Cragg and Epelbaum (1996) and Esquivel and Rodríguez-López (2003) argued that Mexico was experiencing skill-biased technological change that increased the relative demand for skilled labor. Revenga and Montenegro (1998) and Hanson and Harrison (1999) found that Mexico's tariff reductions after it joined GATT and NAFTA were greatest for products that were more intensive in less-skilled labor. Their findings suggest that trade liberalization reduced the rents that unskilled workers had been able to obtain previously in highly protected industries.

Feenstra and Hanson (1997) developed a model of offshoring in which U.S. industries outsource the least skill-intensive operations in their production processes (vertical supply chains) to Mexico, but those operations are relatively high skill-intensive compared to existing industrial activities in Mexico. This results in a rise in the average degree of skill intensity in both countries, leading to a rise in relative demand for more skilled labor and increasing wage inequality in both. According to Verhoogen (2008), the peso depreciation of 1994-95 added an additional shock that induced "quality upgrading" in Mexican industries. Essentially, the depreciation led to more rapid expansion of the more efficient and higher quality firms in export markets, which in turn led to greater wage increases within these firms compared to other firms and relatively greater wage increases for white collar workers compared to blue collar workers, and hence contributed to a rise in within-industry wage inequality.

In contrast, the more gradual decline in the skilled wage premium since 1997 appears to be largely unrelated to Mexico's international trade. Esquivel et al. (2010) and Lustig et al. (2013) show that this decline can be attributed mainly to an increase in the relative supply of more educated workers, which more than offset the rising relative demand so that the rate of return to higher education diminished in the early 2000s. Nevertheless, wage inequality still increased in the long run, as the post-1997 decline in the skill premium was much less than the previous increase. This implies that the wage gains from trade liberalization and export growth have been skewed toward the more highly educated and relatively better-off workers. For those workers who have the requisite education and training, the gains have helped to propel them into the rising Mexican middle class. But for the larger numbers of workers who lack the requisite skills, trade liberalization has failed to bring the promised benefits—and has left many of them to seek other solutions such as emigration or employment in low-productivity informal activities.

In addition to rising wage inequality between more and less skilled (or educated) workers, Mexico also experienced a widening of other social gaps in the years following its trade liberalization. Several studies have found that wage gaps between different regions of the country increased, with workers in the northern and border regions (where export industries and

FDI are concentrated) doing relatively better than those in the central and southern regions (Hanson, 2004; Borras and López-Córdova, 2007; Chiquiar, 2008). The latter two studies also provide an important qualification to the finding of increased wage inequality: they find that the increase in the skilled wage premium was relatively smaller in the northern and border states than in the rest of the country. This latter finding could be a result of low-skilled workers losing the most from globalization in the regions of the country that had less participation in exports and more exposure to the negative side of globalization (for example, cheap imports of consumer goods displacing local production). Also, Borras and López-Córdova (2007) found that less-skilled women workers did better in the northern and border states than in the rest of the country as a result of globalization forces. Altogether, this evidence suggests that the benefits of export activity and globalization were very uneven and were concentrated in certain regions and groups, while other regions and groups either did not share in the gains or actually felt the brunt of the losses (for example, the losses to Mexican corn farmers caused by subsidized and dumped imports of U.S. corn, as analyzed by Wise, 2010).

Regardless of the shifts in relative wages between different groups of workers since trade liberalization and NAFTA, overall average real wages in Mexican manufacturing have stagnated since those policies were adopted. As shown in Figure 5, real compensation per hour fluctuated cyclically in the aftermath of the debt crisis in the 1980s, then fell after the peso crisis of 1994-95, and eventually (by around 2003) recovered from the latter. However, as of 2013 real hourly compensation had barely recovered to its previous peak level of 1994, when NAFTA went into effect, and still remained below its historical peak level of 1981. Hanson (2004, p. 515) noted that the real wage fell for both genders in his comparison of data from the 1990 and 2000 population censuses: "When deflated by Mexico's consumer price index (CPI), the average hourly wage in 1990 dollars declined for males from $1.33 to $1.11 and for females from $1.24 to $1.13". Thus, *all of the changes in relative wages for different categories of workers discussed here have taken place around a long-run trend for average real wages that is at best flat, and at worse slowly declining*; on the whole, labor simply has not gained much either in real earnings or in employment from the tremendous expansion of exports of the past few decades.

[Figure 5 about here]

The overall distribution of income in Mexico is, of course, better measured by inequality at the household level rather than by wages or relative wages for industrial workers alone. Gini coefficients and other standard indicators generally showed rising inequality from the 1980s through the mid-1990s (i.e., during the debt crisis and early years of trade liberalization), and then decreasing inequality in the late 1990s and early 2000s—with somewhat of a reversal after the recession of 2008-9. The period of rising inequality coincided with the country's opening to trade and the increase in the skilled wage premium. The decrease in inequality in the late 1990s and early 2000s appears to have been caused mainly by domestic factors. Esquivel et al. (2010) and Lustig et al. (2013) attribute this decrease in inequality mainly to increased progressivity of fiscal policies (especially on the expenditure side, including new transfer programs) and the increase in the relative supply of skilled labor due to rising education levels (as discussed above).

The evidence of declining inequality in the late 1990s and early 2000s should be taken with caution, however, because the Gini coefficients are based on data sources that do not allow

the separate computation of the income of the super-wealthy (top one percent or higher). Guerrero et al. (2009) show that Mexico has a relatively high ratio of billionaire's net worth to GDP compared to other low and middle-income countries, and that this ratio was sometimes increasing in periods (such as 2003-6) when conventionally measured Gini coefficients were falling. Guerrero et al. also show that billionaire-controlled companies have disproportionate political influence and are more able than other firms to win favorable rulings from government agencies that are supposed to regulate them.

4.3 Convergence

Given the goals that Mexico set for itself in seeking economic integration within North America, the objectives of inclusion and escaping the middle-income trap have a special meaning: Mexico wanted to raise its income levels to first-world standards or levels that would prevent emigration, which in the North American context would mean (absolute, unconditional) convergence with the United States. However, since average Mexican real wages have been stagnant, it should not be surprising that there has been no convergence of Mexican wages toward U.S. levels in the past few decades. In 1993, the year before NAFTA went into effect, the average Mexican production worker in manufacturing earned 18 percent of the hourly compensation of a typical U.S. production worker; by 2012 (and after various fluctuations in-between), this percentage had fallen to 16 percent.[24]

Aside from wages, there has also been no convergence in broader measures of per capita income or labor productivity between Mexico and the United States since the former liberalized its trade and joined NAFTA (see Blecker and Esquivel, 2013). Figure 6 shows three measures of Mexico's labor productivity and per capita income,[25] all taken from the most recent version (8.0) of the Penn World Tables and measured as percentages of their respective U.S. levels at PPP. All of these measures generally improved during the era of import substitution policies between the 1950s and the 1970s, indicating that Mexico was converging with the United States during those decades, although the relative productivity measures stagnated in the 1970s and the final increases in these measures (especially per capita income) around 1980 were associated with an the unsustainable oil boom and debt build-up which occurred at that time. All three measures collapsed during the debt crisis of 1982-86, and fell again during the peso crisis of 1994-95.

[Figure 6 about here]

Of course, divergences that occurred as a result of macroeconomic crises cannot be blamed on economic integration. Nevertheless, there is no evidence of a long-term increase in Mexico's relative productivity or per capita income since the country's initial trade liberalization (recall that Mexico joined GATT in 1986) or the formation of NAFTA (1994). On the contrary, as of the last year for which data are available (2011), Mexico's relative per capita income was no higher than it was in the early 1990s prior to NAFTA, and its relative labor productivity was lower than in the pre-NAFTA years. Even more distressingly, by 2011 all the convergence that Mexico had achieved between 1950 and 1980 had been completely reversed; its labor productivity was a smaller percentage of the U.S. level than in 1950, and its per capita income was about the same percentage as in 1950 (around 30 percent). Economic integration has thus not sufficed to revive the process of convergence since the reversals caused by the financial

crises of the 1980s and 1990s.

5. Conclusions and policy lessons

It is hoped that the analysis of the Mexican case in this chapter will provide important lessons for other Latin American nations that seek to become more globally competitive and to escape from the middle-income trap. Of course, one must recognize that Mexico is in some respects a very unique in a Latin American context. As a result of its geographic proximity to the United States, Mexico has achieved a degree of integration with the U.S. economy that no other major Latin American nation would be likely to attain. Nevertheless, as the comparative data presented in other chapters (especially the ones by Stallings and by Larrañaga and Rodríguez) show, Mexico is not so different from the major South American nations in terms of many indicators of social and economic development or educational attainment. Therefore, the Mexican case can help to reveal both the benefits and the costs of an industrial development strategy based on trade liberalization and regional integration policies.

After a generation of focusing on trade liberalization policies, Mexico has established itself as a leading exporter of manufactured goods and a key link in global value chains, especially those targeted on ultimate sales to the U.S. market. However, the slow growth of Mexico's main export market and the increasing Chinese penetration of that market have limited the expansion of Mexican exports since 2001, in spite of some gains from a lower peso in the last few years. Furthermore, the broader benefits of this export success have been attenuated by various factors, including heavy reliance on imported inputs, exchange rate fluctuations, limited job creation, regional concentration of industries within Mexico, and a relatively low level of R&D activity at a national level. As a result of these limitations and other factors, median real wages in manufacturing have not increased significantly in the last two decades, while millions of Mexican workers have migrated to the United States in search of jobs at higher wages. Contrary to some initial expectations, the greatest gains in employment and wages within the manufacturing sector have accrued mostly to the more highly educated workers, while total employment in that sector has decreased since it peaked around 2000.

The Mexican case thus suggests caution in relying upon trade liberalization and economic integration policies by themselves to foster more rapid economic growth and more inclusive development. Undoubtedly, such policies can boost trade, and they can also lead to upgrading of the industrial structure, increased productivity in the exporting firms, and eventually—with help from public policy—the birth of domestic innovative activities. Nevertheless, there are no automatic linkages from these sorts of gains to broader gains in aggregate growth and welfare, and the gains that are reaped (as well as any costs or losses) may be very unequally shared. This does not mean that countries like Mexico should not open their economies, promote exports, or seek to become a part of global value chains, but it does mean that the outcome of such efforts—especially the inclusivity of the gains—depends on the entire package of policies that accompanies opening of trade at both the micro and macro levels.

A good example of the need for a more integrated and comprehensive policy approach is found in the frequently cited area of education. The overwhelming evidence of increased relative demand for more skilled labor in the modern and successful firms makes it imperative for

Mexico to focus on educational reforms that can improve the quality of basic (primary and secondary) education and enhance access to tertiary education, especially in the technical fields. The World Economic Forum (2013) includes Mexico in its category of economies in transition between stage 2 (efficiency-driven) and stage 3 (innovation-driven). If Mexico is to move forward to stage 3 and not backward to stage 2, it will have to emphasize human capital formation and position itself to embrace the industries and occupations of the future. Moreover, there are some very positive examples of places where educational policies have benefited Mexico. For example, as described in the chapter by Carrillo, the training of aerospace engineers and technicians at a public university in Querétaro has helped to attract significant FDI in aerospace production in that state, resulting in employment that has more than tripled in the last seven years (from about 6,000 at the beginning of 2007 to about 20,000 in early 2014.[26]

Nevertheless, the fact that returns to higher education began to fall after the supply of more highly educated workers increased in the late 1990s and early 2000s suggests that merely expanding and improving education is not sufficient. Unless the demand for more educated labor keeps pace with the supply, the returns to higher education will diminish and the incentives to seek it will fall. Moreover, in the absence of adequate employment opportunities at rising wages domestically, some highly educated workers will seek to migrate abroad where they can earn higher incomes.[27] Simply increasing the education of the labor force does not necessarily create more jobs that match the skills of the more educated workers unless the right conditions are in place in other dimensions of the policy environment. Therefore, policy makers need to be just as concerned about boosting the demand for skilled labor through measures that can attract and retain more high-technology production as they (rightly) are about boosting the supply of such labor through educational policies.

One key condition for attracting and keeping globally mobile industries is maintaining a competitive exchange rate, which Mexico has not done consistently throughout the period since its liberalization of trade. Much recent research has found that competitive exchange rates are a vital ingredient in achieving and sustaining rapid growth in emerging market nations (see, for example, Hausman et al., 2005; Rapetti et al., 2012). Berg et al. (2012) find that avoiding exchange rate overvaluation is especially important for maintaining a long duration of rapid growth. Blecker and Razmi (2008) stress the importance of exchange rates between a given emerging market nation like Mexico and other rival emerging market nations like China. This chapter has show that Mexico's exports have exhibited the best performance (taking into account the growth of the U.S. market and Chinese competition) when the peso was at a competitive level, while exports have grown more slowly when the peso has been overvalued.

Recognizing the centrality of a competitive exchange rate also points to the need for more accommodative and pro-growth macroeconomic policies in general. Although a full discussion of macro policies would be beyond the scope of this chapter, it seems clear that unleashing Mexico's growth potential requires a renewed emphasis on the demand side as well as on the supply side.[28] Since the late 1980s, the country has relied too much on exports to provide the main engine of growth, without paying adequate attention to the expansion of domestic sources of demand. As we have seen, although exports have grown, they have not always grown as much as hoped for various reasons, including exchange rate overvaluation, sluggish U.S. growth, and increased Chinese competition. Scanning the horizon, it does not seem likely that a further

expansion of exports will provide the growth stimulus that Mexico needs in the foreseeable future. Mexico's principal export market, the United States, seems destined to grow more slowly in the aftermath of the recent financial crisis and is often forecast to be entering a period of secular stagnation (see Blecker, 2014). In spite of Mexico's persistent efforts to diversify its export markets, progress on this objective has been disappointing to date, as nearly 80 percent of the country's exports are still destined for the U.S. market.

Given Mexico's geographical location and the global competitive environment, it does not seem likely that this country will suddenly find a major new set of markets for its exports that could compensate for slow growth of exports to the United States. For example, even if a TPP agreement is reached, Mexico will be only one of several emerging market nations participating (Chile, Peru, Malaysia, Singapore, and Vietnam are among the others), and it is hard to believe that the result will be a massive increase in Mexican exports sufficient to pull the country out of its slow growth regime. In fact, Mexico could potentially lose markets to some of these other countries if they gain similar tariff preferences in the U.S. and Canadian markets to what Mexico enjoys under NAFTA and if NAFTA's rules of origin are weakened under TPP. Mexico could possibly gain increased markets for its exports in some of the other TPP countries, but given that it already has trade agreements with several of them (Chile, Peru, and Japan) in addition to the United States and Canada, any such gains are likely to be limited and could well be outweighed by losses of market share in the latter two countries.

A sober analysis of the prospects for further growth in exports thus makes it clear that, going forward, Mexico needs a better balance of internal and external sources of demand than it has had in the past—either under the import substitution regime of the 1940s through the early 1980s, when the economy was largely closed to trade and growth was mainly internally oriented, or under the trade liberalization regime since the late 1980s, in which the economy is wide open and growth is mainly dependent on the dynamism of exports. In reality, aggregate growth has been sluggish throughout most of the post-liberalization period, and most of the job creation for the past two decades has occurred in domestically oriented sectors such as services, construction, and transportation. Mexico needs to embrace this reality and use both macroeconomic and redistributive policies to ensure more rapid and sustainable growth of the internal market, while continuing to use international trade to achieve what it can truly offer. The true benefits of trade are above all the incentives to upgrade quality, enhance efficiency, and introduce innovations, more than the standard consumer gains from access to cheaper imports—the latter of which, unfortunately, also bring losses to many small-scale domestic producers unless they are successful in getting jobs in the modern sector or in modernizing their own enterprises.

Fortunately, rather than facing a conventional equity-efficiency trade-off, Mexico is in a position in which enhancing inclusion and promoting growth can potentially go hand in hand.[29] Redistributive policies that would further boost the incomes of the nascent middle class and social inclusion policies that would bring informal sector workers into the formal modern economy are essential for providing the domestic demand growth that Mexico needs to accompany its export promotion efforts. Eventually, the goal should be to achieve a "virtuous circle" of rapid and balanced growth in which real wages rise in tandem with increasing productivity.

Such a shift in emphasis toward income redistribution and the demand side should not, however, detract from continued efforts to relieve supply-side constraints on Mexico's growth, which are also significant. Improving education remains essential for attracting and retaining the technologically advanced industries of the future. Greater investment in infrastructure is needed to relieve supply-side bottlenecks and reduce costs, as well as for its demand-side stimulus effect. Improving the provision of credit to the private sector, especially for small and medium-size firms, is vital. Moreover, policies that encourage technological innovation and give incentives to perform R&D in Mexico are essential for the country to complete the transition to being, in the classification of the World Economic Forum, an "innovation-driven" economy. The time is ripe for Mexico to work on all these fronts to achieve its economic potential and provide the better life for its people that past reforms and integration efforts have promised but not delivered.

Notes

[1] See Esquivel and Rodríguez-López (2003), Verhoogen (2008), and Carillo et al. (2012), among many others.

[2] See Lustig (1998) and Moreno-Brid and Ros (2009) on the origins of the country's liberalization strategy in the 1980s and 1990s.

[3] Blecker (2009) finds that the impact of U.S. growth and the real exchange rate on Mexican growth was magnified after trade liberalization and NAFTA, while the effects of net financial inflows and real oil prices were reduced in magnitude but still significant.

[4] Information obtained from the Mexican Secretaría de Economía, Sistema Integral de Información de Comercio Exterior, http://www.siicex.gob.mx/portalSiicex/SICETECA/Tratados/Tratados.htm (section on "Tratados y Acuerdos"). The total number of countries cited here includes the 28 members of the European Union. Agreements that have been abrogated or are no longer in effect are not included.

[5] Gallagher (2008a, 2008b) analyzes the "policy space" available to developing countries under regional and bilateral trade agreements like NAFTA and multilateral trade agreements like the WTO.

[6] See Moreno-Brid and Ros (2009) and Ros Bosch (2013) for discussions of Mexico's fiscal and monetary policies, and Blecker (2009) and Blecker and Ibarra (2013) on the increased external vulnerability of the Mexican economy post-liberalization and post-NAFTA.

[7] Note the drop in the growth rate of Mexican industrial production in 2013, shown in Figure 2 below.

[8] Data from Ibarra and Blecker (2014), who took the export data from the Mexican Instituto Nacional de Economía y Estadística (INEGI, www.inegi.org.mx). Nominal exports in U.S. dollars were converted to real volumes of exports using the U.S. producer price index for industrial commodities from U.S. Bureau of Labor Statistics (BLS), www.bls.gov.

[9] This figure for 2012 is taken from the World Bank's *World Development Indicators* (WDI) online database, and is used for international comparative purposes. According to the Mexican government data source cited in the previous note, the figure was closer to 80 percent. Most likely, the World Bank excludes some resource-based exports from its definition of manufactures.

[10] We focus on nonpetroleum imports here to make the Mexican share more comparable to the Chinese share, because China does not export petroleum to the United States. Growth rates are computed using real nonpetroleum imports at chained 2009 prices, as explained in the note to Table 1.

[11] See, among others, Gallagher et al. (2008), Feenstra and Kee (2009), Hanson and Robertson (2009), and Dussel Peters and Gallagher (2013).

[12] Correlation coefficients and growth rates for industrial production are author's calculations from the same data sources given for Figure 2. I am indebted to Gerardo Esquivel for suggesting this way of analyzing Mexican-U.S. economic integration and for supplying historical data for Mexico.

[13] Author's calculations based on data from INEGI and the U.S. Bureau of Economic Analysis (BEA, www.bea.gov).

[14] Based on data from Timmer and de Vries (2007), labor productivity in Mexican services fell from 60 to 38 (in thousands of constant 1993 pesos per employee) between 1971 and 1995, and then increased but only to 43 (in the same units) from 1995 to 2005.

[15] Data on productivity at the sectoral level for 16 Asian and Latin American nations were obtained from the Groningen Growth and Development Centre (GGDC) 10-Sector Database, which applies a common methodology to all countries—but, unfortunately, provides data only through 2005. The methodology is described in Timmer and de Vries (2007); the data are available at http://www.rug.nl/research/ggdc/data/10-sector-database.

[16] The MGI report uses the Economic Censuses of 1999 and 2009 which, in reality, are based on data for 1998 and 2008. These censuses exclude the agricultural and government sectors.

[17] According to neoclassical economic theory, another way to increase labor productivity is via "capital deepening", which means increasing the quantity of capital per worker without any change in the quality of the capital goods. By definition, capital deepening does not raise total factor productivity, since it requires an increase in one of the factors of production (capital). As a practical matter, however, new capital goods normally embody new generations of technology, so the theoretical distinction between investing in new capital and acquiring improved technology is rarely possible to maintain in reality.

[18] Note that we attribute the Economic Census data here to the years in which the data were gathered, rather than the years in which the censuses were released as in the MGI report (see note 16). Complete data for 2000 are not available as only quinquennial Census data are available prior to 2007, but the data for the maquiladoras—where most of the job growth occurred—indicate that employment continued increasing until 2000.

[19] Author's calculations based on data for 1993-2012 from World Bank, *World Development Indicators*, online database, http://databank.worldbank.org/data/home.aspx, downloaded April 6, 2014.

[20] Author's calculations from INEGI's Encuesta Mensual de la Industrial Manufacturera (EMIM), http://www.inegi.org.mx/sistemas/bie/.

[21] Data from INEGI. Due to small surpluses with other nations, mainly in Latin America, Mexico's overall deficit in goods trade for 2013 was only $1 billion.

[22] Author's analysis of INEGI data. Note that the manufacturing deficit includes a significant deficit in petrochemicals (manufactured petroleum derivatives) and that the primary commodity surplus combines a deficit for agricultural goods and a surplus for other primary goods.

[23] Although this is an admittedly imperfect measure, the distinction between nonproduction and production workers correlates well with the distinction between employees with higher and lower levels of educational attainment, and data by educational level are not readily available for the manufacturing sector. The data given here are the author's calculations based on various surveys of the manufacturing sector available from INEGI's Banco de Información Económica, http://www.inegi.org.mx/sistemas/bie/.

[24] Source: BLS, "International Comparisons of Hourly Compensation Costs in Manufacturing, 2012", August 9, 2013, and author's calculations.

[25] A fourth measure, expenditure-side real GDP per person at chained PPPs, is almost identical to the similar measure at current PPPs, and hence is omitted to avoid cluttering the graph.

[26] Data from INEGI, EMIM (see note 20).

[27] Hanson (2006, pp. 898-99) notes that, contrary to popular perceptions, "individuals with moderate to high education levels have the highest likelihood of migrating abroad".

[28] For a variety of perspectives on Mexico's macroeconomic policies and the causes of its slow growth in recent years see, among others, Levy and Walton (2009), Arias et al. (2010), Hanson (2010), Moreno-Brid and Ros (2009), and Ros Bosh (2013).

[29] Much recent research finds that, more generally, greater distributional equity and sustained rapid growth are compatible in the long run. See, for example, Berg et al. (2012) and Lee (2013).

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Table 1
Growth Rates and Shares of U.S. Nonpetroleum Imports from Mexico, China, and Other Countries

	Percentage share in total U.S. nonpetroleum imports				
	1987	1993	2000	2007	2013
Mexico	4.5	6.7	11.4	11.3	13.4
China	1.7	5.9	9.1	19.7	23.2
Other countries	93.8	87.4	79.5	69.0	63.5
	Average annual growth rate of real nonpetroleum imports (in percent per year)				
		1987-1993	1993-2000	2000-2007	2007-2013
All countries		5.2	14.6	5.8	1.5
Mexico		12.4	25.2	5.6	4.4
China		29.1	23.2	20.4	4.3
Other countries		4.0	12.8	3.3	0.1

Sources: U.S. Bureau of Economic Analysis (BEA), International Transactions Accounts, Release of March 19, 2014 (Tables 2a and 2b), and National Income and Product Accounts, release of March 27, 2014 (Table 4.2.4), www.bea.gov; Petróleos Mexicanos (Pemex), *Anuario Estadístico* (various years), www.pemex.com; U.S. Census Bureau, FT900: U.S. International Trade in Goods and Services, December 2013, www.census.gov; and author's calculations.

Notes: Percentages may not add to exactly 100.0 due to rounding. U.S. petroleum imports from Mexico were taken from Pemex up to 2007 and Census for 2013, and were subtracted from total imports from Mexico to get nonpetroleum imports from Mexico (all U.S. imports from China are nonpetroleum). Shares were calculated using nominal values; growth rates were calculated based on real imports where nominal imports in current dollars were deflated by the U.S. chain-type price index for nonpetroleum imports. Data for 2013 are preliminary.

Table 2
Country Composition of Mexico's External Trade
(percentages of total exports or imports)

	1987	1993	2000	2007	2013
Exports: Destination country					
United States	69.2	82.7	88.7	82.1	78.8
China	n.a.	0.1	0.1	0.7	1.7
Rest of world	29.7	14.2	9.1	17.2	19.5
Imports: Country of origin					
United States	74.0	69.3	73.1	49.5	49.1
China	0.2	0.6	1.7	10.6	16.1
Other Asia	4.5	10.7	10.0	17.6	15.2
Rest of world	19.6	17.6	13.0	22.4	19.5

Sources: Instituto Nacional de Estadística, Geografía e Informática (INEGI), www.inegi.org.mx, except for 1987, and authors' calculations. The U.S. percentages for 1987 (including maquiladora trade) were taken from Hufbauer and Schott (1992, p. 48, Table 3.1), based on International Monetary Fund (IMF), *Direction of Trade Statistics*; data for other countries for 1987 were estimated using data from INEGI, *Anuario Estadístico de los Estados Unidos Mexicanos 95* (Aguascalientes: INEGI, 1996).

Notes: These data are for total trade including maquiladora industries, petroleum, and other primary products. Percentages are independently rounded. Data for 2013 are preliminary.

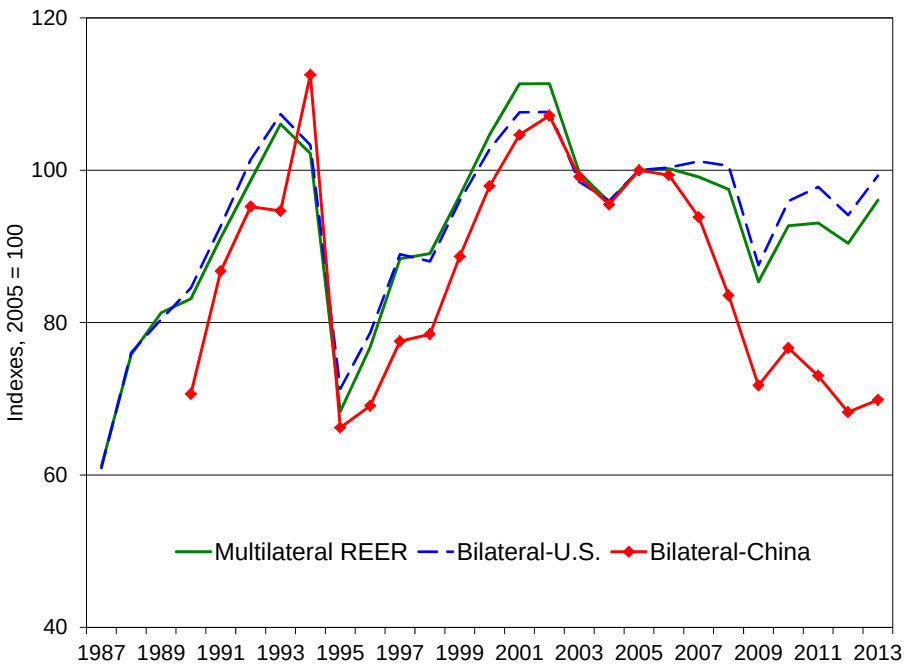

Figure 1. Real value of the Mexican peso, bilateral and multilateral indexes, 1987-2013
Source: International Monetary Fund, *International Financial Statistics*, online database, and author's calculations.

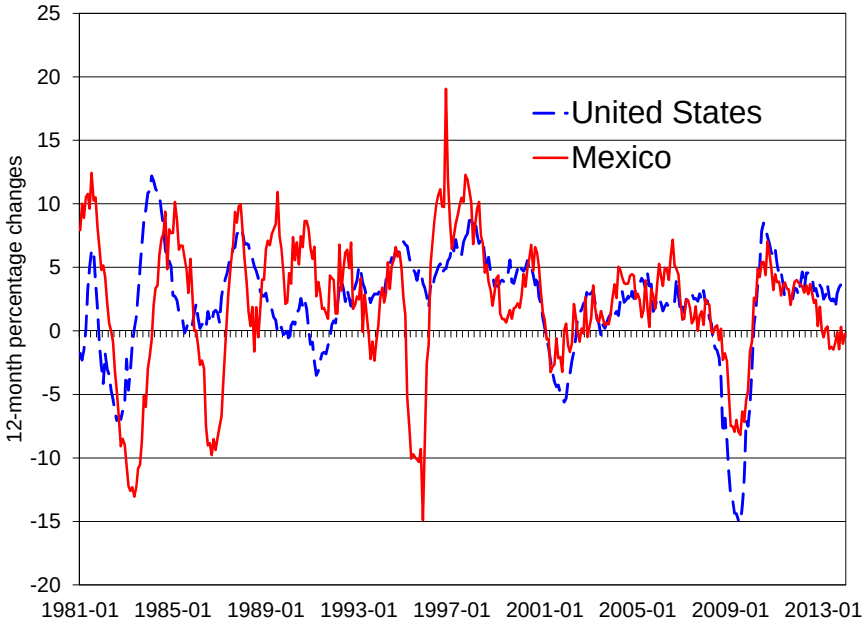

Figure 2. Mexican and U.S. indexes of industrial production, 12-month growth rates, monthly, January 1981 to December 2013
Sources: Federal Reserve Board of Governors, INEGI, and author's calculations.

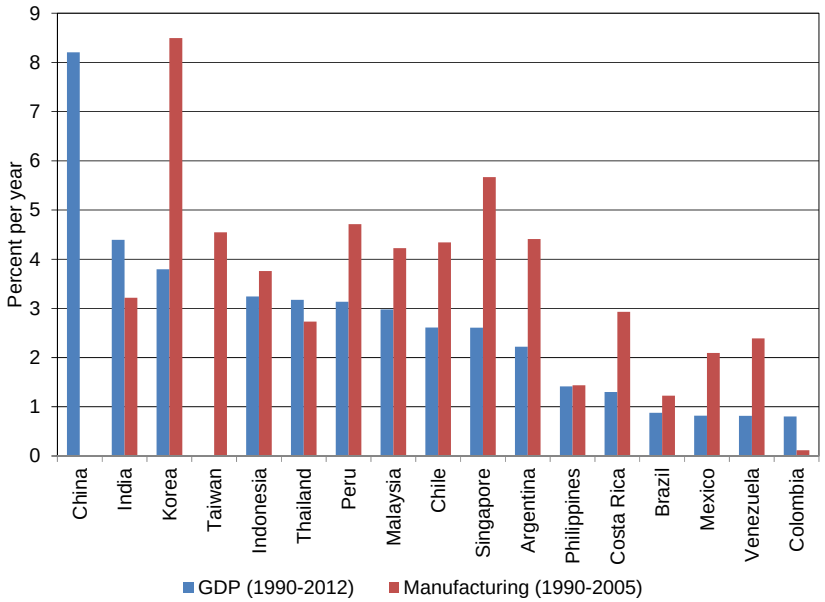

Figure 3. **Average annual growth rates of labor productivity: GDP and manufacturing value added per employed person in constant 1990 PPP dollars.**
Sources: GDP data from World Bank, World Development Indicators (WDI) online database; manufacturing data from Groningen Growth and Development Centre 10-Sector Database, Timmer and de Vries (2007); and author's calculations.
Notes: GDP per employed person is not available for Taiwan; manufacturing value added per employed person is not available for China. Manufacturing data for India are for 1990-2004 only.

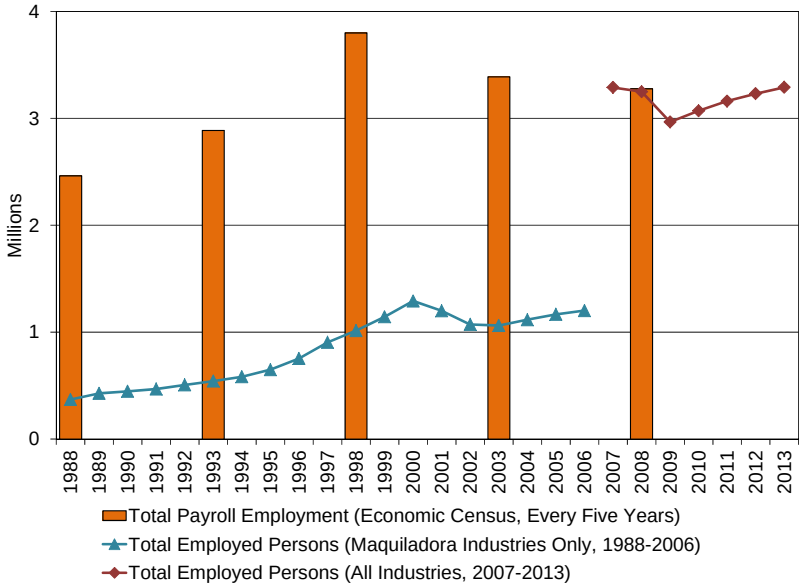

Figure 4. Total employment in Mexican manufacturing, alternative measures, 1988-2013
Sources: INEGI, Encuesta Nacional de la Industrial Manufacturera (EMIM), Censos Económicos, and author's calculations.
Notes: Data are shown for all periods for which each series is available: maquiladora data ended in 2006; the new, complete survey of all industries began in 2007; and the Economic Census is quinquennial (Census data for 2013 were not available at the time of this writing). Data for the maquiladoras (1988-2006) and for all industries (2007-13) are annual averages of monthly data.

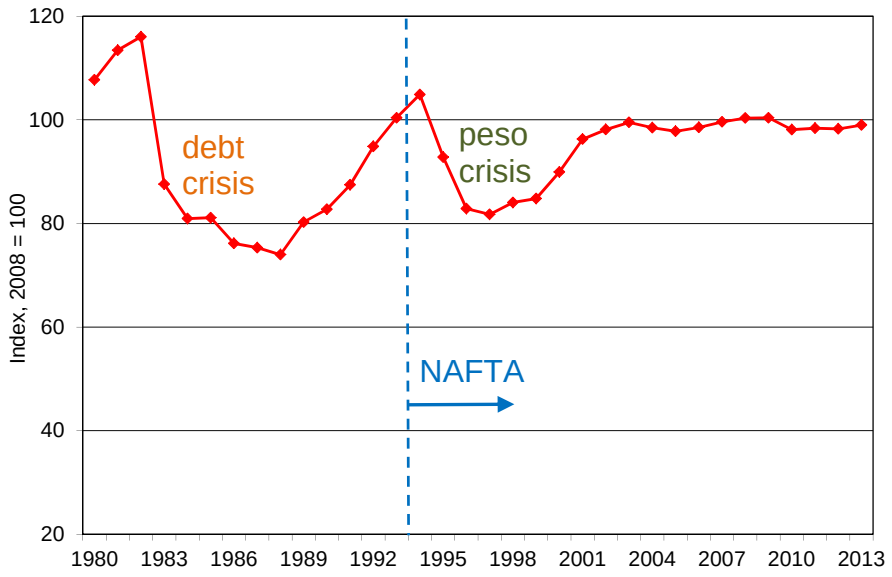

Figure 5. Real hourly compensation in Mexican manufacturing industries, annually 1980-2013
Sources: INEGI, Banco de México, and author's calculations.

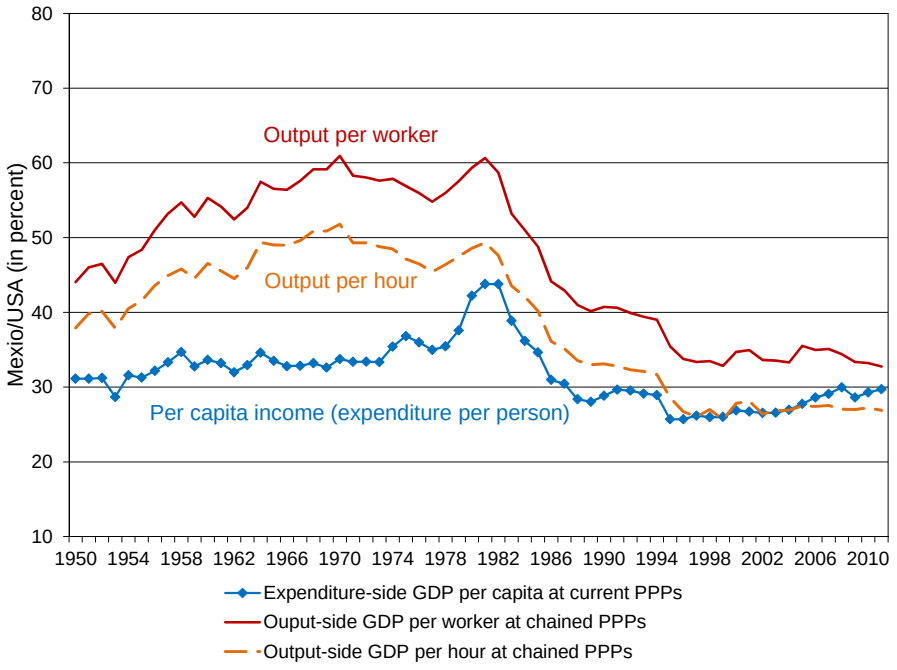

Figure 6. Per capita income and labor productivity, at purchasing power parity (PPP), Mexico as a percentage of the United States, 1950-2011
Sources: Penn World Tables 8.0, in Feenstra et al. (2013), and author's calculations.