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Challenges and
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NEARSHORING: **POSSIBLE SCENARIOS** OF ITS SIZE AND IMPACT ON **MEXICO´S ECONOMY**

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NEARSHORING: POSSIBLE SCENARIOS OF ITS SIZE AND IMPACT ON MEXICO´S ECONOMY

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Abstract

We present an analytical framework and evidence that characterize the historical patterns of Mexico's manufacturing exports and its participation in Global Value Chains (GVCs). We use this framework to guide an empirical analysis in which we identify sectors with the highest export potential as a result of nearshoring. We also estimate the orders of magnitude of the potential impacts of this process on Mexico´s manufacturing exports and GDP. Finally, we discuss factors that could have an influence on the size of these effects, including an elastic supply of skilled labor, an institutional framework that promotes contract enforcement, cost effective and reliable energy supply, and strong and widespread connectivity through transportation and communication networks.

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1. Introduction

In recent years, several global events have challenged the perceived reliability and resilience of international production networks, commonly known as Global Value Chains (GVCs). The supply-side effects of the earthquake in Japan in 2011, rising wage levels in China, the U.S.-China tariff war, the increased transportation costs and supply disruptions caused by the COVID-19 pandemic and its aftermath, and the Russia-Ukraine conflict have underscored GVCs' reliance on particular world regions. The recognition of this dependence has led firms to consider diversifying foreign supply sources to mitigate the risks of supply chain disruptions, even if such diversification could result in short-term efficiency losses. In this context, the concept of nearshoring, which involves the relocation of certain processes currently undertaken in distant regions to geographically closer countries, has gained significant attention. The concept of relocating processes towards countries that have similar business practices and closer cultural, language, and ideological ties with advanced economies, often referred to as friendshoring, has also gained attention in both the policy and the corporate circles.

The reconfiguration of GVCs resulting from these events could position Mexico as the host of specific production processes that were previously located elsewhere, particularly in China. According to the Inter-American Development Bank (IDB), Mexico is the country with the largest potential benefits from nearshoring within Latin America and the Caribbean (IDB, 2022). U.S. corporate surveys also suggest that Mexico's geographic proximity, its trade integration with the United States under the United States-Mexico-Canada Agreement (USMCA) and its lower labor costs as compared to China, among other features, make this country a natural destination to nearshore processes currently undertaken elsewhere (Morgan Stanley, 2022). However, in these surveys, respondents also mention as challenges for Mexico its low proximity to suppliers, quality of infrastructure, institutions, and access to skilled labor. According to some stakeholders, other relevant factors include policy uncertainty, lack of rule of law, insecurity, and energy supply (Bank of America, 2022; Banco de México, 2022; Miller and Talbot, 2023).

Anecdotal and indirect evidence suggests that the process of nearshoring is already taking place in Mexico. The demands for industrial space and labor in the Mexican side of the border region have shown important increases in a context of a significant rise in capacity utilization. This has resulted in full occupancy of industrial real estate in the area and a notably tight labor market (Bank of America, 2022; Morgan Stanley, 2022). Surveys among large firms in Mexico conducted by Banco de México (2022, 2023a) suggest that many of them, especially those located in the border region, have experienced benefits as a result of nearshoring. These firms argue that the main two factors behind the recent arrival of new foreign firms to Mexico are the U.S.-China trade conflict and the rules of origin imposed by the USMCA. Both exporters and non-exporting firms supplying goods to exporters in the northern region claim to have experienced a surge in demand. This was mainly attributed to rising demand from new foreign firms and the increased exports to the United States of goods that were previously imported by that country from other regions. Also, during the five-year period after 2017, there have been foreign direct investment (FDI) announcements in various industries, including motor vehicle manufacturing and parts, furniture, home appliances and toys, among others. These announcements coincided with significant increases in U.S. imports from Mexico in specific sectors, such as computer and electronic products, electrical equipment, machinery and beverages, where a decline in China's market share in the United States was observed.

In this chapter we examine the historical patterns of Mexico's manufacturing exports and its participation in GVCs. We put a special focus on the most recent period, including the trade war between the United States and China and the pandemic and post-pandemic cycle, to identify possible nearshoring processes that may already be underway. We afterwards present a simple theoretical framework whose main objective is to acquire insights that serve as a foundation for interpreting the empirical evidence regarding the changes in Mexico's patterns of trade specialization t, and as a guide for our forward-looking analysis. Thus, the objective of this framework is not to provide a comprehensive or groundbreaking view of the theory that may underlie firms' relocation decisions, foreign direct investment and international trade. Instead, we choose an already well-established model in the literature (Feenstra and Hanson, 1996) and adapt it conveniently to use it as a basis for the empirical analysis we conduct. Within this analysis, we identify sectors that, according to the evidence and the theoretical framework, stand to benefit the most from nearshoring. The identification of these sectors considers their relative requirements of skilled labor (Nunn and Trefler, 2013), their recent export performance as a consequence of the U.S.-China trade war, and their explicit appearance in the U.S. Government´s nearshoring priorities. We also characterize these sectors in terms of their contract intensity (Nunn, 2007), product complexity (Costinot, 2009), and differentiation (Rauch, 1999), and we discuss their needs for other relevant factors such as physical capital, transportation networks, and energy. We finally assess the potential magnitude of the effects of nearshoring on sectoral exports and output in Mexico, while also considering the possible constraints that this country may encounter in achieving these gains.

The results suggest that the early nearshoring process towards Mexico may have already increased the value of GDP by around 1% in the last five years. This figure reflects the effects of higher exports in industries such as computer and peripheral equipment manufacturing, beverages, semiconductor and other electronic components, other electrical equipment and component manufacturing, and communications equipment manufacturing. Furthermore, in a forward-looking scenario we estimate a potential additional increase of slightly more than 0.8% in GDP in the following years. Adding up these effects, nearshoring may bring with it an overall increase of slightly less than 2% to Mexico's GDP. This figure is of a comparable order of magnitude to existing estimates of the effect of the North American Free Trade Agreement (NAFTA) on the Mexican economy (Caliendo and Parro, 2015; Romalis, 2007). This would be fundamentally a consequence of the increased output in specific industries that exhibit an important export potential due to nearshoring, such as communications equipment, semiconductor and other electronic components, household and institutional furniture and kitchen cabinet, manufacturing and reproducing magnetic and optical media, and electrical equipment, among others, and the spillover effects that these exports would have through input-output linkages on the levels of activity of other tradable and non-tradable sectors. These results must be taken as an approximation of the possible order of magnitude of the effects of nearshoring on the Mexican economy, and not as precise estimates.

For this potential increase in GDP to materialize, especially in the short run, an elastic supply of skilled labor, an institutional framework that promotes contract enforcement, cost-effective and reliable energy supply, and strong and widespread connectivity through transportation and communication networks, are critical. We conclude that these are the main challenges that Mexico faces to reap the benefits offered by the new global environment. In order to face these challenges successfully, a two-layer strategy can be considered, including across-the-board actions to promote an investment-friendly environment, as well as focalized interventions towards specific sectors with high export potential to overcome any coordination or informational failures or other kinds of externalities that may be present.

2. Mexico's manufacturing exports and participation in Global Value Chains

2.1. A description of Mexico's trade and insertion into GVCs

During the decades of the 1980s and 1990s, Mexico undertook several bold actions to liberalize the economy to international trade and foreign investment flows, among many other structural reforms. This process left behind an import substitution model that was held for more than four decades and which involved significant tariff and non-tariff barriers to trade and a regulation that severely restricted foreign direct investment flows (Chiquiar, 2003).

In the mid-1980s, Mexico embarked on a process of unilateral reduction of trade barriers and joined the General Agreement on Tariffs and Trade (GATT). By the end of 1987, Mexico lowered tariffs even further in support of the anti-inflationary program known as the *Pacto de Solidaridad Económica*. As a result, the proportion of manufacturing products covered by import licenses dropped from 92% to 19% between 1985 and 1990. The maximum tariff was also reduced from 100% to 20%. Further tariff reductions occurred between 1993 and 1997, leading to a weighted average tariff of only 2.7% in the manufacturing sector by the end of that period (see related figures in Lustig, 2001).

Starting in 1989, Mexico also eliminated many constraints on FDI flows. According to Feenstra and Hanson (1997), during the 1970s a 49% foreign ownership cap on equity holdings was strictly enforced, leading to severe restrictions on foreign investment. However, after the 1982 crisis, the government began to waive this cap for many new investors. In 1989, regulatory changes formally lifted the cap and opened most sectors to foreign investment. In 1993, the Law of Foreign Investments was significantly modified to formally allow these investments in most sectors of the economy and to include provisions for NAFTA, which became the primary framework for trade and investment between Mexico, the United States, and Canada in 1994. Mexico subsequently signed other free trade agreements with a relatively broad group of developed and developing economies in the following years.

This trade and investment liberalization process had a significant impact on Mexico's export volume and transformed its trade patterns. In the early 1980s, manufacturing exports made up only around 30% of total exports. However, the substantial increase in manufacturing exports in the following years led them to represent nearly 90% of total external merchandise sales by the end of the twentieth century. This was primarily due to the fact that the country's liberalization process encouraged firms from developed countries, particularly the United States, to save on labor costs by establishing plants or contracting suppliers in Mexico in order to offshore relatively unskilled intensive processes (Hanson, 2001).[1] These plants participated in regional production networks that exploited Mexico's comparative advantage in unskilled labor-intensive processes by concentrating on assembly activities. In particular, they imported intermediate inputs, mainly from the United States, to assemble goods on the Mexican side of the border to economize on transport costs, and then exported the finished products. Thus, most of the effects on output from trade liberalization were concentrated in the northern region

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[1] During the NAFTA negotiations US firms explicitly argued that they needed a low-wage partner for routine, low-skill operations such as assembly, to be able to compete with suppliers or branches of Japanese multinationals in less developed countries (Markusen and Zahniser, 1997).

of the country (Aitken, Hanson and Harrison, 1997; Chiquiar, 2003 and 2005; Hanson, 2001).

This kind of production sharing scheme with the United States existed in Mexico since the late 1960s through the *maquiladora* program. This program allowed assembly plants to import virtually all their intermediate materials with zero-tariff preferential treatment from the United States and were restricted to export most of the assembled goods back to that country. Initially, *maquiladora* plants were restricted to locate in the border region, but this constraint was lifted after 1971. However, these plants continued to be constructed mainly in that region to save on transportation costs. With Mexico's trade liberalization from the mid-1980s on, and even after NAFTA, *maquiladora* plants experienced significant growth in their exports. Moreover, the liberalization of trade and FDI also prompted non-*maquiladora* plants in Mexico to increasingly specialize in unskilled labor-intensive processes, importing intermediates and exporting processed goods. Indeed, Hummels, Ishii, and Yi (2001) show that the share of vertical specialization, which refers to the use of imported inputs in producing exported goods, became increasingly important in Mexico's trade patterns since the 1980s. To sum up, Mexico's reforms led to a significant increase in its integration in what is now known as Global Value Chains.

Figure 1 depicts Mexico's export activity from 1980 to 2020. Mexico's export growth has generally outpaced its GDP growth. A discrete jump in Mexican exports after the implementation of NAFTA, causing them to increase from under 15% to around 25% of GDP, is notorious. While this increase may have also been partly due to the devaluation of the Mexican currency in 1995 during the Tequila Crisis, exports continued to exhibit high values in the following years despite recovering GDP and exchange rates. Additionally, in the first two decades of the twenty-first century, exports continued to grow relative to GDP, rising to nearly 40% of its value in 2018 to 2020.

Figure 1 uses a new dataset from the World Bank that breaks down total exports into two components: GVCs related exports and traditional trade.[2] The figure illustrates an increasing trend in both components of Mexican exports throughout the analyzed period, and the discrete jump these flows exhibited with the enactment of NAFTA. Figure 2 illustrates how GVCs related exports have generally outpaced traditional exports. Before NAFTA, GVCs related exports constituted less than 25% of total exports. However, after the implementation of the agreement, they rose to such an extent that in just a couple of years they surpassed 40% of total exports. This highlights the opportunities created by the agreement for production sharing arrangements between the United States and Mexico.

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[2] See Borin, Mancini, and Taglioni (2021) and https://wits.worldbank.org/gvc/global-value-chains.html for details. This data source includes GVCs related trade calculations based on multiple alternative data sources. For the analysis in this chapter, we joined the calculations based on the World Input Output Database-Long Run from University of Groningen for 1980 to1994 and from the OECD Inter-Country Input-Output (ICIO) Tables for 1995 to2020. In this data, trade flows that include items that cross at least two borders as part of a global production network are assumed to correspond to GVCs related trade, while those that only cross one border are classified as traditional trade. Thus, while the value of traditional exports represent value added fully generated in the exporting country, GVCs related exports may contain an imported component, which represents value-added generated in another country. This imported content must be deducted from the gross GVCs related exports to identify the true contribution of these exports to GDP. An important consideration related to this data is that crossing two borders is a sufficient, but not a necessary condition for a trade flow to truly be GVCs related. While Borin, Mancini, and Taglioni (2021) needed to assume that GVCs related trade is only composed of items crossing two borders to be able to identify these flows, this means that, as will be discussed in the main text, the data may contain truly GVCs related trade that is classified as traditional (non-GVCs) trade.

As seen in Figure 3, the positive trend of Mexico´s share in US manufacturing imports was temporarily interrupted during the first decade of the 21st century when China joined the World Trade Organization (WTO) (the so-called China Shock). This event allowed China to displace Mexican exports to the United States in various product categories (Chiquiar, Fragoso, and Ramos Francia, 2007). In particular, before China's accession to the WTO in 2001, NAFTA contributed to an increase in Mexico's share in U.Ss imports, especially in its GVCs related purchases. However, following the significant increase in China's presence in international manufacturing trade after 2001, this country reaped a relevant portion of the U.S. market Mexico had gained, both in GVCs related and in traditional exports (see related Figures in Appendix A.1). From 2008 to 2009 onwards, Mexico began to regain the ground lost, and consistently maintained a larger share than China in U.S. GVCs related imports. In contrast, in terms of traditional exports to the United States, Mexico has been significantly outpaced by China since the early 2000s. Moreover, while China and Mexico remain close competitors in the U.S. market, China has gained a larger presence in worldwide markets during the last two decades. This can be attributed to Mexico's strong concentration of exports towards the United States market, while China has a more diversified export base with a focus on Asian regional production chains.

The previous figures provide insights into the economy's increasing outward orientation following its trade reforms. However, they overestimate the actual contribution of Mexico's trade to its GDP. This is because, as already mentioned, Mexico has increasingly specialized in specific processes within GVCs, importing a significant share of intermediate goods to be processed and assembled with Mexican labor before being re-exported. Consequently, the imported content in Mexico's manufacturing exports is substantial. This implies that a large part of Mexico´s GVCs related exports represent value-added generated in other countries.

Thus, to accurately assess the contribution of Mexico's trade to its GDP the imported content of these exports needs to be deducted. To this end, we rely on Borin, Mancini, and Taglioni (2021). Their framework breaks down gross GVCs related exports into three components: i) a *purely backward* component, which represents exports at the end of the value chain that rely on imported inputs to export final goods and services not re-exported by the purchasing country; ii) a *pure forward* component, which corresponds to exports that contain domestically generated value-added at the beginning of the value chain and are exported to a partner country for re-exportation; and iii) a *two-sided* participation in GVCs, where imported materials are used to produce exports that are re-exported by the purchaser. The *purely backward* and *two-sided* components of a country's GVC-related exports entail value-added generated in another country but embedded in its exports. Thus, when assessing the contribution of GVC-related exports to GDP, only the domestically generated value-added embedded in these exports (the *pure forward* component) must be considered. In the case of traditional exports, their gross value can be assumed to entirely consist of domestically generated value-added, as there are no imported components to account for.

Figure 4 shows the share in Mexico´s GVC-related exports to the US of these three components. In line with Mexico´s increasing specialization in assembly activities, the imported content in its GVC-related exports has been substantial and growing. Indeed, the purely backward component has grown to represent approximately 80% of GVC-related exports. Consequently, the domestically generated value-added, the purely forward component, has remained remarkably low since the trade liberalization of the country. In the manufacturing sector in particular, the purely forward component of its GVC-related exports to the US has been only slightly larger than 10% since NAFTA started operating, while the purely backward component in these exports amounts to close to 80% of their total value. This means that most of the gross value of Mexico´s

GVC-related exports entails an imported component incorporated in products that are shipped by Mexico to their final destination.

2.2. Quantifying the effect of Mexico's traditional trade and GVCs related trade effect on GDP growth

Using the approach of Borin, Mancini, and Taglioni (2021) to identify traditional and GVC-related exports and the decomposition of the latter into pure forward, pure backward and two-sided components, we estimate the contribution of international trade to Mexico's GDP growth.[3] Table 1 shows, for selected periods, the average share, the average of the annual growth rates and the average contributions to overall GDP growth of the value-added generated by exports, distinguishing between traditional exports and the value-added resulting from Mexico´s pure forward participation in GVCs.[4] It also shows the contribution to GDP of activities whose output is fully consumed domestically.

It is relevant to acknowledge when analyzing these figures that a part of Mexico's exports includes finished goods shipped to the final consumption market. Many of these products are processed in Mexico using a significant amount of imported materials, Mexican labor and possibly some local inputs. Thus, in these statistics, the value-added generated by Mexican inputs embedded in these particular exports is considered as traditional trade, since it crosses borders only once, while the value of imported materials included in these gross exports is considered as purely backward GVC participation, since it crosses two or more borders and entails value-added generated by another country. Thus, part of the traditional exports identified in these statistics include value-added that Mexico in fact contributes in the final stage of a GVC. A consequence of this is that the true contribution of Mexico's participation in GVCs on its GDP may be underestimated in this data since part of this contribution is classified as traditional trade.[5]

2.2.1. Quantifying the effect from 1981 to 2017

Focusing briefly in the years preceding the U.S.-China trade war, several findings emerge from the data. First, except for a slight decrease during 1987 to1993, there has been a

[3] The data used is available up to 2020 with the sources we used, so that it includes the negative effects of the initial consequences of the pandemic, but not the restoration of economic activity and exports during 2021-2022. Even if we chose to add the data from an alternative source from the same World Bank database that includes GVCs data up to 2021 (the Asian Development Bank MRIOT Database), the calculations would still imply negative numbers in most of the growth figures in Table 1 for the last period. Thus, we chose to use this data only up to 2019. In the analysis we make for the years including both the U.S.-China trade war and the pandemic, we therefore used data from the U.S. Census Bureau as an alternative.

[4] Appendix A.2 provides a summary of the share of each exporting sector in Mexico's purely forward component in its GVC-related exports and the contribution of each producing sector to the generation of value-added as a result of Mexico´s insertion into GVCs during these years. This distinction is relevant since the final exporting sector is not the sole sector responsible for generating the value-added that is embedded in GVC-related exports. In particular, part of the domestic value-added embedded in Mexico´s GVC-related exports may be generated by upstream suppliers of the industry exporting the goods.

[5] If instead Mexico exported these same goods to another country, which then re-exported these to a third market, the same domestic value-added generated in Mexico would be classified as pure forward participation in GVC, since in this case it would cross two borders. In both cases, the net effect on Mexico´s GDP would be the same.

consistent upward trend in the share of value-added generated by Mexico's trade.[6] Traditional trade value-added accounted for almost 12% of total GDP between 1981 and 1986, increasing to slightly over 20% in the two years preceding the COVID-19 pandemic. The value-added resulting from Mexico's pure forward participation in GVCs has also shown a growing trend over time, although it represents a significantly smaller proportion of total GDP. It grew from less than 2% in the 1980s and 1990s to slightly more than 3% of GDP in the last years in the analysis. Thus, while the increasing share of value-added related to trade in Mexico's total GDP can be attributed to both traditional trade and GVC pure forward participation, the relatively smaller share of GVC pure forward participation in total value-added means that this component has contributed significantly less to overall growth than traditional trade.

Second, from 1994 up to China's entry into the WTO, trade had a substantial contribution to GDP growth. This can be attributed, to a large extent, to NAFTA, which improved Mexico's access to the U.S. market and led to a large increase in the participation of *maquiladora* and non-*maquiladora* industries in GVCs formed with the United States and other developed countries' firms.[7] Thus, resources in the economy shifted from non-traded to traded sectors, so that compared to the previous period, the contribution of total trade to GDP´s annual growth *increased* by 1.91 percentage points, while the contribution of the purely domestic component of GDP *decreased* by 1.58 percentage points. These figures could suggest that NAFTA may have accelerated GDP growth by around 0.3 percentage points per year during 1994 to2000. However, other factors, such as the sustained growth of the U.S. economy during this period, may have also contributed to export growth, so that NAFTA´s direct causal effect on GDP growth could have been somewhat smaller.[8] The significant increase in the contribution of trade to GDP growth during this period was primarily driven by the growth of traditional exports. GVC-related domestic value-added grew at a similar rate, but

[6] The periods from 1981 to 1986 and from 1987 to 1993 were characterized by macroeconomic developments that influenced significantly on the relative contributions of domestic and external sources of growth. During 1981 to1986, the macroeconomic instability and real exchange rate depreciation switched expenditures favoring external demand growth over domestic demand, so GDP growth was mainly driven by exports. In contrast, during the initial trade liberalization phase, but prior to NAFTA, domestic spending was boosted by an increase in bank financing to the private sector and a currency appreciation, which had adverse effects on net exports (Krueger, 1999). Thus, in this period the contribution to growth from trade was negative, while the purely domestic component exhibited an extraordinarily high growth rate.

[7] This export dynamism may have also been fueled by the depreciation of the real exchange rate in 1995. However, the facts that: i) the discrete increase in manufacturing exports during this period started in 1994, before the devaluation of the local currency took place; ii) the real exchange rate settled back to levels similar to those observed before the crisis by 1996, but manufacturing exports kept on growing; and iii) the increase in Mexican exports share in U.S. imports persisted until the end of the century, suggest that NAFTA did have an important role in the increase in Mexico's exports during this period.

[8] The cumulative effect of these growth rates on the level of GDP would be close to 2%. Romalis (2007) estimates that because of NAFTA the real value of output increased in Mexico by 1.09%, while Caliendo and Parro (2015) estimate a rise in welfare of 1.31%, driven by an increase due to trade creation of 1.80%, from which slightly negative contributions of trade diversion and terms-of-trade effects are netted out. These papers differ in the interpretation of these figures: while Caliendo and Parro (2015), consistently with Krueger (1999), argue that most of the effect of NAFTA implied trade creation (leading to higher welfare), Romalis (2007) argues that the trade generated by NAFTA was mostly diverted from the rest of the world, so that it did not lead to higher welfare. In this chapter we do not take a stand in this sense, and estimate the possible effect of nearshoring on GDP without arguing whether this effect is mostly due to trade creation or trade diversion. In relation to this last point, the evidence on the increases in the unit values of U.S. imports from Vietnam and Mexico since 2018 that Alfaro and Chor (2023) present suggests that the policy-induced reallocations derived from the tariff increases on Chinese imports has implied a relevant amount of trade diversion.

its contribution to growth was only 20 basis points, reflecting the smaller share it has in overall GDP.

Finally, the displacement of Mexican exports as a consequence of China's entry to the WTO contributed to an important slowdown of international trade´s effect on growth between 2001 and 2008. Although there was a slight recovery of this contribution over 2009 to2017, it remained considerably lower than in the initial years following NAFTA's implementation.

2.2.2. 2018 to 2019 and the pandemic

2.2.2.1. Share in U.S. manufacturing imports

The information used to identify separately traditional and GVC-related trade is not available yet for the full 2018 to 2022 period. However, using the data on manufacturing imports from the U.S. Census Bureau as an alternative, we may conduct an initial analysis to assess whether Mexico's exports to that country have benefited from the most recent events. Table 2 illustrates the changes of the shares is U.S. manufacturing imports from China and from the six economies with the highest share increases from 2018 to 2022, distinguishing between the changes that occurred in 2018 and 2019 (that is , comparing 2019 to 2017, which may approximate the initial effects of the U.S.-China trade war) and those that occurred in the full 2018 to2022 period, which also include lagged effects of the trade war, the pandemic and its aftermath. The countries are ordered in terms of their market share gain from 2017 to 2022.

Focusing first on the changes during 2018 and 2019, Mexico was the country with the largest increase in its share within U.S. manufacturing imports. Other countries, such as Vietnam, Taiwan and India, also increased their market share, although to a smaller extent. However, Mexico´s share increased by 1% of U.S. total manufacturing imports, whereas China's loss was 4% of these during this same period. For this period in particular, a part of the observed increase in Mexico´s share seems to be due to preexisting trends in Mexican exports to the United States of some product categories in which China did not compete directly with Mexico. Indeed, 0.44 percentage points of Mexico´s 1% observed market share gain are explained by the increase in its motor vehicles exports.

For the full 2018 to 2022 period, China's market share loss in the United States was even larger, but Mexico's observed gain dropped to 0.72 percentage points, while those of Vietnam and Taiwan increased significantly. However, as opposed to the 2018 to2019 period, for the five years going from 2018 to 2022 as a whole the export performance of the motor vehicle industry had a negative net effect on the change of Mexico´s share in U.S. imports. Indeed, given the sharp decrease in the exports of this industry during the pandemic and its aftermath, the share of these in total U.S. manufacturing imports decreased by 0.27 percentage points. Thus, for this full period, the share of non-motor vehicle Mexican exports in the U.S. market in fact increased by 1%. Thus, the data could suggest that Mexico's exports to the United States may have indeed benefited from the effects that the trade war, the pandemic or other geopolitical considerations may have had on nearshoring decisions, especially if we consider the full 2018 to2022 period.[9]

[9] It could be argued that part of this increase was a result of the cycle induced by the pandemic and its aftermath, which may have boosted the relative demand for manufactured goods exported by Mexico during the recovery phase. The pandemic, however, may have also induced some sectors within Mexico to increase their exports to the United States if the supply of their corresponding products from other parts of the world

However, Mexico's market share gains were relatively small as compared to China's losses, suggesting that a seemingly larger portion of China's imports may have been replaced by goods exported from other countries.[10]

2.2.2.2. Counterfactual analysis

To assess more precisely the possible effect of the U.S.-China trade war on Mexico´s manufacturing exports to the United States, we need to consider the counterfactual performance that non-motor vehicle Mexican exports would have had in the absence of the tariff war. As explained in more detail in Section 4, the results of an econometric exercise intended to identify this counterfactual imply that, in the absence of the trade war, Mexico´s non-motor vehicle exports to the United States would have been around 12% lower in the last five years.[11] This estimate means that, on average, Mexico´s share in U.S. manufacturing imports was 1.11 percentage points higher during 2018 to2022 due to this event. These results suggest that most of the gains in Mexico´s share in non-motor vehicle U.S. imports described before can be indeed attributed to the effects of the trade war. However, the results also highlight the idea that Mexico´s gains have been smaller than China's losses and the gains of other countries, namely, Vietnam and Taiwan.

Other studies also argue that the tariff war induced increases in Mexican exports over 2018 to2019 and that Mexico was one of the main beneficiaries of this episode, but that other countries may have benefited to a larger extent. Fajgelbaum et al. (forthcoming) argue that Mexico´s export mix includes many product varieties that are relatively close substitutes to goods that China exports to the United States and tends to exhibit downward sloping export supply curves, possibly due to economies of scale, suggesting that during 2018 to 2019 Mexico was able to exploit the opportunities from the trade war by increasing its exports of products that were targeted by the United States' tariff increases both to the United States and to the rest of the world. In Section 4 we extend their analysis to the 2018 to2021 period and show that these conclusions remain. Wang and Ahmed Hannan (2023), Lovely and Xu (2021), Mesquita Moreira et al. (2022), Pietrobelli and Seri (2023) and Alfaro and Chor (2023) provide evidence of a causal effect of U.S. tariffs on Chinese goods on Mexico's exports of these goods to the United States and conclude that Mexico has been one of the countries that has gained the most from the tariff war, but that its gains represent a relatively small part of China´s losses and that some other countries gained a larger fraction of these losses.

2.3. Skill intensity of Mexico and China´s export mixes

The events described above induced shifting patterns of specialization in both China and Mexico. Before 2001, Mexico and China had a very similar export composition, so that

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was affected by the disruption of the supply chains and increase in transport costs, so that this could also partly be considered as nearshoring.

[10] For 2018 to2022 as a whole, the six countries that increased their observed share in U.S. manufacturing imports the most were, in descending order, Vietnam, Taiwan, Mexico, India, South Korea and Thailand. This ordering persists even if we deduct the (negative) contribution of finished motor vehicle exports on overall Mexico´s sales to the US.

[11] Using a synthetic control approach, Banco de México (2023b) estimates that the output of the sectors most likely to have been benefited by nearshoring according to a Google search increased as a consequence of this process on average by 11.4% from July 2020 to June 2023.

the average skill intensity of their exports to the United States, excluding motor vehicles, was similar.[12] However, following China's entry into the WTO, this country tended to increasingly specialize on average in higher skill-intensive sectors than Mexico in its manufacturing exports to the United States. Furthermore, the sectors in which China displaced Mexico the most seem to have been relatively high-skill intensive, leading Mexico to increasingly specialize in lower skill intensive industries as a result (further evidence on this is found in Chiquiar and Tobal, 2019).

These outcomes are relevant to make inferences concerning the possible consequences of nearshoring on Mexico´s sector-level exports, its average export skill intensity and the skill premium in the country. As will be argued below and formalized theoretically in Section 3, nearshoring can be seen as a reversal of some of the forces that affected Mexico's export mix after China's entry to the WTO. Just as in past episodes China's market access gains in the United States coincided with a decrease in the skill intensity of Mexico's exports, now that China has started losing market access due to the trade war and nearshoring decisions, Mexico seems to have started regaining share in relatively higher skill intensive goods. We therefore conclude that, given the observed patterns of specialization of China and Mexico just before the trade war, it is likely that the industries that may mostly shift activities from China to Mexico as a result of nearshoring have on average a higher skill intensity than current Mexican exports. This in turn suggests that the nearshoring process may lead to an increase in the relative demand for skilled labor in Mexico and possibly to a rise in the skill premium in the country. These considerations will have special relevance when we make a forward-looking analysis of the potential consequences of nearshoring on Mexico in Section 4 below.

2.3.1. Average export skill intensity levels and trends

To provide evidence concerning the points discussed above, we first calculate the average skill intensities of Mexico's and China´s manufacturing exports to the United States and compare their levels and trends during the periods analyzed before. We use the industry level measure of skill intensity proposed by Nunn and Trefler (2013). They use data for U.S. manufacturing to build a human capital intensity indicator for each industry i (SI_i) as follows:

$$SI_i = ln \left[\frac{npw_i}{tw_i}\right] \quad (1)$$

where npw_i and tw_i are non-production worker wages and total worker wages in industry i, respectively. This measure takes values from zero to minus infinity. The larger the value of SI_i is (that is, the closer it is to zero), the higher the share of non-production worker wages over total wages is and, therefore, the more skill-intensive industry i is assumed to be. We compute this measure for 85 4-digit NAICS manufacturing industries (see Chiquiar and Tobal, 2019). Using this industry-level measure, we estimate the average skill intensities of Mexico and China's exports to the United States for each year in the period of analysis as follows:

[12] Chiquiar, Fragoso, and Ramos Francia (2007) show that when China entered the WTO, its export basket was very similar to that of Mexico, making it a direct competitor in global and U.S. markets.

$$SI_{MEX,t}^{X} = \sum_{i=1}^{85} \left(\frac{X_{MEX,i,t}}{X_{MEX,t}} \right) SI_i \qquad (2)$$

$$SI_{CHN,t}^{X} = \sum_{i=1}^{85} \left(\frac{X_{CHN,i,t}}{X_{CHN,t}} \right) SI_i \qquad (3)$$

where $SI_{MEX,t}^{X}$ and $SI_{CHN,t}^{X}$ are the average skill intensity in Mexican and Chinese manufacturing exports to the United States in year t, respectively; and $\frac{X_{MEX,i,t}}{X_{MEX,t}}$ and $\frac{X_{CHN,i,t}}{X_{CHN,t}}$ are the shares of industry i's exports over total manufacturing exports to the United States of Mexico and China, respectively. That is, for each year the skill intensity of each country's exports to the United States is the weighted average of the industry-level skill intensities, where the weight of an industry is its share in total manufacturing exports of each country to the United States, as recorded by the Census Bureau.

Figure 5 shows the time series of these indicators. For Mexico, we calculate the average skill intensity of total exports, as well as the average skill intensity excluding the motor vehicle assembly industry (NAICS code 3361). This industry holds a significant share in Mexican exports and is notably the least skill-intensive among the 85 sectors analyzed.[13] Thus, its inclusion in the calculation lowers substantially the skill intensity indicator for Mexico. Since there is no relevant competition between Mexico and China in the United States market within this industry, it is reasonable to exclude it when comparing the skill intensities of the two countries to focus on the sectors in which they do compete.

As can be seen, according to the skill intensity measures described above and the observed patterns in Mexico and China's exports, the average skill intensity of China's export mix to the United States has been consistently higher than that of Mexico's exports since that country entered the WTO in 2001. Indeed, comparing the average skill intensities of non-motor vehicle Mexican exports and Chinese exports to the United States, we can note that prior to China's entry into the WTO these were roughly similar and were both exhibiting an upward trend. However, after China's entry into the WTO there was a decline in the skill intensity of Mexico's exports, while China's skill intensity maintained its positive trend. Econometric evidence based on the approach in Romalis (2004) in Appendix A.3 provides further support of the increasingly larger specialization in relatively higher skill intensive sectors that China has exhibited since 2001, as compared to Mexico. This pattern is consistent with the findings of Pietrobelli and Seri (2023), who argue that the growth of Mexican exports to the United States between 2005 and 2015 was not accompanied by a significant upgrading within the value chain. This contrasts with China, which did experience a notorious upgrade during the same period, transitioning from assembly to higher value-added stages in the production process (see also Kee and Tang, 2016).

[13] The measure SI_i takes a minimum value of -1.90 in the automobiles and trucks manufacturing industry (NAICS code 3361) and a maximum value of -0.28 in the industry of computer and peripheral equipment. The result for the motor vehicle manufacturing reflects the fact that this category corresponds to the final assembly of motor vehicles. The industries of motor vehicles bodies and trailers and motor vehicle parts are relatively more skill intensive than the assembly industry according to this measure.

2.3.2. Correlation analysis

We now use the industry-level disaggregated data to compute the correlations between the changes in the share of an industry in each country's total manufacturing exports to the United States for different periods and the skill intensity of that industry. This analysis provides valuable insights into whether a country's export mix became more or less skill-intensive over specific periods of time.

Table 3 presents these correlation coefficients, with corresponding p-values in parentheses, for Mexico and China over different periods.[14] A statistically significant and positive/negative coefficient indicates that the average skill intensity of exports increased /decreased over a specific period. For Mexico, we show the correlation coefficients for the entire sample and for a sample that excludes the finished motor vehicles industry. In several cases the sign of the coefficient switches when we exclude the latter industry, reflecting the fact that it is a strong and large outlier. Thus, the most appropriate comparison, accounting for the fact that the motor vehicle assembly sector has its own distinct dynamics and is not an industry where China competes with Mexico in the U.S. market, seems to be between Mexico´s correlations without this industry with China´s correlations.

As can be noted, in the years following NAFTA and before China's entry into the WTO the correlation is positive for both Mexico and China, suggesting that these countries increasingly shifted resources towards more skill intensive industries. However, once China entered the WTO, the skill intensity of Mexico's exports started to decrease significantly, while China's export skill intensity continued to rise. Finally, we observe the opposite pattern during the first two years of the U.S.-China trade war: China's skill intensity decreases significantly while Mexico's skill intensity starts to increase slightly, although this now positive correlation coefficient is barely significant, with a p-value of 0.12. This pattern becomes stronger if we add the years including the U.S.-China war, the COVID-19 pandemic and a potential new phase of nearshoring from 2017 to 2022. In fact, in this last case the positive correlation for Mexico becomes strongly significant and China´s correlation remains negative and significant. This means that in the last five years China started decreasing the average skill intensity of its exports, while the average skill intensity of Mexican exports started rising again.[15]

We may conclude that since China's entry to the WTO this country has tended to increasingly specialize in industries that entail a higher relative use of skilled labor than Mexico. According to the theoretical model we present in Section 3 below, this implies that by reversing this pattern, nearshoring may lead Mexico to gain share in this type of industries. The correlation analysis described above, especially for the period going from 2017 to 2022, seems to be consistent with this prediction. In turn, this means that the sectors that may be near-shored from China to Mexico will likely tend to have a higher skill intensity than Mexico's current average skill intensity in its export mix. This suggests that the nearshoring prospects that Mexico may face in the near future may imply a higher overall relative demand for skill and, thus, the effects on output will be larger,

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[14] The data are weighted by the industry share in total source country initial exports for each period. This is guided by the theoretical model we present in Section 3, which suggests that although capital movements or changes in transport costs alter the skill intensity of a country's export mix, this change is irrelevant for inputs in which the country does not specialize. Adjustments occur only across inputs in which the country does specialize. By assigning these weights, the analysis considers that changes in industries with a smaller weight, where the country does not tend to specialize, are less important.

[15] Utar, Cebreros Zurita and Torres Ruiz (2023) also suggest that the effect of the U.S.-China trade war on Mexico's exports to the United States was primarily driven by increased sales of GVC-related firms in skill intensive industries.

and those on the skill premium lower, to the extent that Mexico´s supply of skilled labor is more elastic.

3. Theory

This section builds upon an extension of the Feenstra and Hanson (1996, 1997) two-country model of foreign investment and outsourcing. Lee and Sim (2016) extended this model to the case of three countries to analyze the outsourcing decisions of a middle-income country. Here, we use a similar extension to explicitly model the nearshoring and reshoring decisions of a developed country in the current economic juncture. The goal is to provide a conceptual guide for the interpretation of the empirical results described before and for the forward-looking analysis we make below. In particular, our aim is not to develop a single model that can fully explain all variation we observe in the data. Instead, we develop a theoretical framework that offers intuition and serves as a guide for the evidence presented above and in Section 4.[16] Thus, among all the well-established models in the literature, we chose this one because it aligns with the specialization patterns that are implied by the skill intensity index we describe in Section 2.

As will be shown, depending on the assumptions made concerning the relative skill abundance of Mexico and China, the model has different predictions concerning the effects of nearshoring on Mexico´s pattern of specialization, average export skill intensity, relative demand for skilled labor and its skill premium. If Mexico´s current export mix is relatively more skill intensive than China´s (reflecting an assumption that China is less skill abundant than Mexico), according to the model the effect of nearshoring on Mexico´s specialization patterns and average skill intensity would be ambiguous. In contrast, in a second scenario, in which we assume instead that China is more skill abundant than Mexico and, thus, Mexico's current export mix is relatively less skill intensive than China´s, the model predicts that nearshoring will lead Mexico to increasingly export more skill intensive goods, thus increasing its relative demand for skilled labor and the skill premium in the country.

The evidence described in the previous section suggests that since China's entry to the WTO the export mix of Chinese goods to the United States has been on average more skill intensive than Mexico´s mix. Also, after the trade war started, a gradual move of Mexico's exports towards more skill intensive industries was observed, at the same time that China's average export skill intensity started to decrease. This is more consistent with the assumptions and predictions under the second scenario. We will also show below that the model's implications for the consequences of past events on Mexico, China and the United States (NAFTA and the China Shock) are also more consistent with the available data under the lens of that scenario. We therefore conclude that a scenario in which nearshoring will tend to lead Mexico to increasingly export more skill intensive

[16] Feenstra and Hanson (1996, 1997) belongs to the family of Heckscher-Ohlin models of international trade. Selecting this model as a basis for our theoretical framework therefore appears suitable for examining the changes in the specialization and trade patterns of Mexico, China and the United States across goods that differ in their skill intensity as a consequence of exogenous shocks. For example, as seen before, the indexes measuring the skill intensity of Chinese and Mexican exports we compute, change significantly after China's entry into the WTO and after the imposition of tariffs during the U.S.-China trade war. We nonetheless acknowledge that our setup does not intend to fully explain all aspects of the trade patterns of these countries, since it relies on the validity of some assumptions which under some circumstances may be restrictive. For instance, to simplify our analysis, we consider a world composed of only three countries. Also, other factors we do not consider, such as the possible existence of scale economies, may also influence the trade patterns between these countries.

goods, as compared to its current export mix, is the most likely case. This idea will guide the forward-looking analysis we make in Section 4.

3.1. Model setup

Consider an economy comprising three countries that for the time being we label as *A, B* and *C*. Each country, *i* ,is endowed with capital (K_i), skilled labor (H_i) and unskilled labor (L_i). We assume that differences in relative factor endowments are large enough to prevent factor price equalization. Specifically, we denote the return to capital, the skilled labor wage and the unskilled labor wage in country *i* by r_i, q_i and w_i, respectively, and assume that the following inequalities hold: $q_A/w_A > q_B/w_B > q_C/w_C$ and $r_A > r_B > r_C$. These inequalities reflect the assumption that country *A* is the most unskilled labor abundant, followed by country *B*, while *C* is the most skill-abundant country. Country *A* is also assumed to be the least abundant in physical capital, followed by *B* and *C,* in that order. Initially, we assume that these factors are immobile internationally, although we will examine the effects of capital movements on production patterns and input prices in subsequent comparative statics exercises.

There is a single final manufactured good, *Y*, which is assembled in Country *C* using a continuum of intermediate inputs indexed by $z \in [0,1]$.[17,18] This final good is then costlessly traded with the remaining countries for its consumption.[19] The intermediates *z* can be produced domestically or sourced from either of the other two countries. The production of each unit of input *z* requires $a_H(z)$ units of skilled labor and $a_L(z)$ units of unskilled labor. We sort the intermediates such that those with higher values of *z* are more skilled-labor intensive than those with a lower value of *z*,that is, $a_H(z)/a_L(z)$ is increasing in *z*. The amount of *z* produced is given by the following production function:

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[17] This follows Feenstra and Hanson (1996, 1997). None of the model´s implications would change if we instead had assumed that each *z* corresponds to goods produced by a different manufacturing industry, where these industries vary in terms of their factor intensity, as is assumed in the original continuum-of-goods version of the Heckscher-Ohlin model of Dornbusch, Fischer and Samuelson (1980), which is the basis for Feenstra and Hanson´s model, or more recently in Romalis (2004). In that case, we would simply reinterpret *Y* to be a consumption aggregator of goods from different industries. For this reason, we may be relatively loose and use interchangeably the terms inputs in the description of the theoretical model and industries in the empirical sections of this chapter.

[18] The fragmentation of production processes has given rise to a contemporary perspective in the literature, conceptualizing international trade in terms of tasks (Grossman and Rossi. Hansberg, 2008; Chiquiar, Tobal and Yslas, 2019). These tasks represent small components into which production can be broken down, allowing different countries to specialize and subsequently engage in trade with other nations. The theoretical setup presented by Feenstra and Hanson (1996) precedes this literature and, as such, does not explicitly reference the term tasks. However, they do take into account that production can be fragmented and conceptualize the production process into infinitely small pieces referred to as intermediate inputs. Furthermore, in their model, these inputs can have different trade costs and skill-intensities—two of the most relevant sources of task heterogeneity discussed in the modern literature (Tobal, 2019). Thus, while Feenstra and Hanson (1996) and, consequently, our theoretical framework, cannot be strictly classified as models of trade in tasks, the insights and intuition derived from these can be applied to a more contemporary world characterized by trade in tasks.

[19] Without any relevant effect on the model's predictions, we could have alternatively assumed that the final good is only consumed in country *C*. In a different offshoring model, Baldwin and Venables (2013) make this precise assumption. The only difference in our case would be that the variable *E*, which corresponds to the worldwide expenditure on good *Y*, instead would correspond to the expenditure on good *Y* made by consumers of country *C*. Both in their model and in ours, these assumptions are explicitly made to declutter the analysis.

$$x(z) = \left[min\left(\frac{L(z)}{a_L(z)}, \frac{H(z)}{a_H(z)}\right)\right]^{\theta} [K(z)]^{1-\theta} \quad (4)$$

where *L(z), H(z)* and *K(z)* are the unskilled labor, skilled labor and capital used to produce *z,* respectively. The final good *Y* is costlessly assembled according to a Cobb-Douglas function:

$$ln\,ln\,Y = \int_0^1 \alpha(z)\,ln\,ln\,x\,(z)dz \quad (5)$$

where $\int_0^1 \alpha(z)dz = 1$.

Given these technologies, the minimum cost of producing one unit of *z* in each country *i = A, B* and *C* is given by:

$$c(w_i, q_i, r_i; z) = \beta[w_i a_L(z) + q_i a_H(z)]^{\theta} r_i^{1-\theta} \quad (6)$$

where β is a constant. We assume that, for fixed factor prices, $c(w_i, q_i, r_i; z)$ is continuous on *z*.

To capture the decision-making process of firms in country *C* regarding the relocation of intermediate input production between countries *A* and *B,* nearshoring, and the return of input production to country *C*, reshoring, we incorporate costs associated with international input trading. These costs can arise from tariffs or transportation costs. Specifically, we introduce a cost shifter $T_i \geq 1$ in each country *i,* which can either increase or decrease the costs of sourcing inputs, inclusive of all charges such as tariffs. Thus, the minimum full unit cost of sourcing input *z* from each country can be expressed as follows:

$$c_i^f(w_i, q_i, r_i; z) = (T_i)\beta[w_i a_L(z) + q_i a_H(z)]^{\theta} r_i^{1-\theta} \quad (7)$$

where we assume $T_C = 1$. To describe the initial market clearing conditions, we will also assume T_i = 1 in countries *A* and *B*, although in comparative statics exercises we will let T_i change for these two economies.

After defining the effective cost functions from the perspective of country *C*, we can graph these schedules to depict the initial trading equilibrium (Figure 6). The exact slopes of these schedules are not specified but their relative slopes are known. Due to the varying ratios of skilled to unskilled labor wages in each country, in a trading equilibrium where positive production exists in all three countries the minimum full cost schedule of country *C* must lie below those of countries *B* and *A* at the highest values of *z*. This reflects that country *C* has comparative advantage in the production of the most skill intensive inputs. Similarly, the schedule of country *A* must lie below those of *B* and *C* at the lowest values of *z*. Additionally, for country *B* to engage in international trade and produce a positive quantity of certain inputs, its cost schedule must lie below those of countries *A* and *C* at intermediate values of *z*. Given that the capital share in the production of all inputs is equal, costs are equalized at most at a single point *z** for countries *A* and *B* and at most at a single point *z*** for *B* and *C*. Formally, these points are defined by the following two conditions:

$$c_A^f(w_A, q_A, r_A; z^*) = c_B^f(w_B, q_B, r_B; z^*); \text{ and}$$
$$c_B^f(w_B, q_B, r_B; z^{**}) = c_C^f(w_C, q_C, r_C; z^{**}). \quad (8)$$

Note in Figure 6 that country *C* produces locally the most skill intensive inputs (those with $z \in (z^{**}, 1]$) and imports the least skill intensive ones $z \in [0, z^*)$ from country *A* and those with middle values $z \in (z^*, z^{**})$ from *B*.

This equilibrium requires factor market clearing in each country. As in Feenstra and Hanson (1996, 1997), we assume that the supply of skilled labor is increasing and the supply of unskilled labor is decreasing in the skill premium: $\partial L_i(q_i/w_i)/\partial(q_i/w_i) \leq 0$ and $\partial H_i(q_i/w_i)/\partial(q_i/w_i) \geq 0$. These supplies must equal the total demand for each corresponding factor in each country. The demand for each factor is given by the integral over all inputs *z* produced in the specific country of the total quantity of the corresponding factor used to produce each *z*, which in turn is the product of the unit requirement of the factor to produce *z* times the quantity of *z* produced. By Shephard's lemma, the unit requirement of the factor is given by the derivative of equation 7 with respect to its factor price, where we initially assume $T_i = 1$ in the three countries. Thus, labor market clearing in country *A* is given by the conditions:

$$L_A(q_A/w_A) = \int_0^{z*} \beta\theta \left[\frac{r_A}{w_A a_L(z) + q_A a_H(z)}\right]^{1-\theta} a_L(z) x_A(z) dz \quad (9)$$

$$H_A(q_A/w_A) = \int_0^{z*} \beta\theta \left[\frac{r_A}{w_A a_L(z) + q_A a_H(z)}\right]^{1-\theta} a_H(z) x_A(z) dz \quad (10)$$

Similar expressions, evaluated at country *B* and country *C*´s factor prices and with the integrals going from *z** to *z*** and from *z*** to 1, respectively, define the labor market clearing conditions in those countries.

Given that, from production function 4, capital holders receive a share $(1-\theta)$ of national income, full employment of capital in each country *i* can be defined from:

$$r_i K_i = [w_i L_i + q_i H_i](1-\theta)/\theta \quad (11)$$

Given the Cobb-Douglas technology to produce *Y*, each input *z* receives a share *α(z)* of total world expenditure on the final good, denoted by *E*. Thus, the demand for an input produced in country *A* is:

$$x_A(z) = \frac{\alpha(z)E}{c_A^f(z)}, z \in [0, z*) \quad (12)$$

Similar expressions apply to inputs produced in countries *B* and *C* within the ranges (*z*, z***) and (*z**,* 1], respectively. Using equations 12 and 7, the factor demands in the right side of 9 and 10 can be simplified to get:

$$L_A(q_A/w_A) = \int_0^{z*} \theta \left[\frac{a_L(z)\alpha(z)E}{w_A a_L(z) + q_A a_H(z)}\right] dz \quad (9')$$

$$H_A(q_A/w_A) = \int_0^{z*} \theta \left[\frac{a_H(z)\alpha(z)E}{w_A a_L(z) + q_A a_H(z)}\right] dz \quad (10')$$

Equations 8 and 11, along with the labor market clearing conditions in the three countries and a condition equalizing world expenditure *E* to worldwide factor payments, determine the equilibrium. A relevant equilibrium concept we will highlight in the following analysis is the relative demand for skilled labor in each country. For country *A*, using equation 9´ and equation 10´ this relative demand is given by:

$$D_A(q_A/w_A, z^*) \equiv \frac{\int_0^{z*}\left[\frac{a_H(z)\alpha(z)E}{w_A a_L(z)+q_A a_H(z)}\right]dz}{\int_0^{z*}\left[\frac{a_L(z)\alpha(z)E}{w_A a_L(z)+q_A a_H(z)}\right]dz} \qquad (13)$$

Analogous expressions, evaluated at country-specific factor prices q_i and w_i and integrated from $z*$ to $z**$ and from $z**$ to 1, respectively, define the relative demands for skilled labor in countries *B,* $D_B(\frac{q_B}{w_B}, z^*, z^{**})$, and *C,* $D_C(\frac{q_C}{w_C}, z^{**})$:

$$D_B(q_B/w_B, z^*, z^{**}) \equiv \frac{\int_{z*}^{z**}\left[\frac{a_H(z)\alpha(z)E}{w_B a_L(z)+q_B a_H(z)}\right]dz}{\int_{z*}^{z**}\left[\frac{a_L(z)\alpha(z)E}{w_B a_L(z)+q_B a_H(z)}\right]dz} \qquad (14)$$

$$D_C(q_C/w_C, z^{**}) \equiv \frac{\int_{z**}^{1}\left[\frac{a_H(z)\alpha(z)E}{w_C a_L(z)+q_c a_H(z)}\right]dz}{\int_{z**}^{1}\left[\frac{a_L(z)\alpha(z)E}{w_C a_L(z)+q_C a_H(z)}\right]dz} \qquad (15)$$

It may be shown that the relative demands for skilled labor in countries *A* and *B* are both increasing in $z*$. Intuitively, an increase in $z*$ shifts input production from *B* to *A*. The range of inputs produced by *A* expands, now including inputs that are more skill intensive than those it produced before the rise in $z*$. Thus, the average skill intensity and the relative demand for skilled labor in Country *A* increase, exerting upward pressure on its skill premium. By the same token, the increase in $z*$ reduces the range of inputs produced by *B* such that the inputs it stops producing are less skill intensive than those it remains producing after the rise in $z*$*.* Thus, the average skill intensity and the relative demand for skilled labor also increase in *B*, with similar upward pressures on its skill premium. Following the same intuition, the relative demands for skilled labor in both *B* and *C* are also increasing in $z**$.[20]

Appendix A.5 describes simple comparative statics exercises that are useful to illustrate the main workings of the model. Briefly, the consequences of any shock on the average skill intensity and skill premium of a country depend on the changes in the thresholds $z*$ and $z**$, which in turn result from shifts of the cost schedules illustrated in Figure 6. An increase in the costs of importing inputs from a country shifts its cost schedule upwards. A move of capital from one country to another, by affecting the prices of this

[20] In Appendix A.4 we provide a sketch of the proof for the case of $D_B(q_B w_B, z^*, z^{**})$. The proofs for $D_A(q_A/w_A, z^*)$ and $D_C(q_C/w_C, z^{**})$ are very similar. Formal proofs can be found in Feenstra and Hanson (1996) and in Lee and Sim (2016). It can also be shown that these relative demands are decreasing in the ratio of skilled to unskilled labor wages in each corresponding country.

factor in each country, shifts the cost schedule of the recipient country downwards and the schedule of the sending country upwards. By affecting z^* and z^{**}, these shocks have consequences according to the positive relationship between these thresholds and the skill intensity of the countries in the model.

3.2. Nearshoring in the three-country model

In this section we use the model to study the consequences for Mexico of the current environment under two alternative scenarios. Two changes occur simultaneously in each of them: i) a rise in the costs of importing inputs from China to the United States, which shifts China´s cost schedule upwards; and ii) a capital movement from China to Mexico, which by making capital cheaper in Mexico and more expensive in China, shifts China´s cost schedule upwards and Mexico´s schedule downwards.

The scenarios differ in terms of the ordering of Mexico and China along the skill continuum. In Scenario 1, Mexico is the intermediately skill-abundant country (country *B*) and China is country *A*, so we assume that the United States (country *C*) increases tariffs on inputs imported from country *A* (T_A) and, for some reason ,say, political pressure to nearshore processes, United States firms move capital away from country *A* into country *B*.[21] In Scenario 2 we instead assume that Mexico is the least skill abundant country ,country *A*. Thus, in this second case we model the effects of the United States imposing tariffs on country *B* and of firms moving capital away from *B* into *A*. We will also compare the evidence from past events to the predictions of this model under each scenario to show that Scenario 2 seems to be the empirically relevant one. Table 4 summarizes the model´s qualitative implications of the different shocks that we discuss below under each scenario.

3.2.1. Nearshoring under Scenario 1

The tariffs imposed by the United States increase the effective price of imports from China, shifting up its cost schedule. This reduces z^* and leaves z^{**} unchanged. Thus, the tariffs diminish the relative demand for skilled labor and the skill premium in China and in Mexico, while leaving them unchanged in the United States. This would seem to be inconsistent with the apparent increase in the average skill intensity of Mexico's exports to the United States after 2017 documented above. However, once we add the additional effect of capital movements from China to Mexico, z^* diminishes further and z^{**} increases (see Figure 7). Thus, there is nearshoring to Mexico from China and offshoring to Mexico from the United States. In this case, the net effect on Mexico's relative demand for skilled labor and skill premium is ambiguous, while the relative demand for skilled labor and the skill premium diminish in China, as seems to be the case in the data, and increase in the US.

The model has other implications under Scenario 1 that can be contrasted with past events. In this scenario NAFTA and the capital movements from the United States to Mexico of the 1980s and 1990s can be thought of as a reduction in the cost schedule of Mexico and a rise in that of the United States. This is the way Feenstra and Hanson (1996, 1997) modeled foreign direct investment and outsourcing from the United States

[21] It may seem odd to assume in this case that capital moves from a country that has a higher return to capital to a country that has a relatively lower one. However, the nearshoring process may indeed entail movements in which owners of capital are willing to lose some return if that leads to other economic or non-economic benefits. This may in fact be implicit in the idea behind the concept of "friendshoring".

to Mexico in their two-country model and explained the increase in the skill premium in both countries during Mexico's trade and investment liberalization. In the three-country extension, however, there is an additional effect. The downward shift of Mexico´s cost schedule not only induces this country to start producing more skill intensive goods that were previously produced by the United States, as in the original two country model, but it also starts producing some relatively less skill intensive inputs previously produced by China.[22] This additional effect could partially or totally offset the positive effect on average skill intensity of Mexico´s output mix identified in the two-country model, making the net impact on Mexico's relative factor prices ambiguous. Thus, while under this scenario the three-country model could still be consistent with Feenstra and Hanson´s (1997) findings, it would as well be consistent if the evidence had pointed instead to a decrease in the relative demand for skilled labor in Mexico during this process.

Similarly, we can assess the effects of the China Shock under Scenario 1. This shock can be thought of as a reduction in the costs of importing inputs from China, so that the cost schedule of country *A* shifts downward and z^* increases. This effect would be reinforced if we considered that the China Shock may have also induced a capital movement from Mexico to that country.[23] In this latter case, however, the cost schedule of Mexico would shift upwards and z^{**} would decrease. Thus, if the China Shock predominantly implied a reduction in the costs of importing from China, its effects would have been higher average skill intensity and higher skill premium in both Mexico and China, with null effects on the United States. This seems inconsistent with the observed decrease in the average skill intensity of Mexico's exports after this event. But if the shock also entailed a significant capital movement from Mexico to China, the effect on the relative demand for skilled labor would still have been positive for China but ambiguous for Mexico. In this case, the output mix of the United States would become less skill intensive, as it starts producing some relatively less skill intensive inputs previously produced by Mexico. As will be discussed below, this is inconsistent with the negative consequences of the China Shock on the U.S. labor markets and its positive effect on the U.S.´s skill premium (Autor, Dorn and Hanson, 2013; Chetverikov, Larsen and Palmer, 2016). Instead, if capital flew predominantly from the United States to China during the China shock, z^{**} would have also increased. In this case the relative demand for skilled labor would have risen in Mexico and the United States as well, which is again inconsistent with the evidence from Mexico described before.

3.2.2. Nearshoring under Scenario 2

Now we consider Mexico as being country *A* and China as country *B*. Thus, in concordance with the current environment, we assume that the United States imposes tariffs on country *B* and there is a capital movement from this country to *A*. The tariff increase raises z^* and diminishes z^{**} and the capital movement reinforces these effects (Figure 8). The increase in z^* implies nearshoring from China to Mexico. The inputs nearshored towards Mexico are relatively more skill intensive than Mexico´s initial output mix. As a result, consistently with the evidence described before, Mexico's average export skill intensity rises, increasing in turn its relative demand for skilled labor and its skill

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[22] In a sense, this could illustrate trade diversion. Some existing evidence suggests that, even if on net NAFTA implied trade creation, it may indeed have also induced trade diversion in some specific industries, such as apparel (Gruben, 2006; Chiquiar, Fragoso and Ramos Francia, 2007).

[23] Some evidence suggests that certain *maquiladora* plants in Mexico closed and investment of new plants in the same sectors were made in China after 2001. This was notorious in the apparel industry (Gruben, 2006).

premium. The reduction in z^{**} implies reshoring of some inputs from China to the United States. The inputs reshored are in the upper end of China's initial output mix but have a lower skill intensity than the United State´s initial output mix.[24] Thus, under Scenario 2 the model suggests that the tariff rise and the firm relocation processes reduce the skill premium in the Untied States, with an ambiguous effect on China.

Concerning past events, NAFTA lowers the cost schedule of country *A* (Mexico) and raises z^*. Furthermore, if capital flows from the United States to Mexico, the cost schedule of the United States shifts up, increasing z^{**} and reinforcing the increase in z^*. Thus, the relative demand for skilled labor demand and the skill premium increase in the three countries. For Mexico and the United States, this is consistent with the evidence supporting the two-country model of Feenstra and Hanson (1997). It is also consistent with the apparent simultaneous increase in Mexico´s and China's average export skill intensity during this period described before. On the other hand, the China Shock would correspond in this case to a downward shift in the cost schedule of country *B* (due to lower tariffs), lowering z^* and increasing z^{**}. Independently of whether there are capital movements accompanying this shift or not, these effects may only remain or be magnified. Thus, in this case the China Shock unambiguously diminishes the relative demand for skilled labor and skill premium in Mexico, as the evidence suggests, it increases them in the United States, and has an ambiguous effect in China.

3.2.3. The three-country model and the empirical evidence

The theoretical model described above provides insights about whether Mexico may increasingly specialize in industries that require lower or higher skilled labor, as compared to its current export mix, as a consequence of nearshoring. However, as already mentioned, the model provides different implications concerning this depending on whether the current environment is better described by Scenario 1 or Scenario 2. Under Scenario 1, the model suggests that in the absence of capital movements to Mexico, the country will specialize in industries with lower skill intensity. However, if capital movements to Mexico occur, the effects are ambiguous. In contrast, under Scenario 2, the model unambiguously predicts that nearshoring will lead to an increase in the average skill intensity of Mexico's exports. Hence, determining which scenario is the empirically relevant one is crucial in assessing the potential consequences of nearshoring on Mexico's specialization patterns.

As suggested above, the overall evidence described in Section 2 and the apparent responses of China and Mexico´s specialization patterns during past shocks, after the trade war started and since the COVID-19 pandemic struck seem to be somewhat more consistent with the assumptions and implications of the model under Scenario 2. Consistently with the assumptions of this scenario, since China entered the WTO the average skill intensity of Chinese exports to the United States has surpassed that of Mexico's exports. Furthermore, the observed changes in the skill intensity of these countries´ exports during NAFTA and the China Shock tend to conform more to some of the predictions of the model under that scenario. Indeed, this scenario suggests that China's exports average skill intensity would rise after NAFTA and that Mexico´s corresponding intensity would fall after 2001. This is consistent with the patterns described in Section 2. Also, the evidence suggests that since the China-U.S. trade war started, Mexico's average export skill intensity has started to rise again, as Scenario 2 implies. In this same direction, we will provide below some weak evidence suggesting

[24] Consistently with the predictions of the model under Scenario 2, Alfaro and Chor (2023) find evidence of both nearshoring from China towards Mexico and reshoring from China to US since 2018.

that since 2018 FDI flows towards Mexico seem to have shifted towards relatively higher skill intensive industries, as this scenario implies, even though the overall size of these flows has not apparently responded strongly to nearshoring opportunities.

It is nonetheless challenging to determine fully the empirically relevant scenario if we rely only on the evidence from Mexico and China's past experiences. This difficulty arises from the fact that under one or the other scenario the model has ambiguous predictions concerning the effects of the past episodes on each of these countries, so we cannot rule out any scenario with the evidence (see Table 4). For instance, consider the case of Mexico. Data from the 10% household samples from the National Institute of Statistics and Geography (INEGI) population censuses indicate that whereas during the nineties the skill premium rose by close to 20%, during the first two decades of the twenty-first century it fell by almost 25% (Aldeco et al., 2023). This behavior is consistent with the trends of its export skill intensity we described before. In this context, the model suggests that after NAFTA came into effect its average skill intensity and skill premium would increase under Scenario 2 but could have also risen under Scenario 1. Thus, the evidence does not allow us to rule out either scenario. Similarly, after the China Shock any change on Mexico’s average export skill intensity would have been consistent with Scenario 1. We could only discard Scenario 2 if Mexico’s average skill intensity during this period had risen which, according to the described evidence, was not observed.

In the case of China, the evidence and the available data suggests that the average skill intensity of its exports and its skill premium rose during the whole period including NAFTA and the China Shock (Li et al., 2012; Parro, 2013; Li et al., 2017). We could thus in principle use the implications of the model for NAFTA to discard Scenario 1, which implies a decrease in China’s average export skill intensity and skill premium. However, given the significant reforms undertaken by this country in the mid-1990s, such as labor market liberalization, transition from public to private industry ownership, agricultural labor shifts to industry, and government-induced educational improvements (Li et al., 2012; Li et al., 2017), it is difficult to identify the causal effect of trade on its export mix and its skill premium. In turn, China’s skill intensity and skill premium response to the China Shock is positive in Scenario 1 but ambiguous in Scenario 2. Thus, we cannot rule out either scenario with the evidence concerning a rise in its skill premium during these years.

Interestingly, the United States´s experience with the China Shock is helpful to distinguish more easily the empirical relevance of each scenario, since the model has unambiguous predictions for the US labor markets. In Scenario 1, the effects of the China Shock on the U.S.´s range of inputs produced and on its skill premium depend on whether capital moves from Mexico to China (Figure 9, panel (a)) or from the United States to China (panel (b)). If capital mostly moved from Mexico to China, this would lead to an increase in the range of products that the United States produces and reductions in the average skill intensity of its product mix. This is inconsistent with the negative effects of the China Shock on the U.S.´s manufacturing employment documented in Autor, Dorn and Hanson (2013) and with the relatively larger decrease in the wages of less skilled workers that was observed during this episode (Chetverikov, Larsen and Palmer, 2016). If it is the United States who reduces its capital stock to increase it in China instead, the United States would lose the production of relatively low skill intensive manufactures and exhibit increases in its skill premium. This may be somewhat more consistent with the U.S.´s labor market response but is inconsistent with the originating source of this response, according to Autor, Dorn and Hanson´s (2013). Indeed, as can be seen in the figure, in this case the model would imply that the negative effects on the industrial sector of the United States would be mostly a consequence of increased competing imports from Mexico, not from China.

In contrast, the model has predictions that are consistent with the existing evidence under Scenario 2. As can be seen in panel (c), independently of whether capital moves from the United States or from Mexico to China, after the China Shock the United States loses industries within the lower end of its skill intensity range directly to China and experiences an increase in its skill premium. This is fully consistent with Autor, Dorn and Hanson (2013) and with Chetverikov, Larsen and Palmer (2016). Thus, in terms of its consistency with the U.S.´s experience with the China Shock, it seems adequate to assume that Scenario 2 is the empirically relevant one.[25]

3.3. Evidence from foreign direct investment flows

We now analyze whether FDI flows towards Mexico´s manufacturing sector have responded to nearshoring opportunities. At an aggregate level, these flows have not exhibited a significant increase from 2018 to 2022 (Figure 10). In fact, they showed a downward trend until 2020 and rose only slightly in 2021 and 2022 (see also Mesquita Moreira et al., 2022).

Using more disaggregated data, however, we can also analyze whether the FDI flows received by Mexico have shifted towards skill-intensive industries, as we would expect to observe under Scenario 2 described above. To assess this, we calculate correlations between the log-changes in the FDI flows received by each industry and the skill intensity of that industry for different periods. We first compute the FDI flows received by each industry on average for 2008 to2012 and for 2013 to2017, along with their changes between these two periods, to identify trends observed before the trade war started. We compute the corresponding changes in average FDI flows from 2013 to2017 to 2018 to2019 to identify possible effects of the trade war, and from 2013 to2017 to 2018 to 2022 to verify whether the most recent data provide additional evidence. We then estimate the correlation coefficients between these changes and the skill intensity of each sector. Finally, we compute the correlation between the differences in the FDI growth rates before and after the trade war and the pandemic and the skill intensity of each industry.

Table 5 summarizes the results.[26] The correlation between the FDI changes of an industry and its skill intensity was negative and statistically significant prior to the trade war, consistent with the hypothesis that Mexico increasingly specialized in relatively less skill intensive sectors over that period. However, this correlation turned positive and significant during the first two years of this war. Moreover, the correlation between the difference in these growth rates and skill intensity is positive and significant, indicating that FDI flows shifted towards more skill intensive sectors, as compared with previous trends. These conclusions remain valid for the full 2018 to 2022 period, although the

[25] It may seem odd to assume that China has a higher relative abundance of skilled labor than Mexico as the most possible case. However, it must be acknowledged that during the years around China's entry to the WTO there were government induced orders of magnitude increases in China's enrollment rates to college and educational attainment (Li et al., 2012 and Li et al., 2017). Also, if there are economies of scale in skill intensive industries (something that is not assumed in the theoretical model, but is certainly possible), the fact that China may have a larger pool of skilled labor than Mexico may lead it to be able to specialize to a larger extent in skill intensive industries, even if in relative terms its skill endowment was smaller. As shown before, the export patterns of China do suggest that it is relatively specialized in goods that are more skill intensive than Mexico, and this difference increased after China’s entry to the WTO.

[26] The data exhibits high volatility and contains large outliers. In particular, for several sectors the rates of change in the FDI flows in some periods were extremely large (more than 500%) or low (close to -100%), and in some years these flows were zero or negative. These extreme observations were omitted from the correlation analysis. Therefore, caution should be exercised when interpreting these results.

evidence becomes slightly weaker. In particular, the correlation for the entire period is not significant, but its comparison with the previous trend,2013 to2017, remains positive and is close to be significant at conventional levels (p-value of .125). This weaker evidence may be due to the effects of the pandemic on FDI flows. Hence, while total FDI flows to Mexico did not increase on aggregate over 2018 to2022, they did seem to have exhibited a shift towards skill-intensive sectors.

A second relevant question is whether in the last years there have been increases in FDI flows from China to Mexico. Even when these flows remain small as compared with those going to Mexico from the United States, they show a notorious increase after the trade war started (see Figure 11). This behavior is explained almost completely by higher Chinese investments in the computer and peripheral equipment manufacturing and the motor vehicle parts manufacturing sectors. The first of these industries is precisely one of the skill-intensive sectors that, we argue below, may benefit the most from nearshoring.

The results of this subsection align with Scenario 2; whereas prior to the U.S.-China trade war Mexico was apparently increasing production capacity in sectors with relatively low skill intensity, since the onset of the trade war there has been an incipient shift towards more skill-intensive activities. Nevertheless, it also seems that overall FDI flows towards Mexico have not responded significantly to the opportunities presented by nearshoring yet. It is very likely that the sectors that can be mostly boosted by nearshoring will need increases in their export capacity and, thus, possibly increases in incoming FDI flows. As will be seen below, factors that may be especially relevant for these investments to take place include providing an investment-friendly environment, trade policy certainty and facing the challenges we describe in subsection 4.5 below.

4. Perspectives

The discussion above suggests that, from its entry into the WTO until the onset of its trade war with the United States, the average skill intensity of China's manufacturing exports to the United States showed an upward trend. Over the same period, the average skill intensity of Mexican manufacturing exports to the United States was consistently lower than China's and diminished progressively until 2017. Viewed through the lens of Scenario 2 of the theoretical model, the trade war and a wave of firm relocations towards Mexico would have the opposite effects from those of China's entry into the WTO, leading to a shift in U.S. imports towards a relatively more skill intensive mix of goods purchased from Mexico.[27] The evidence suggesting that during the 2018 to 2022 period the average skill intensity of Mexico's exports to the United States has risen is consistent with this view.

In this section, we assess formally the extent to which the trade war and a possible early nearshoring process since 2018 may have already influenced Mexico's specialization patterns and export performance. We also analyze the possible order of magnitude of these effects on Mexico's GDP. Subsequently, we also examine the potential effects that further nearshoring may have in the coming years, and the challenges that Mexico may face during this process.

[27] As illustrated in Section 3, this increase results from the positioning of Mexican products in relation to China's on the skill continuum and does not depend on whether the U.S.-imposed tariffs affected to a larger extent goods with specific skill intensities. In fact, we find no significant correlation between the average skill intensity of 4-digit NAICS industries and the changes in the average U.S. tariffs applied to Chinese goods within each industry during the trade war.

4.1. Overview of Mexico's opportunities with nearshoring

A critical question for policymakers is whether the opportunities that arise from nearshoring can be leveraged to increase Mexico's output growth. Nearshoring may induce an increase in the relative demand for skilled labor in Mexico in the following years, as the average skill intensity of the Mexican goods demanded in the U.S. market rises. If the supply of skilled labor is sufficiently elastic in the short run, a relatively larger part of this increase will be met with higher employment of skilled workers in exporting industries, thus having a larger effect on exports and output. In contrast, if the skilled labor supply is inelastic in the short run, the increase in demand may mostly lead to a rise of the skill premium, with relatively smaller effects on output in the short run.

However, from a long-term policy perspective, a shift to more skill-intensive sectors is a significant opportunity even if the supply of skilled labor is not very elastic in the short run. In this case, the rise in the skill premium can induce higher investments in human capital, leading eventually to a larger supply of skilled labor. Thus, Mexico would still benefit from nearshoring, but the benefits would accrue gradually. In any case, in the final equilibrium Mexico may end up better off by having a larger endowment of skilled labor, which may in turn yield benefits in terms of productivity and a larger allocation of resources in the production of goods that are placed higher on the quality spectrum, leading to an improved economic performance (see Hausmann, Hwang, and Rodrik, 2007).

The opportunities stemming from nearshoring are not free of challenges. As argued above, the availability of skilled labor will influence the speed and extent to which Mexico may benefit from nearshoring. Furthermore, as seen below, many industries with a high export potential in the current environment rely heavily on inputs that are specialized and custom-made. Therefore, having a robust institutional framework, particularly in terms of contract enforcement, is of paramount importance. The quality of these institutions will significantly impact the successful execution of investments needed to expand export capacity in these sectors. Additionally, the availability of other crucial inputs like energy and transportation must be flexible and reliable to facilitate these investments. These factors should be a top priority on the policy agenda for Mexico to fully harness the opportunities in the current environment.

4.2. The effects of the tariff war on Mexico's manufacturing exports

We first assess the extent to which the tariff war may have already influenced Mexican manufacturing exports to the United States, to China and to the rest of the world (ROW). To this end, we follow the approach of Fajgelbaum et al. (forthcoming) and Khandelwal (2022) to model the impact of the tariff war on Mexico´s exports growth from their pre-trade war averages (2016 to2017) to their 2018- to 2021 average values.[28] Briefly, we run three regressions, where the dependent variable is the log increase between those periods of the product-level exports from Mexico ΔlnX_{ω}^{n} to each of the three destinations (*n = US, CH, ROW*) and the independent variables are: i) the tariff changes imposed on Chinese goods by the United States from 2016 to 2017 to 2018 to 2019, $\Delta lnT_{CH,\omega}^{US}$; ii) the tariff changes imposed by China on U.S. goods $\Delta lnT_{US,\omega}^{CH}$ during the same period; iii) the

[28] We encourage the reader to consult the original references for a description of the theoretical model supporting this approach and the general interpretation that the results of this kind of regressions imply.

tariff changes imposed by the United States on Mexican goods $\Delta lnT^{US}_{MX,\omega}$; and iv) the tariff changes imposed by China on Mexican goods $\Delta lnT^{CH}_{MX,\omega}$, which in the current environment correspond to the Most-Favored-Nation tariff decreases that China applied during this episode:

$$\Delta lnX^{n}_{\omega} = \alpha^{n}_{j} + \beta^{n}_{1}\Delta lnT^{US}_{CH,\omega} + \beta^{n}_{2}\Delta lnT^{CH}_{US,\omega} + \beta^{n}_{3}\Delta lnT^{US}_{MX,\omega} + \beta^{n}_{4}\Delta lnT^{CH}_{MX,\omega} + \varepsilon^{n}_{\omega} \quad (16)$$

α^{n}_{j} are 2-digit HS chapter j fixed effects and ω corresponds to each 6-digit HS product classification. The identification of the elasticities relies on tariff variations across products within sectors. In the regressions, we only include manufactured goods. The log changes in tariffs imposed by country n on imports of good ω from country m, $\Delta lnT^{n}_{m,\omega}$, are defined as $ln(1+t^{n}_{m,\omega,t+1}) - ln(1+t^{n}_{m,\omega,t})$, where $t^{n}_{m,\omega,t}$ is the corresponding ad-valorem tariff, t corresponds to the 2016 to2017 average and $t+1$ to the 2018 to2021 average. Note that our specification assumes that the 2018 to2019 tariff changes may have had lagged effects on exports up to 2021.

The results of these regressions are summarized in Table 6.[29] The coefficients related to the U.S. tariffs on Chinese goods are all positive. Furthermore, in the regression corresponding to Mexico's exports to the United States this coefficient is statistically significant, while in the regression corresponding to the exports to the rest of the world it is relatively close to be significant at conventional levels (p-value of 0.17). These results suggest that the tariff increases on Chinese goods not only induced Mexico to increase its exports of the affected goods to the United States, but also to increase its exports of these goods to the rest of the world. This is consistent with the hypotheses that Mexico's exports tend to be substitutes to China´s products and that it operates on a downward-sloping export supply, possibly reflecting the existence of scale economies.[30] As argued by Fajgelbaum et al. (forthcoming), these are the features that allowed Mexico to benefit from the trade war. Another piece of evidence from these regressions supporting a downward-sloping supply is the fact that the three coefficients related to the tariffs the United States imposed on Mexican products are negative and are statistically significant in the regressions for the exports to the United States and to the rest of the world. This suggests that the tariffs the United States imposed on some Mexican goods not only directly affected its exports to the United States, but also led to lower exports of these goods to the rest of the world.[31]

It is straightforward to use the estimated coefficients to compute the overall increase in Mexico´s manufacturing exports that is explained by the tariff war. We can therefore identify the counterfactual export performance that Mexico would have had in the absence of the trade war. Assuming that in any case the motor vehicle assembly industry would exhibit the same performance, we find that the remaining manufacturing exports of Mexico to the United States would have been on average around 31 billion dollars

[29] In each regression we trimmed the lowermost and uppermost 2% observations in terms of the values of the dependent variable to avoid the results being driven by extreme outliers.

[30] In Appendix A.6 we present the results of an alternative estimation of these regressions, where instead of trimming the sample we weighted the observations by the initial value of product-level exports. In those regressions, the three coefficients related to the tariffs imposed by the United States on Chinese goods are positive and statistically significant, further supporting the downward-sloping supply hypothesis. The predictive performance of those regressions, however, was relatively inferior to the ones we discuss in the main text, so we prefer making the analysis below with the latter.

[31] The positive coefficient on Chinese tariffs in the regression related to exports to China seems to be counterintuitive. The results of this regression should nonetheless be taken with care, since Mexico's exports to that country are especially small and concentrated to a very limited group of commodities.

lessr a year during the 2019 to 2021 period. If we assume a similar figure for 2022, these results imply that, in the absence of the trade war, Mexico's non-motor vehicle exports to the United States would have been around 12% lower than those observed.[32] As a consequence, Mexico´s share in U.S. manufacturing imports (as reported in Table 3) would have in fact diminished slightly. In particular, according to these figures Mexico gained 1.11 percentage points in its share in U.S. manufacturing imports during 2018 to 2022 as a consequence of the tariff war.[33] Hence, Mexico´s market share gain in U.S. manufacturing imports during this period seems to be mostly explained by this episode.

4.3. A sectoral analysis of Mexico´s opportunities from nearshoring

The preceding discussion suggests that the trade war and nearshoring decisions by firms may induce an increase in the average skill intensity of Mexican exports. Thus, in this section we first identify a set of 23 4-digit NAICS industries that, based on their relatively high skill intensity, may contribute to this process. These are the industries that, according to the evidence and theory described, are likely to benefit the most as a result of the trade war and a wave of firm relocation. We acknowledge, however, that some relatively less skill intensive industries may also benefit from the current environment. Thus, we also identify a set of 5 less-skill intensive industries that, according to the econometric results above, also contributed a relatively large part of the exports induced by the trade war. By combining these two sets of sectors, we end up with a group of 28 industries where most of the opportunities from nearshoring seem to be concentrated.

To determine the industries that would contribute to an increase in the average skill intensity of Mexican manufacturing exports, we use equation (1). We first calculate the average skill intensity of Mexican manufacturing exports to the United States for 2022 (excluding the motor vehicle manufacturing sector). We then identify those industries for which an increase in their export share would result in an increase of the aforementioned average.[34] Aggregating the predicted effects of the tariff war on each product-level exports to the United States from the regressions described before into NAICS 4-digit industries, these 23 industries account for two thirds of the total estimated export gain due to the tariff war. This choice turns out to be consistent with the results of the survey conducted by Banco de Mexico (2023a), where the firms in these precise

[32] As a percentage of the average total Mexican manufacturing exports to the United States during this period (including motor vehicles), the figure estimated here represents 9%. This trade war effect is larger than the ones estimated with data up to 2019 by other authors (Mesquita Moreira, 2022; Fajgelbaum et al., forthcoming). This in turn may suggest, as Meinen et al. (2019) emphasize, that the indirect trade-creating effects of the tariff war on the exports of bystander countries may have taken a longer time to materialize fully than its direct trade-destroying effects.

[33] Given the coefficients implying a downward sloping supply curve, the results also suggest that Mexico's exports to the rest of the world increased by around $3.5 billion dollars as a consequence of the trade war.

[34] The 23 industries that fulfill this criterion are: bakeries and tortilla manufacturing; beverage manufacturing; apparel accessories and other apparel manufacturing; basic chemical manufacturing; pharmaceutical and medicine manufacturing; paint, coating, and adhesive manufacturing; soap, cleaning compound, and toilet preparation manufacturing; other chemical product and preparation manufacturing; industrial machinery manufacturing; commercial and service industry machinery manufacturing; other general purpose machinery manufacturing; computer and peripheral equipment manufacturing; communications equipment manufacturing; audio and video equipment manufacturing; semiconductor and other electronic component manufacturing; navigational, measuring, electromedical, and control instruments manufacturing; manufacturing and reproducing magnetic and optical media; electric lighting equipment manufacturing; electrical equipment manufacturing; other electrical equipment and component manufacturing; aerospace product and parts manufacturing; medical equipment and supplies manufacturing; and other miscellaneous manufacturing.

sectors claimed to a much larger extent than those in other manufacturing industries that they have been benefited from nearshoring up to 2023.

Then, using the same aggregation of product-level predicted exports into 4-digit NAICS industries, we find that half of the remaining export increase explained by the trade war is accounted for by the export behavior of the product categories included in a compact set of 5 relatively less skill intensive industries: plastics product manufacturing; agriculture, construction, and mining machinery manufacturing; metalworking machinery manufacturing; motor vehicle body and trailer manufacturing; and household and institutional furniture and kitchen cabinet manufacturing. Thus, by combining the 23 skill intensive industries identified before with these five additional ones, we have a group of 28 4-digit NAICS industries that account for 85% of the export increase explained by the U.S.-China trade war. These are the sectors in which we will focus on in the analysis below.

Table 7 displays these industries and summarizes the recent behavior of Mexico and China's share in U.S. imports of goods from each of these sectors. The interpretation of the figures in the last columns of the table will become clear below. This group of industries encompasses various broad sectors, such as chemical; machinery; computer and electronics; and electrical equipment, appliances, and components.

We now perform a series of calculations to quantify in a relatively simple manner the possible size of the past effects and of the future potential consequences of nearshoring in these specific industries on exports and GDP. This exercise is intended to approximate the possible order of magnitude of these effects and does not intend to provide precise estimates.

a) First, we identify the market share loss that China experienced in U.S. imports from 2018 to 2022 in each of these industries. Then, we evaluate these losses in terms of 2022 value, meaning that we multiply the market share loss of each industry by the total market value of U.S. imports in that industry in 2022. For the three industries in which China in fact increased its market share during this period (basic chemical, pharmaceutical and medicine manufacturing and medical equipment and supplies), we assume that China's loss was zero.

b) As a second step, we use the industry-level aggregation of the predicted product-level increases in annual exports explained by the tariff war to approximate the sectoral gains that Mexico has already achieved from 2018 to 2022 (referred to as "Realized Mexico gains" in Table 7). For five specific sectors, however, there are large differences between the observed export increases and those predicted by the regressions. In these cases, we entered the observed gains that Mexico achieved in 2018 to 2022 valued at 2022 market size, by multiplying its market share increase from 2017 to 2022 by the value of total U.S. imports in each industry in 2022.[35]

[35] The exports of three of these sectors (beverages, computer and peripheral equipment manufacturing and medical equipment and supplies manufacturing) exhibited increases that were an order of magnitude larger than those predicted. In the cases of the computer and peripheral equipment and medical equipment and supplies sectors, this could suggest that there have already been nearshoring processes towards Mexico that have boosted exports over and above the direct effects of the tariff war. This is consistent with the fact that foreign direct investment flows from China to Mexico have increased largely because of investments in the computer and peripheral equipment (see Subsection 3.3). In contrast, in the industries of metalworking machinery and aerospace product and parts, the observed export increase was an order of magnitude smaller than the predicted value. This could suggest that the export potential induced by the tariff war and nearshoring has not been exploited yet in these sectors.

The value of these realized gains amounts to $32.6 billion dollars. Slightly more than a fourth part of this gain can be attributed to higher exports of the computer and peripheral equipment manufacturing industry. Other sectors that significantly contributed to this increase include: i) beverages; ii) other electrical equipment and component manufacturing; iii) semiconductor and other electronic component manufacturing; iv) other electrical equipment and component manufacturing; and v) communications equipment manufacturing.

These export gains do not fully represent additional value-added. To identify the net effect of these additional exports on domestically generated value-added, we used the 2018 Mexican input-output matrix to deduct the imported content of these exports and to identify the distribution of the domestic value-added they generate across all sectors of the economy through input-output linkages.[36] The results of this calculation suggest that these additional exports led to an aggregate increase of around 1% in the 2022 value of Mexican GDP.[37] Assuming that this GDP gain was gradually distributed over the past five years, this increase implies a rise in the average annual growth rate of GDP of 0.2 percentage points in that period.[38]

c) As a third step, we calculate Mexico's potential gain from additional future exports resulting from nearshoring. To determine an upper limit of this gain, we first computed the extent to which Mexican exports in each industry would need to increase to compensate fully for China's loss. These figures are obtained by subtracting Mexico's realized gains from China's total dollar-valued loss. For the industries in which Mexico's realized gain is already greater than China's loss, we assume the potential additional gain is zero.[39] The potential additional export gain in this scenario amounts to $80 billion dollars. Using a similar procedure as in the previous exercise, the value-added that this figure could represent is close to 2.5% of Mexico´s 2022 GDP. This should be considered an especially optimistic upper bound for the potential effect of nearshoring on Mexico’s GDP.

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[36] We summarize the spillover effects of these exports on other sectors of the economy in Subsection 4.4 below. The input-output matrix is available in https://www.inegi.org.mx/temas/mip/#tabulados.

[37] An alternative calculation of the effect on GDP of these additional exports could be made using the data from the World Bank (Borin, Mancini, and Taglioni, 2021). The results turn out to be very similar. According to this data, roughly half of Mexico's manufacturing exports to the United States are traditional and the remaining are related to GVCs, with approximately 8% of the latter representing pure forward participation. A back-of-the-envelope calculation using these figures would imply that the value-added generated by these exports as a share of Mexico's 2022 GDP is of around 1.2%.

[38] Using a different approach as ours, Reyes Heroles et al. (2020) find very similar quantitative and qualitative effects of the U.S.-China trade war on Mexico. They develop and calibrate a dynamic general equilibrium trade model featuring multiple countries, sectors and factors of production, including both productivity and factor endowment differences as drivers of trade, and add endogenous capital formation. Their results point to an increase in Mexico’s GDP of somewhat less than 1% because of the trade war. Interestingly, they also find that this war leads to an increase in the skill premium in the country, as we also argue here.

[39] These industries are bakeries and tortilla manufacturing; beverages; basic chemicals, pharmaceutical and medicine manufacturing; agriculture, construction and mining machinery; motor vehicle body and trailer; aerospace product and parts manufacturing; medical equipment and supplies manufacturing; and other miscellaneous manufacturing. Obviously, we cannot rule out that new investments may be made in these sectors, leading to future increased exports and, thus, a somewhat larger effect of nearshoring on exports and GDP than the one computed in these exercises.

d) Finally, to get a more realistic scenario, we repeated the calculations above but assuming that Mexico´s potential market gain can rise only up to 40% of China's loss in each of the sectors where the realized gain is still below this figure. This percentage is close to the simple average of Mexico's industry-level realized gains, as a fraction of China's losses, during 2018 to 2022 (excluding from the average outliers corresponding to beverages; aerospace products and parts; and other miscellaneous manufacturing). With this assumption the value of Mexico's potential gain of additional future exports in each sector is smaller. Furthermore, in the computer and peripheral equipment sector Mexico´s realized gains are already higher than 40% of China's losses as of 2022, so in this case we assumed in this exercise that there are no additional potential gains. If further investments are made in the future within this industry, however, the effects on GDP could be larger than those computed here.

The potential export gain in this case is slightly more than $18 billion dollars. If we followed the same procedure made above, this would represent 0.6% of Mexico´s 2022 GDP. The nearshoring process, however, could lead Mexico to increase the domestic value-added share in its manufacturing exports, by bringing towards Mexico additional processes within the value chain that are currently made in other countries.[40] In particular, according to the figures in Borin, Mancini, and Taglioni (2021), the domestic value-added content of Mexican total manufacturing exports is currently around 55% of their gross value. If we assume that the nearshoring processes in the coming years allow Mexico to increase this domestic content to 65% and adjust the estimates accordingly, the calculated effect generated by additional nearshoring on the level of GDP would be of around 0.86%, implying an increase in its annual growth rate of close to 0.20 percentage points if these gains are accrued in the following five years.[41] Around two thirds of the exports that lead to these gains are derived from the broad sector of computer and electronic products, especially from the communications equipment and the semiconductor and other electronic component manufacturing industries, while the household and institutional furniture and kitchen cabinet manufacturing industry and the electrical equipment, appliances and components sectors contribute with close to 14% and 9% of these export gains. As will be described below, these increased exports will have spillover effects on the activity of other sectors of the economy.

If we add the effects on GDP of the estimates corresponding to the realized gains with the figures implied by the forward-looking scenario, we end up with an overall effect of nearshoring on Mexico's GDP level of close to 1.9%. This is slightly higher, but in the same ballpark as existing estimates of the effects that NAFTA had on Mexico´s economy. Caliendo and Parro (2015) estimate that NAFTA led to a welfare increase of 1.3%, driven

[40] This is consistent with the evidence provided by Chiquiar and Tobal (2019). Applying the measures of *upstreamness* proposed by Fally (2012) and Antràs et al. (2012) on Mexico's manufacturing exports and imports, they argue that the number of stages within GVCs that Mexico conducts domestically has been increasing in the last few years.

[41] Assuming an increase in the domestic content of total manufacturing exports from 55% to 65% has two effects on the overall composition of these. First, by reducing the size of their imported content, backward participation, the share of GVC-related exports diminishes to close to 40%. Second, within the remaining GVC-related exports, the forward participation share increases to close to 15%.

by a rise of 1.8% due to trade creation. Romalis (2017) in turn estimates an increase of Mexico's GDP of 1.09% because of this agreement. The reason why we end up with an apparently higher effect than the one observed after NAFTA is that, even if nearshoring may have a smaller effect on exports growth, exports currently represent a larger share of GDP than in 1993 and, thus, even a smaller impulse can contribute with a similar effect on overall GDP.

The estimates described above rely on the assumptions that Mexico attains a higher domestic value-added share in its exports in the following years and, especially, that it expands its productive capacity in the sectors benefited by nearshoring. In this context, it is relevant to emphasize that, up to 2022, the size of FDI flows towards Mexico has not apparently responded significantly to the opportunities presented by nearshoring (see Subsection 3.3. and Mesquita Moreira et al., 2022). Even when an incipient shift towards more skill-intensive sectors is observed and a significant increase of Chinese FDI towards the sector of computer and peripheral equipment manufacturing has been recorded, it is likely that in general the sectors that can be mostly boosted by nearshoring will need further increases in their export capacity. This, in turn, will partly depend on several factors we emphasize ahead, including an elastic supply of skilled labor, an institutional framework that promotes contract enforcement, cost-effective and reliable energy supply, strong and widespread connectivity through transportation and communication networks, as well as trade policy certainty.

4.4. Spillover effects on the economy

The GDP gains estimated above are not fully generated within each manufacturing sector identified in Table 7. Each of these exporting sectors makes purchases of inputs from other upstream activities within the economy. Thus, part of the domestic value-added embedded in their exports is truly generated through input-output linkages by other domestic sectors that provide inputs or services to the exporter and, thus, contribute indirectly to the domestic value-added that is ultimately exported.

Table 8 summarizes the sector-level GDP increase induced by the realized past export gains and by the potential additional exports in the future that we computed above, as estimated by the spillover effects implied by the input-output matrix. These gains are expressed as a percentage of each sector-level GDP in 2022. As may be noted, the total gains in manufacturing are naturally of a significant size, of slightly more than 6% of total manufacturing GDP. This figure reflects the direct effects of enhanced exports on each sector´s GDP and the indirect effects of within-manufacturing input-output linkages. Other sectors that exhibit especially large increases in GDP are administrative and support and waste management and remediation services, close to 6%), and utilities, 2.21%.[42] The relevance of the latter is that it highlights the fact that nearshoring may be bringing with it an important increase in the derived demand for electric power, natural gas, water and sewage. Other sectors that may exhibit relevant increases in their activity because of nearshoring are wholesale and retail trade; professional, scientific and technical services; mining, quarrying and oil and gas extraction; agriculture, forestry, fishing and hunting; and management of companies and enterprises services.

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[42] Administrative and support and waste management and remediation services includes diverse services that are relevant for manufacturing, such as office administrative services; facilities support services; employment services; business support services; and travel arrangement and reservation services; among others.s.

4.5. Challenges

In order for Mexico to reap the potential benefits of nearshoring, especially in the short run, the enhanced demand for Mexican exports needs to be met by a sufficiently elastic supply. As discussed above, this will depend on the availability of skilled labor in the economy. Indeed, many of the industries with nearshoring potential identified before will require workers with advanced levels of formal education in fields such as engineering, chemistry and related disciplines.

As previously discussed, another relevant challenge is to attain the investment levels needed to expand export capacity in the sectors where most of the nearshoring opportunities are present. In general, an investment-friendly environment and trade policy certainty, including the maintenance of low trade barriers between Mexico and the United States, are fundamental for these investments to take place. As will be shown below, the sectors with the highest export potential from nearshoring are also sensitive to the presence of an institutional framework that promotes contract enforcement, and to a reliable supply of energy when making decisions about relocating their production processes and undertaking investments to enhance export capacity. These conditions need to be ensured to reap the benefits from nearshoring. The location choice of these investments may in part be also influenced by the availability of efficient transportation networks and other relevant local inputs. This availability may have implications for the effects that nearshoring may have at a regional scale.

The broad sectors that concentrate the largest share of the export potential derived from nearshoring opportunities are computer and electronic products and electrical equipment, appliances and components. These sectors encompass product categories that the U.S. government has prioritized for nearshoring or reshoring. Indeed, the United States has emphasized its preference to relocate some specific activities, such as the semiconductor industry, biomanufacturing, medical goods, pharmaceuticals, information and communications technology and microelectronics, among others, towards the Western Hemisphere and, in many cases, towards Latin America and the Caribbean. This preference is driven by economic, geopolitical, and national security concerns (White House, 2023a and 2003b; Congress.gov, 2023a, 2023b and 2023c). The CHIPS and Science Act mentions explicitly the need to promote investment in semiconductor clusters along the Mexico-U.S. border (White House, 2023a; Miller and Talbot, 2023) and to form a semiconductor and information and communications technology supply chain ecosystem between Mexico and the United States (White House, 2022). Considering the extensive policies pursued by the current U.S. administration in these sectors, Mexico emerges as a potential beneficiary of the U.S.'s strategy. Given their substantial contribution to the effects that nearshoring may have on exports and GDP and the high priority that these sectors have on the policy agenda, we consider the industries within these broad sectors. of particular interest for policymakers in the analysis below. As we will show, these sectors are especially reliant not only on skilled labor, but also on some of the factors described above as possible challenges that policymakers need to consider.

4.5.1. Institutional framework

The 28 sectors with the greatest export potential due to nearshoring tend to rely, to a larger extent than other manufacturing industries, on coordination and cooperation with input suppliers. This is especially true for the broad sectors we have labeled of particular interest for policymakers. In these industries, producers must ensure the availability of customized components, materials and parts designed to meet compatibility and quality standards (semiconductors, displays, memory chips, batteries, etc.). Because of these features, input suppliers in these industries must invest resources to produce highly complex and differentiated goods and services for the specific use of their clients. These customized inputs can rarely be sold to other clients or in other markets. This in turn means that both producers and input suppliers must carry out relationship-specific investments. As shown in the literature, customers and input suppliers have incentives to underinvest in these types of relationships unless there is an institutional framework that, by promoting contract compliance, properly aligns incentives and encourages them to increase their investments.[43] In short, these sectors are frequently identified in the literature as contract intensive industries. Thus, the needed investments to expand their export capacity will be undertaken to the extent that Mexico´s institutional framework exhibits these characteristics.

Table 9 illustrates these points. It summarizes the mean values of Nunn´s (2007) industry-specific contract intensity measure for the 28 industries listed before, for the particular interest for policymakers industries within the computer and electronic products and electrical equipment, appliances and components sectors, and for the remaining manufacturing sectors.[44] The mean contract intensity of the 28 sectors is larger than the corresponding intensity of the other manufacturing sectors, and this difference is statistically significant at a 5% level. Furthermore, within the group of 28 selected sectors, the mean contract intensity of the particular interest for policymakers industries is in fact significantly larger than the mean of the remaining ones. The 28 industries identified in Table 7 also exhibit larger values for Costinot´s (2009) measure of product complexity and Rauch´s (1999) index of product differentiation, and these differences are also statistically significant.[45]

According to this evidence, the sectors for which there are more opportunities for Mexico arising from nearshoring are especially contract intensive. Since the expansion of output and export capacity in these sectors will possibly require new investments, a favorable institutional framework, especially in terms of contract enforcement, will be important to ensure that these investments are undertaken. It is also relevant to note that many of these sectors are also highly intensive in research and development (R&D) (OECD, 2017). Thus, the protection of intellectual property rights may also be relevant for these investments to take place.

4.5.2. Energy and transportation

There are other relevant challenges that Mexico may have to deal with to maximize the positive effects of nearshoring. This includes ensuring reliable and efficient access to energy, as well as strong connectivity through transportation and communication

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[43] See Acemoglu et al. (2007), Levchenko (2007) and Nunn (2007). Within this literature, the hold-up problem under a situation of incomplete contracts has been widely recognized (see Rogerson, 1992; Gul, 2001). In this context, strong institutions in terms of the enforcement of contracts provide a mechanism for specifying obligations and, thus, facilitating coordination and cooperation between producers and input suppliers in relation-specific investments, avoiding under-investment in contract intensive sectors. Thus, countries with a higher ability to enforce contracts tend to invest more and attain comparative advantage in this kind of industries.

[44] To construct this measure, Nunn (2007) computes the proportion of intermediate inputs that requires relationship specific investments in each industry. He uses Rauch's (1999) product differentiation index, based on classifying goods as a function of whether they are sold on organized exchange, referenced priced or neither of them. If an input is sold on an exchange or reference priced, then the market for it is assumed to be composed of many alternative buyers and sellers, so that it is considered not to be relationship specific.

[45] Costinot´s (2009) index computes the number of months that a worker with suitable characteristics needs to be completely trained to undertake the tasks in a specific sector.

networks. The transportation network's efficiency is relevant as it not only encourages investment but also ensures a more equitable distribution of nearshoring benefits across Mexico's regions, preventing their excessive concentration along the border, as seen in the past (Chiquiar, 2003 and 2005).

In terms of energy, we do not find a significant difference between the average electricity consumption intensity of the 28 sectors identified before and the remaining ones. This merely suggests that, on average, the relevance of energy supply is comparable to that in most manufacturing activities. The semiconductor industry, however, does seem to be especially sensitive to the availability of reliable energy sources, to such an extent that frequent power outages could deter it from locating in a specific country (see Fried and Lagakos, 2023). Also, as highlighted above, the nearshoring process may significantly increase the derived demand for utilities (electricity, gas and water). Hence an elastic supply of these inputs will be especially relevant for the manufacturing industry to achieve the export expansion estimated above. Related to this point, Fried and Lagakos (2023) study the long-run general-equilibrium effects of power outages in developing countries. Their results suggest that the long run positive effects on labor productivity of a reliable source of electricity that prevents outages are significant by not only avoiding idling productive capital in the short run, but also by enhancing capital accumulation and firm entry in the modern sector of the economy.

Concerning transportation, the states bordering the United States have historically concentrated a significant portion of Mexico's export activity. While this is a natural outcome, given the incentives of exporters to locate near their markets, it has also resulted in the concentration of most of Mexico's gains from international trade in the northern region (Chiquiar, 2003 and 2005). The early stages of the nearshoring process do not appear to be an exception. As shown in Figure 12, the northern states bordering the United States have been increasing their share of total manufacturing exports since 2019. This contrasts with the prior declining trend in this share. Furthermore, around 80% of the exports from the particular interest for policymakers industries are concentrated in that region. Figure 13 shows that it is precisely in the northern region, especially in the state of Nuevo León, where most of the Google searches on the topic of nearshoring have been concentrated since 2020. This suggests that up to this point nearshoring may have contributed to concentrating export activity in the northern part of the country. If the availability of an efficient transportation network increases, lowering transportation costs to the United States from other regions of Mexico, the gains from nearshoring may be spread out somewhat more evenly along the country in the future.

5. Concluding remarks

The changes in the global economic and geopolitical landscape during the last years have had positive effects on Mexico's economy. Mexico stands to gain in the following years an important role in the efforts that the U.S. government and firms have taken to induce nearshoring and reshoring towards the Western Hemisphere. This may lead Mexico to benefit from enhanced investment, increased exports and a rise in its participation in different stages within GVCs. However, we have identified four relevant conditions that Mexico needs to meet in order to benefit the most from nearshoring opportunities: (i) an elastic supply of skilled labor; (ii) an institutional framework that enforces contracts effectively; (iii) a reliable and cost-effective supply of energy; and (iv) strong connectivity through transportation and communication networks.

A key question is whether the public sector can intervene actively with policies that facilitate firm relocation to Mexico and boost productive capacity in nearshoring industries, and if so, what form this intervention should take. The consensus among economists regarding these issues has varied over time (Juhász et al., 2023). From the mid-1980s until the 2007 to2008 global financial crisis, criticisms emerged against the notion that the public sector could improve upon market resource allocation. These objections, partly based on experiences in regions like Latin America with inward-looking protectionist policies, argued that, even if market failures were present, public interventions could not generally improve welfare because: (i) governments did not have the information to make better decisions than markets; or (ii) even if they had this information, those interventions opened the door to self-interested lobbying and political influence.

The argument at the time was that governments often picked winners through interventions that protected specific firms or industries. This not only hindered other policy objectives like promoting competition and international trade, but also risked government capture by vested interests. Research has shown that some of these policies may have unintended consequences that can offset their intended benefits.[46] For instance, Lashkaripour and Lugovskyy (2023) show that the potential gains from unilateral policies to boost production of industries with scale economies may be undone by inducing terms-of-trade losses. Similarly, unilateral trade policies designed to improve terms of trade can limit exports precisely in sectors where optimal industrial policy should increase output to harness economies of scale.

Before discussing the recent shift in the literature towards a more favorable view of a group of outward-oriented industrial policies, we may emphasize that Mexico could implement certain horizontal actions to attract investment and enhance export potential. Unlike policies that target specific sectors, these across-the-board actions would be less prone to the criticisms made to industrial policies described before. These broad actions could address the four conditions mentioned above: encouraging higher education enrollment; skill development through training programs and a more elastic supply of college education (see Bound and Turner, 2007; Tobal, 2019); promoting contract enforcement; and maintaining a reliable supply of essential inputs for industry such as energy, transportation, and communications.[47] As already mentioned, a trade and investment-friendly environment, including trade policy certainty and avoiding actions that can obstruct trade and investment flows between Mexico and the United States, is especially relevant.

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[46] Diverse case studies show that protectionist measures often lead to overall welfare losses, even if they spur domestic production and competitiveness (Baldwin and Krugman, 1986 and 1989; Ohashi, 2005; Harrison and Rodriguez-Clare, 2010). Recently, Bartelme et al. (2019) offer evidence that even when scale economies are present, the welfare gains from targeted Pigouvian production subsidies are limited.

[47] The growing demand for skilled labor and the resulting increase in the skill premium due to nearshoring should encourage higher education degree completion. However, the evidence suggests that the supply of educated workers may be only weakly responsive to short-term wage signals and moderately responsive to long-term employment conditions (Bardhan et al., 2013). This limited response could be due to institutional barriers and a lack of flexibility in educational resources in the higher education market, even in advanced economies like the United States. Tobal (2019) shows that a shortage of relevant skills at the occupational level can hinder labor adaptation in response to trade shocks, making training programs crucial in facilitating this process. In this context, public investment in higher education can play a vital role in increasing the supply of college-educated workers and influencing the types of degrees produced (Bound and Turner, 2007). Therefore, it is important for authorities in middle-income countries to reduce potential constraints or barriers and ensure educational institutions respond effectively to the higher demand for specific degrees and occupations.

That said, recent evidence has fostered a more favorable view of industrial policies targeting specific industries with coordination failures or externalities (Juhász et al., 2023). According to this view, modern policies can have beneficial effects if they focus on addressing coordination issues directly, rather than relying on inward-looking protectionism and price-distorting instruments (Harrison and Rodriguez-Clare, 2010).[48] Notable policies in this regard encompass programs for industrial clusters to access skilled labor and technology, export-facilitating measures like trade financing, public R&D and innovation initiatives, efforts to build local connections with foreign direct investment projects, public-private collaborations to address constraints and enhance coordination in specific industries, targeting constraints to enhance productivity investments, rather than offering direct subsidies, and investing in public infrastructure tailored to the transportation needs of specific activities and regions, among others.[49]

These government interventions must meet certain requirements to be appropriate (Aghion et al., 2011; Aiginger, 2014; Cherif et al., 2022; Juhász et al., 2023). First, they should be justified on the grounds of the presence of coordination failures or externalities at the industry level, including among others learning externalities or agglomeration economies that can be corrected only through sector-specific interventions. Second, they should minimize the risk of government failure or capture by special interests. This can be achieved by ensuring transparency, setting clear performance targets, evaluation mechanisms and benchmarks for the continuation, change or removal of interventions, and conducting thorough cost-benefit analyses to assess the social benefits and costs of the interventions. Public intervention mechanisms should also avoid favoring specific market participants or being influenced by self-interested lobbying and political pressures.[50] These policies should also align with other welfare-enhancing objectives like competition, international trade, and the promotion of innovation, R&D and skill development.[51]

In Mexico's current context, coordination with the United States is highly advantageous.[52] This requires both Mexico and the United States to maintain certainty concerning trade policy and their priorities regarding nearshoring. This is particularly relevant since cooperation between Mexico and the United States may be required to address coordination failures in forming regional production networks in sectors of

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[48] In this sense, Juhász et al. (2023) note that industrial promotion actions that many times overlap with regional or place-based policies have had a higher success rate than traditional tools like import tariffs or subsidies.

[49] A broad discussion of different policy tools available, discussing their relative success in achieving their goals and their associated risks, is found in Cherif et al. (2022).

[50] For instance, Aghion et al. (2011) propose decentralized government interventions, like those at the state level, to prevent arbitrary selections of national champions. This decentralized approach is less harmful to market competition and maintains a more level playing field among market participants. Their evidence supports the idea that more decentralized state aid has a larger impact on exports and innovation performance.

[51] In a context of uncertainty about the effectiveness of policies and the location or magnitude of externalities, governments may still need to support specific activities. However, they also need to develop the ability to let losers go, that is to stop backing non-viable activities. To avoid interfering with market competition, these policies should focus on activities and sectors, distributing assistance uniformly and avoiding favoritism towards specific firms (see Aghion et al., 2011; Aiginger, 2014; Juhász et al., 2023). Even within specific policy instruments, choices should be made to minimize unintended consequences. For example, tariffs on capital and intermediate goods are more likely to reduce steady-state output, and thus transitional growth rates, than tariffs on consumption goods (Estevadeordal and Taylor, 2013). In contrast, tariff protection favoring skill-intensive sectors is positively correlated with productivity growth (Nunn and Trefler, 2010).

[52] Lashkaripour and Lugovskyy (2023) find that internationally coordinated policies aimed at leveraging sector-specific scale economies through comprehensive agreements can produce welfare gains and prevent unintended consequences from unilateral actions.

interest. The U.S.'s commitment to policy coordination is evident in initiatives like the CHIPS and Science Act (White House, 2023a). Thus, Mexico can benefit by implementing specific complementary policies that align with the U.S. efforts and meet the criteria mentioned earlier. That is, Mexico may complement the first group of horizontal policies with a second layer of more focused interventions. These should revolve around the public provision of sector-specific inputs related to the sectors with the most nearshoring opportunities. To address the skilled labor needs of these industries, targeted scholarships, or student financing for fields like engineering, chemistry and related disciplines may be beneficial, alongside general policies promoting higher education enrollment. Ensuring a reliable and competitive supply of energy, communications, and transportation in regions expecting new investments is another priority. These interventions should align with the specific requirements of industrial clusters resulting from nearshoring. Furthermore, in coordination with the United States, Mexico could facilitate networking activities involving government, industry, and private organizations at the cluster level. These activities may include organizing fairs, linkage programs, and information-sharing forums. Such initiatives can help address informational and coordination failures in specific sectors (see Harrison and Rodriguez-Clare, 2010; Cherif et al., 2022).

Recently, Mexico has taken initial steps in this direction. In late 2023, the government announced a set of fiscal incentives to promote investment and human capital formation in a specific group of sectors. These incentives include: i) immediate tax deductions of significant percentages of the new investments made by firms that expect to export at least 50% of their output in the remainder of 2023 and 2024; and ii) an additional 25% deduction of the increase in workforce training expenses. Although differences exist, there is an overlap between the sectors targeted by these actions and those highlighted in Table 7. Furthermore, many of the industries we labeled as of particular interest for policymakers benefit directly from these policies.[53] It is relevant to acknowledge that the decree announcing these incentives explicitly mentions that a level playing field will be maintained among all compliant firms within each sector to promote competition and investment. Following our previous considerations, these efforts can be complemented with a first layer of across-the-board policies addressing the four challenges we have highlighted and promoting an investment-friendly environment, as well as targeted actions coordinated with the United States and guided by the USMCA framework to overcome informational and coordination issues in specific sectors with high export potential.

To conclude, Mexico is in a privileged position to benefit significantly from the current geographic reconfiguration of global production chains. The incentives of firms relocating their operations and of policymakers on both sides of the Mexico-U.S. border are remarkably aligned to position Mexico as a fundamental link in emerging regional production networks, particularly in industries with high value-added potential. To fully harness these opportunities, policymakers may combine broad, investment-friendly horizontal policies with targeted actions designed to enhance coordination among private-sector stakeholders in sectors with high potential. These measures may enhance

[53] The broad sectors that will benefit from these tax incentives include: electronic components; semiconductors; batteries and other electronic components; engines, including those with gasoline, hybrid or alternative energy sources; electric and electronic equipment; fertilizers and agrochemicals; pharmaceuticals; human and animal food manufacturing; medical, control and measurement machinery, and equipment; engines, turbines and transmissions for airplanes; and cinematography. A list of the product categories benefited by this decree may be found in: https://dof.gob.mx/nota_detalle.php?codigo=5704676&fecha=11/10/2023#gsc.tab=0.

the benefits for Mexico that derive from the current environment, allowing it to move up in the value chain and bolstering its position in the evolving global landscape.

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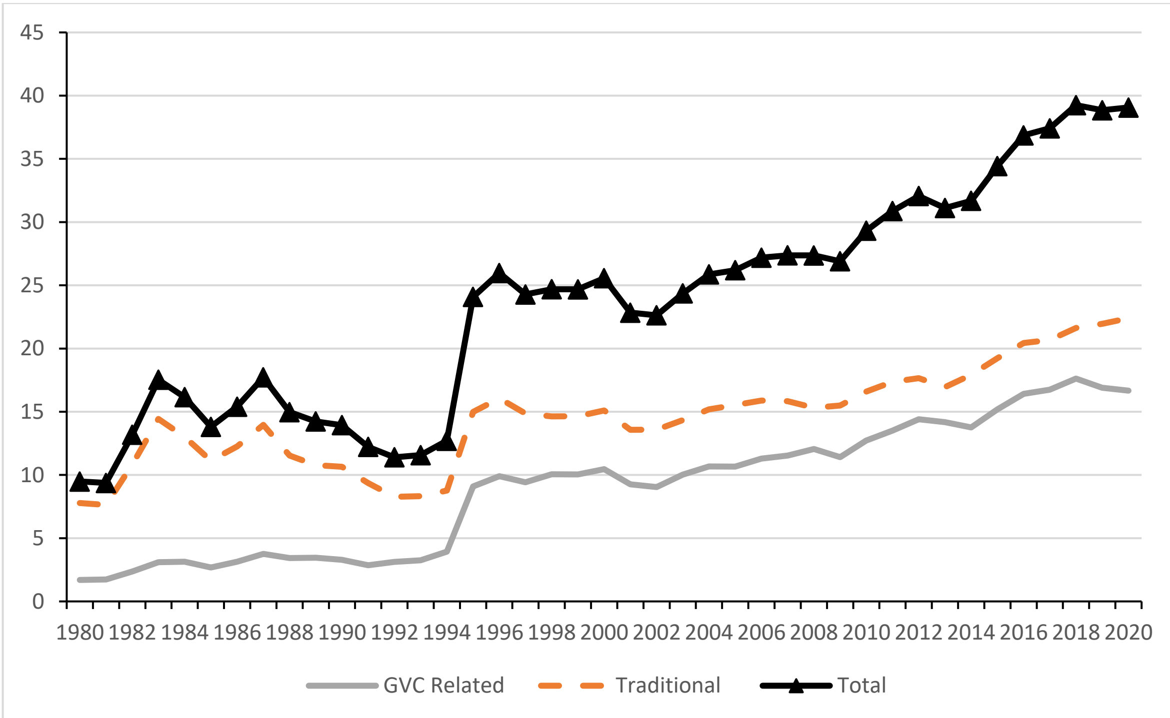
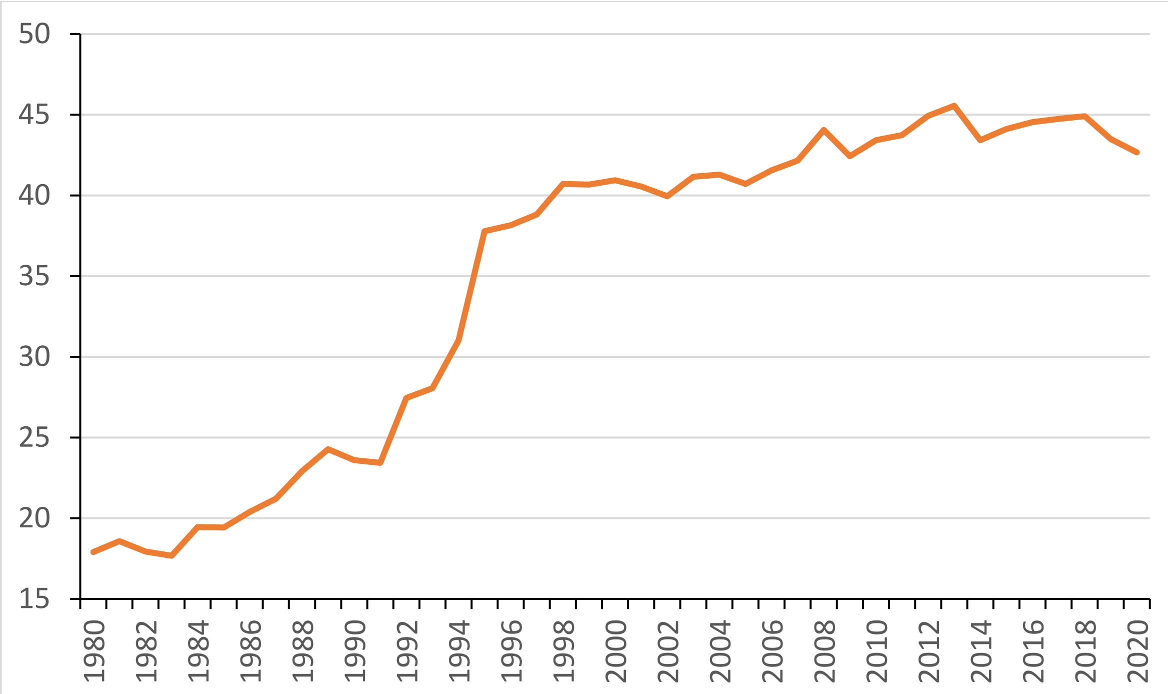
Figure 1. Mexico's Total Exports (% of GDP)



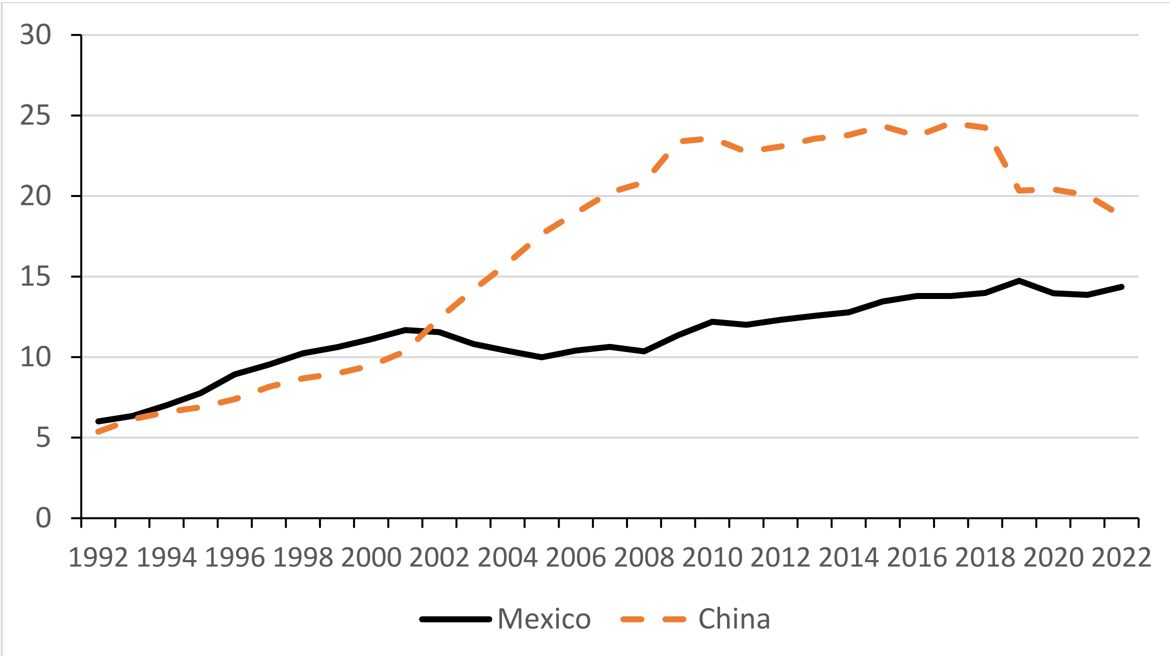
Sources: Computed using INEGI, Banco de México and World Integrated Trade Solution (WITS) data: https://wits.worldbank.org/gvc/gvc-data-download.html.

Figure 2. Mexican GVC Related Exports (% of Total Mexican Exports)



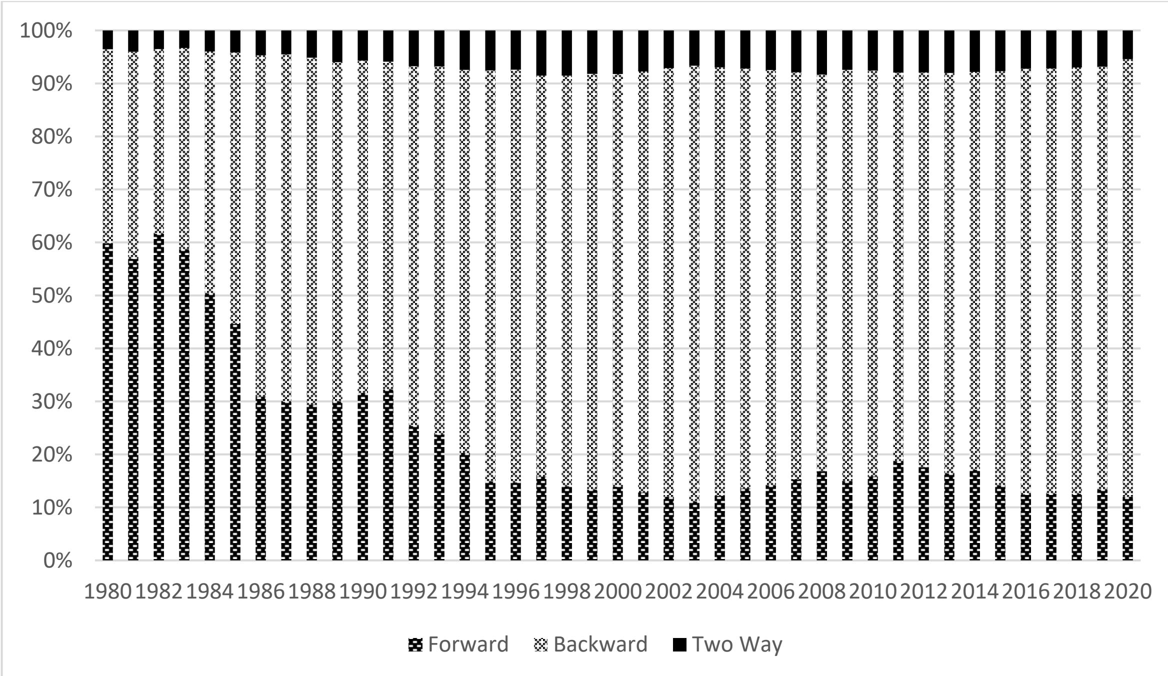
Sources: Computed using WITS data: https://wits.worldbank.org/gvc/gvc-data-download.html.

Figure 3. Share in US Total Manufacturing Imports (%)



Source: U.S. Census Bureau

Figure 4. Type of Participation in GVC Related Mexican Exports to US



Sources: Computed using WITS data: https://wits.worldbank.org/gvc/gvc-data-download.html.

Figure 5.

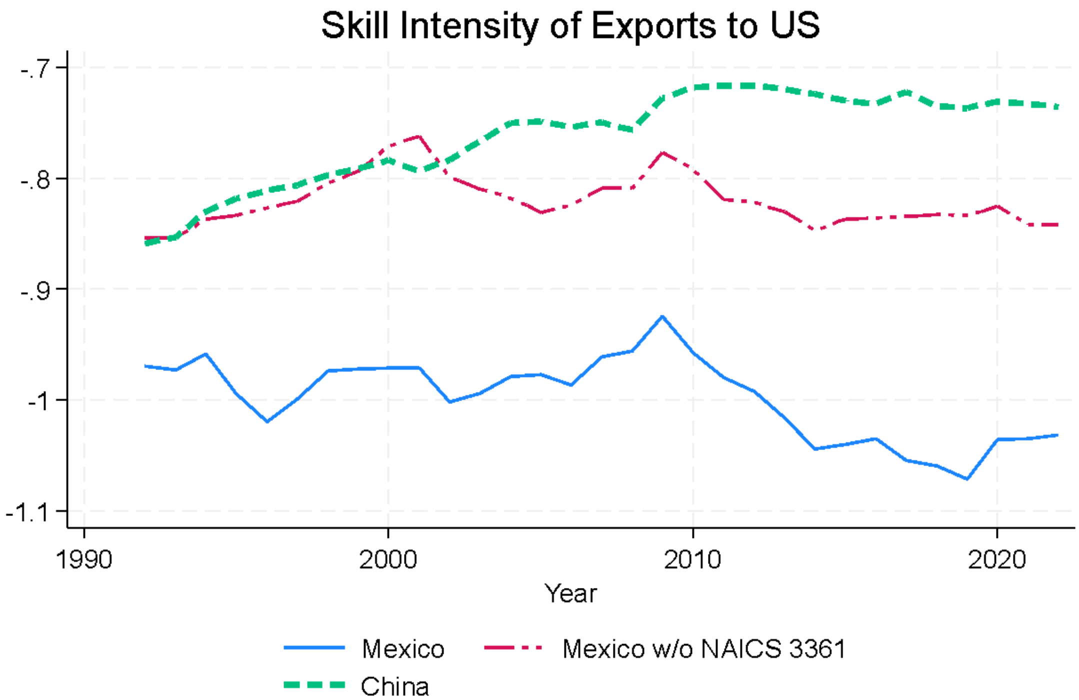

Skill Intensity of Exports to US
-.7
-.8
-.9
-1
-1.1
1990
2000
2010
2020
Year
Mexico
Mexico w/o NAICS 3361
China

Figure 6.

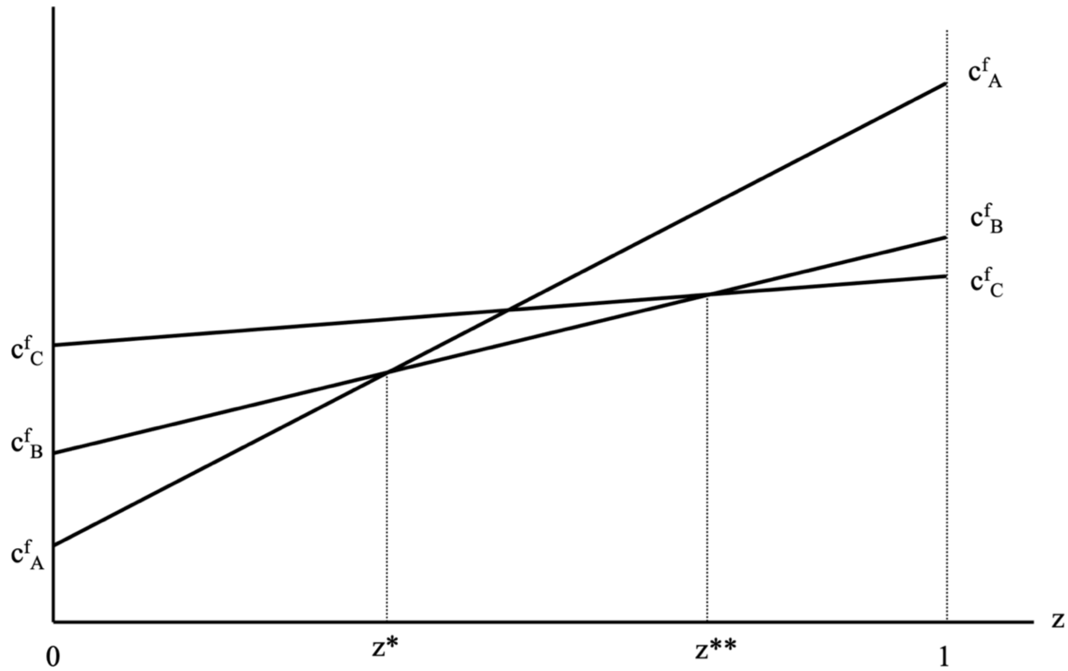


Figure 7.

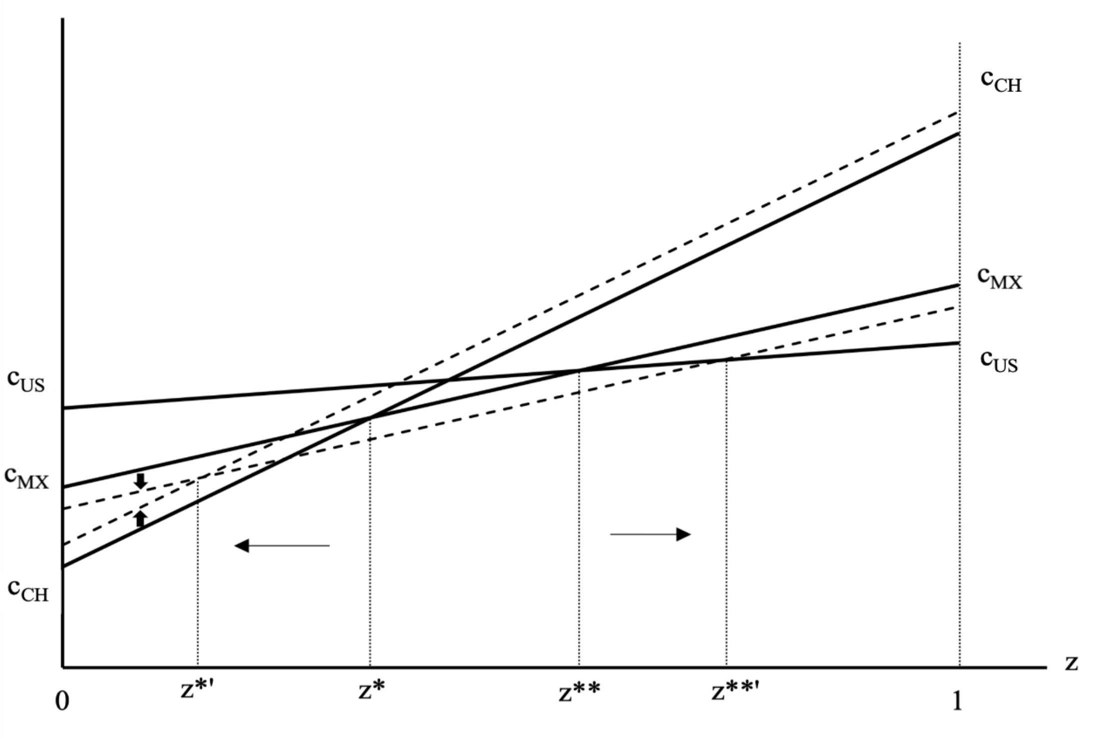


Figure 8.

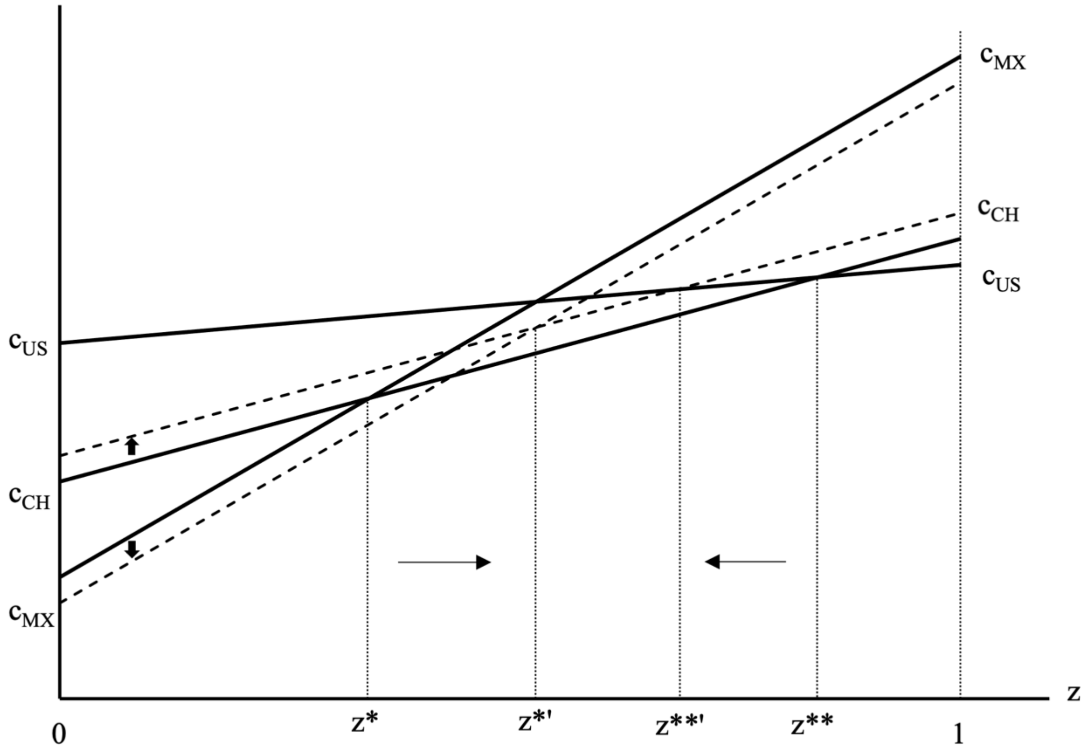
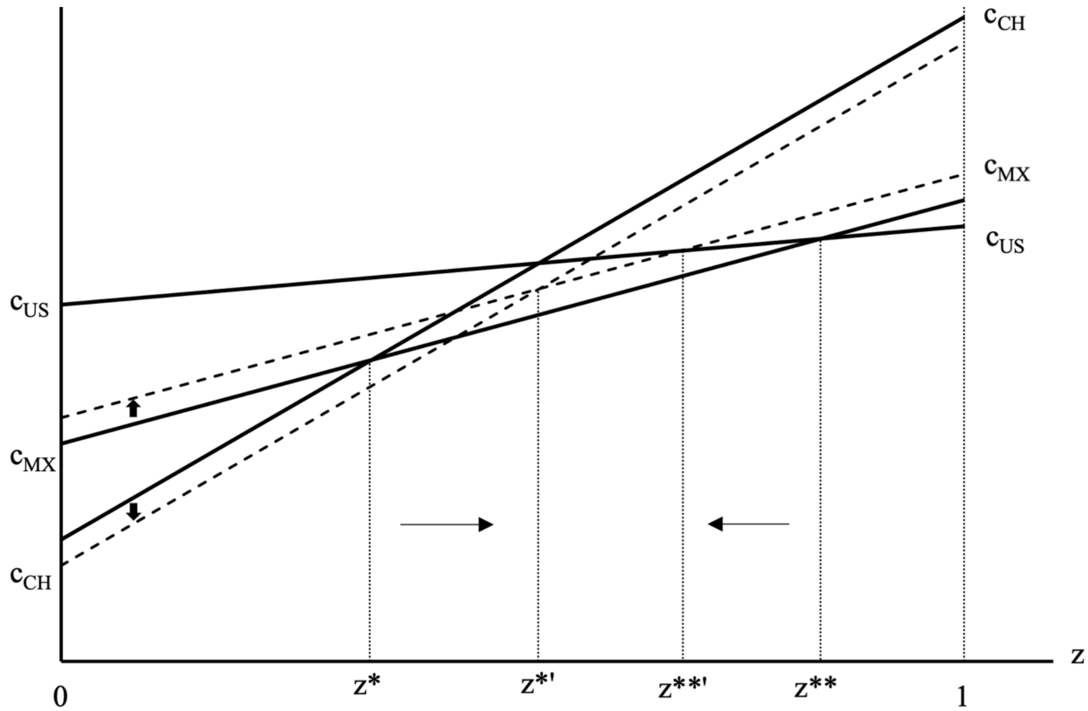


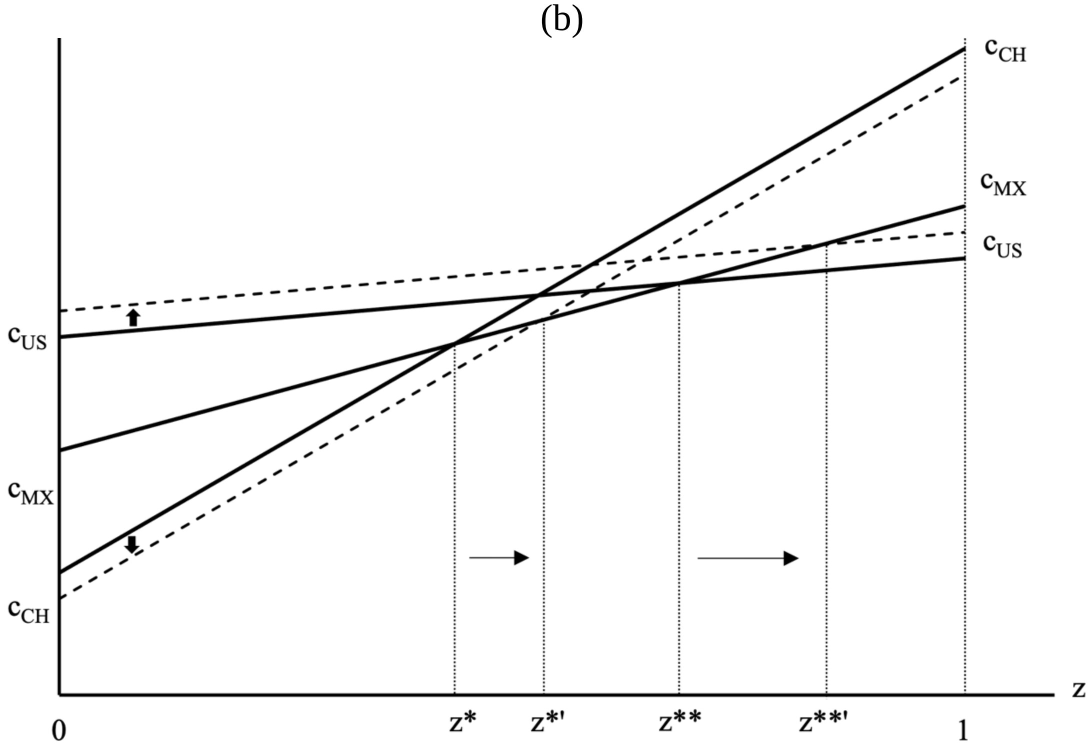
Figure 9.

(a)



c_{CH}
c_{MX}
c_{US}
c_{US}
c_{MX}
c_{CH}
z
0
z*
z*'
z**'
z**
1

(b)



c_{CH}
c_{MX}
c_{US}
c_{US}
c_{MX}
c_{CH}
z
0
z*
z*'
z**
z**'
1

Figure 9.

(c)

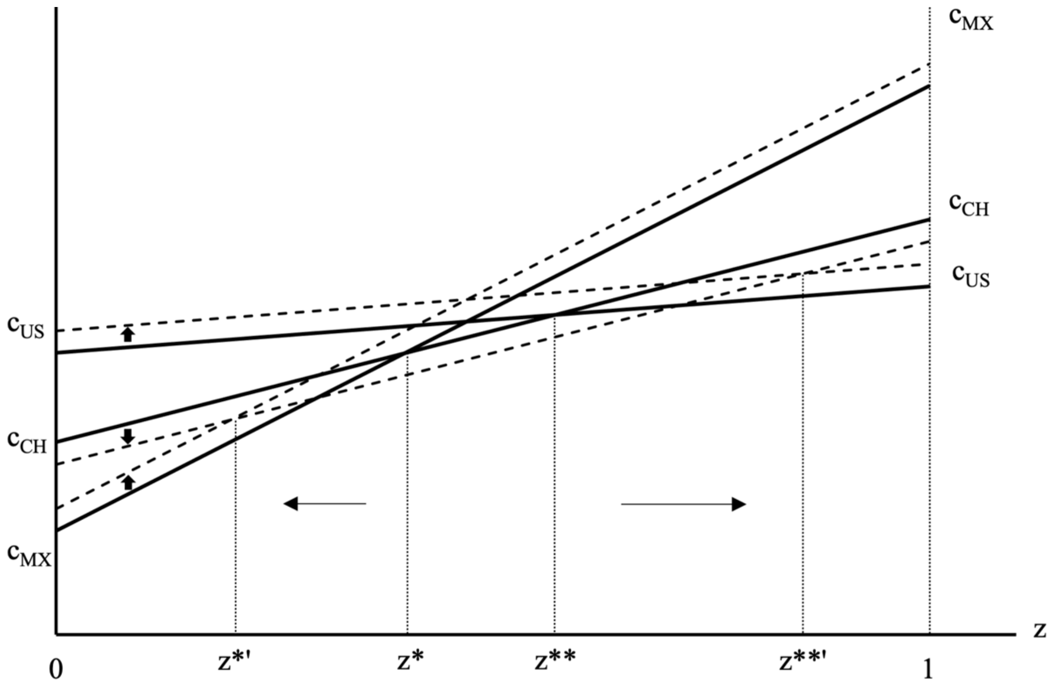
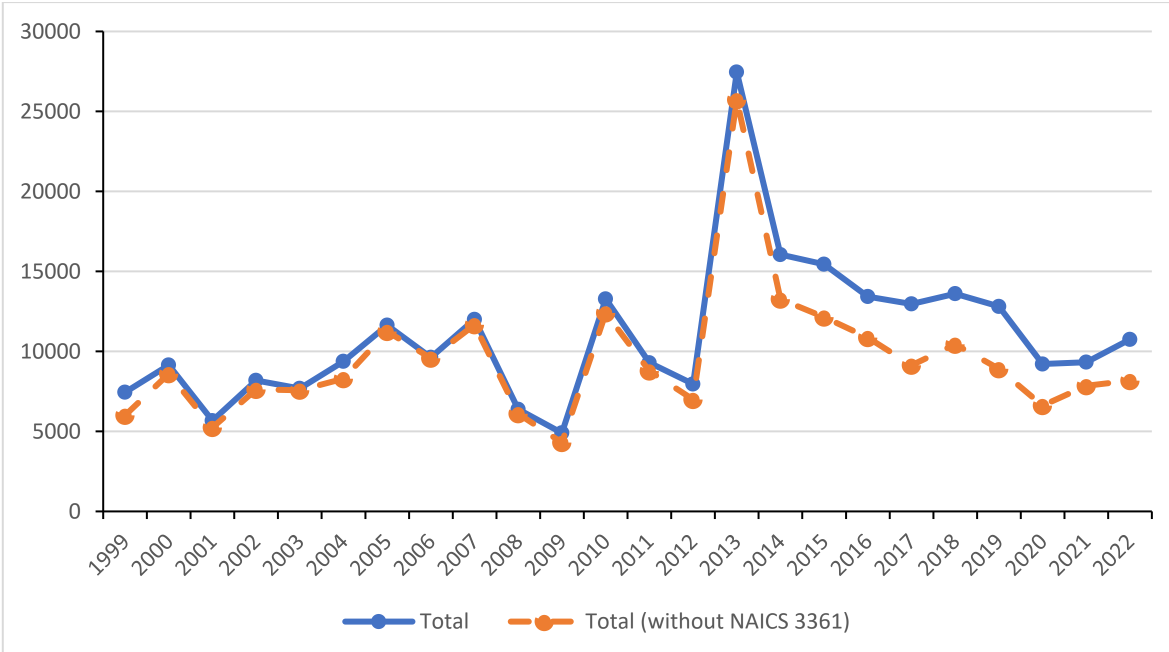
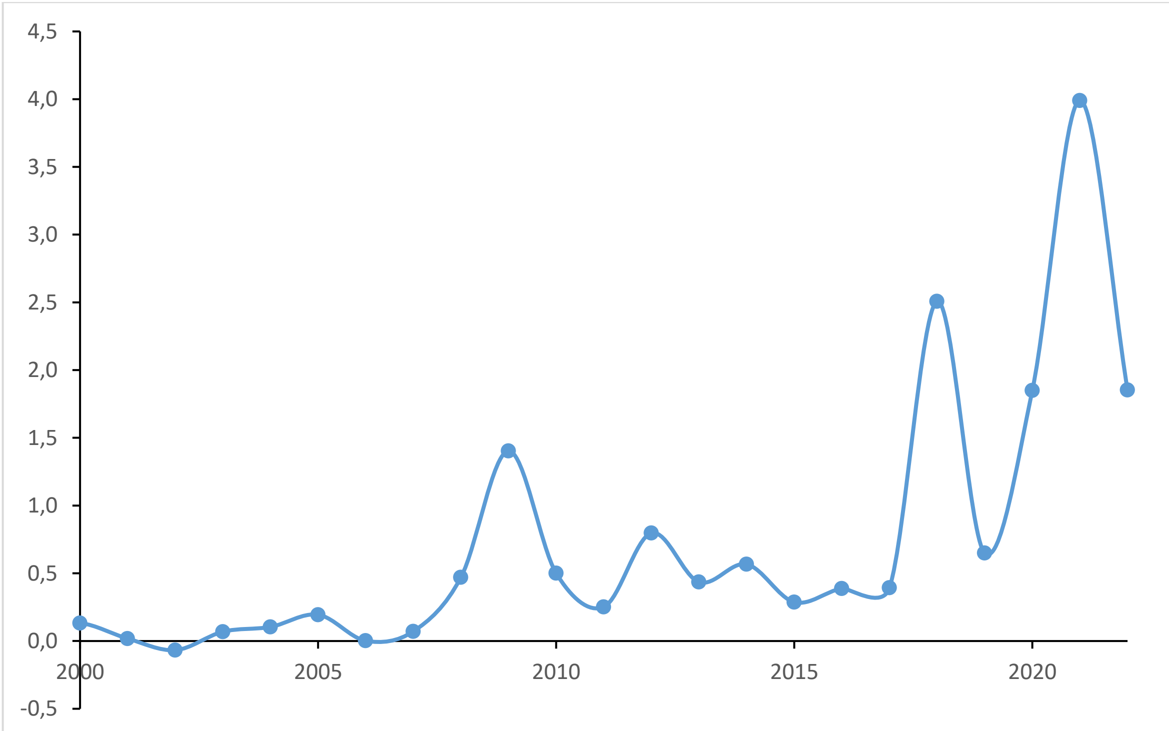


Figure 10. FDI (manufacturing, million US dollars)



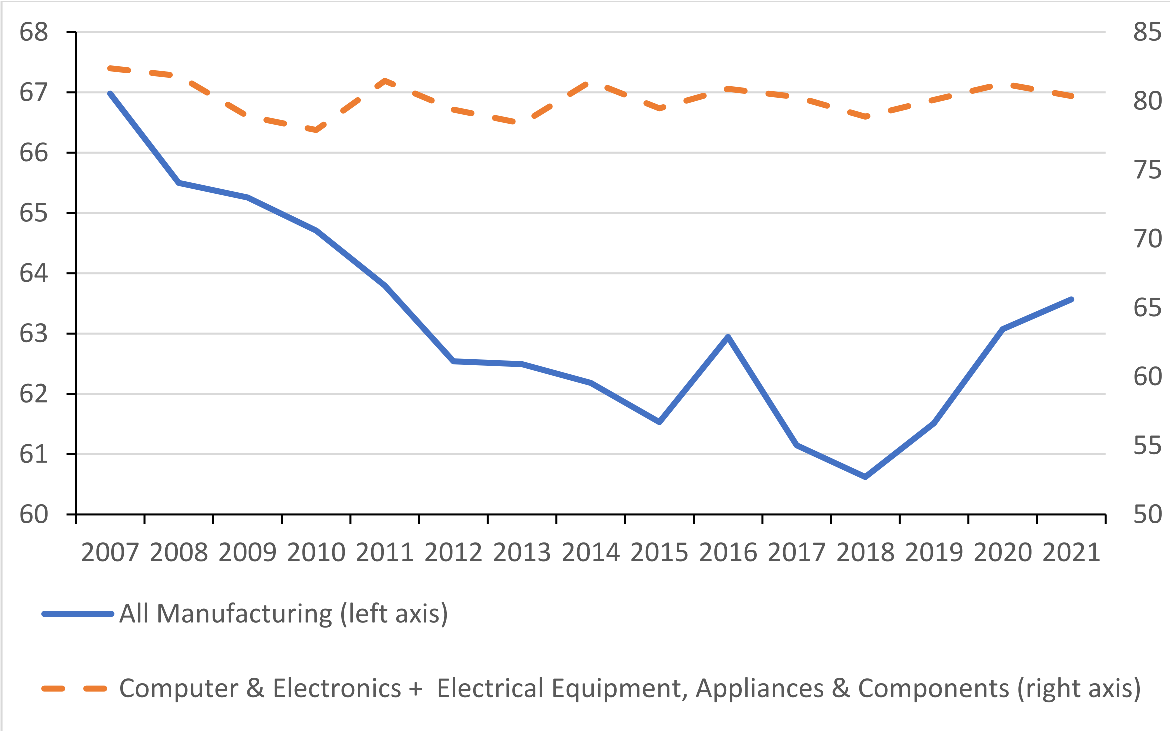
Source: Secretaría de Economía (https://datos.gob.mx/busca/dataset/informacion-estadistica-de-la-inversion-extranjera-directa)

Figure 11. Manufacturing FDI from China (% of manufacturing FDI from US)



Source: Secretaría de Economía (https://datos.gob.mx/busca/dataset/informacion-estadistica-de-la-inversion-extranjera-directa)

Figure 12. Border States´ Share in Mexico´s Manufacturing Exports



Source: INEGI

Figure 13. Google Searches of Nearshoring: 2020 to2023

Source: GoogleTrends. Darker areas represent states with a larger amount of searches for the word Nearshoring

Table 1. Average shares in GDP, annual growth rates and contributions to growth of domestic, traditional trade and forward GVC components.

Average Share in Annual GDP

	Total	Domestic	Total trade related value-added	Traditional Trade	GVC Forward Participation
1981-1986	100.00	86.75	13.25	11.55	1.71
1987-1993	100.00	88.25	11.75	10.41	1.34
1994-2000	100.00	84.11	15.89	14.15	1.75
2001-2008	100.00	83.14	16.86	14.91	1.96
2009-2017	100.00	79.03	20.97	18.04	2.93
2018-2019	100.00	74.95	25.05	21.79	3.27

Average Annual Growth rate

	Total	Domestic	Total trade related value-added	Traditional Trade	GVC Forward Participation
1981-1986	1.13	0.30	10.49	10.53	10.93
1987-1993	3.26	4.00	-1.77	-1.80	-1.40
1994-2000	3.59	2.43	14.14	14.08	14.64
2001-2008	1.90	1.77	2.66	2.25	5.73
2009-2017	2.15	1.28	5.65	5.73	5.54
2018-2019	1.00	0.10	3.85	4.10	2.21

Average Contribution to GDP Annual Growth

	Total	Domestic	Total trade related value-added	Traditional Trade	GVC Forward Participation
1981-1986	1.13	0.24	0.89	0.80	0.09
1987-1993	3.26	3.51	-0.25	-0.23	-0.02
1994-2000	3.59	1.93	1.66	1.47	0.20
2001-2008	1.90	1.47	0.43	0.32	0.11
2009-2017	2.15	1.01	1.14	1.00	0.14
2018-2019	1.00	0.08	0.92	0.85	0.07

Sources: Computed using INEGI, Banco de México and WITS data: https://wits.worldbank.org/gvc/gvc-data-download.html. The contribution to growth of each component in each year t is computed as the product of the share of the corresponding component in GDP in year t-1 and the real growth rate of this component during year t.

Table 2. Share in U.S. manufacturing imports (in descending order in terms of the share change from 2017 to 2022)

	Share in Total U.S. Manufacturing Imports			Changes	
	(a)	(b)	(c)	(b)-(a)	(c)-(a)
	2017	2019	2022		
Vietnam	2.10	2.85	4.33	0.75	2.22
Taiwan	1.99	2.40	3.18	0.41	1.18
Mexico	13.70	14.68	14.42	0.98	0.72
India	2.19	2.49	2.90	0.30	0.70
South Korea	3.40	3.41	4.06	0.01	0.66
Thailand	1.44	1.48	2.03	0.04	0.56
Remaining countries	50.83	52.32	50.62	1.48	-1.70
China	24.34	20.36	18.46	-3.98	-5.88

Source: Computed with Census Bureau´s 4-digit NAICS U.S. Imports data

Table 3. Pairwise correlation coefficients between the changes in the industry share in total source manufacturing exports to the United States and industry skill intensity

	Mexico	Mexico (Without NAICS 3361)	China
1993-2001	-0.338	0.428	0.292
	(.002)	(.000)	(.007)
2001-2008	0.325	-0.329	0.352
	(.002)	(.002)	(.001)
2008-2017	-0.757	-0.506	0.174
	(.000)	(.000)	(.110)
2017-2019	-0.522	0.170	-0.400
	(.000)	(.121)	(.000)
2017-2022	0.744	0.421	-0.382
	(.000)	(.000)	(.000)

Sources: Computed with Census Bureau´s 4-digit NAICS U.S. Imports and Nunn and Trefler (2013). "Without NAICS 3361" omits NAICS code 3361 "Motor Vehicles" from the calculations. The data are weighted by the industry share in total source country initial exports for each period. p-values are reported in parentheses.

Table 4. Comparative statics predictions of the three-country model on the relative demand for skill in each country

	Scenario 1 (China is the least skill abundant country)		Scenario 2 (Mexico is the least skill abundant country)	
	Without capital movements	With capital movements	Without capital movements	With capital movements
Mexico				
Nafta	(?)	(?)	(+)	(+)
China Shock	(+)	(?)	(-)	(-)
Trade War/Nearshoring	(-)	(?)	(+)	(+)
China				
Nafta	(-)	(-)	(+)	(+)
China Shock	(+)	(+)	(?)	(?)
Trade War/Nearshoring	(-)	(-)	(?)	(?)
US				
Nafta	(+)	(+)	0	(+)
China Shock	0	(?)	(+)	(+)
Trade War/Nearshoring	0	(+)	(-)	(-)

Table 5. Pairwise correlation coefficients between changes in industry-level FDI and skill intensity of 4-digit NAICS Manufacturing (excludes NAICS code 3361, Motor Vehicles)

	Skill intensity (Nunn and Trefler, 2013)
(a) Log ΔFDI from 2008-2012 to 2013-2017	-0.279
	(.061)
(b) Log ΔFDI from 2013-2017 to 2018-2019	0.306
	(.039)
Difference (b) - (a)	0.325
	(.028)
(c) Log ΔFDI from 2013-2017 to 2018-2022	-0.011
	(.944)
Difference (c) - (a)	0.232
	(.125)

Sources: Computed with 4-digit NAICS FDI data from the Secretaría de Economía (https://datos.gob.mx/busca/dataset/informacion-estadistica-de-la-inversion-extranjera-directa) and Nunn and Trefler (2013). Data with zero or negative FDI flows, and outliers with FDI changes of more than 400% or close to -100% are omitted. p-values are reported in parentheses.

Table 6. Regression results of Mexico´s product-level exports growth towards the United States, China and Rest of the World.

	1.036 ***	1.272	0.604 $^{+}$
	(0.294)	(1.337)	(0.441)
	0.321	0.131	1.077 **
	(0.339)	(1.763)	(0.501)
	-0.844 *	-2.306	-2.228 ***
	(0.445)	(2.211)	(0.705)
	-1.079 *	12.964 **	-0.997
	(0.585)	(5.593)	(0.833)
Pre existing trend control	yes	yes	yes
Sector FE	yes	yes	yes
R squared	0.031	0.093	0.057
N	2,641	397	1,853

Notes. The table reports estimates of regressions (16). The lowermost and uppermost 2% observations in terms of the values of the dependent variable were trimmed. Standard errors are reported in parentheses. All the regressions include sector fixed effects for products contained in each 2-digit HS chapter and pre-trend controls, corresponding to the product-level export growth to each destination from 2014-2015 to 2016-2017. $^{+}$ p<0.20, * p < 0.10, ** p < 0.05, *** p < 0.01.

Table 7. Sectors contributing to increased exports due to nearshoring

NAICS Sector	Mexico share in US imports 2017 (%)	Mexico share in US imports 2022 (%)	China share in US imports 2017 (%)	China share in US imports 2022 (%)	Change in Mexico's share	Change in China's share	China Market loss (Mill. USD)	Realized Mexico gain (Mill. USD)	Potential Mexico Gain (100% of China loss, Mill. USD)	Potential Mexico Gain (40% of China loss, Mill. USD)
Food and Kindred Products										
3118 Bakeries and Tortilla Manufacturing	18.69	18.65	2.18	1.34	-0.05	-0.83	-81.42	204.25	0.00	0.00
3121 Beverage Manufacturing	21.94	36.43	0.31	0.15	14.49	-0.16	-48.74	4555.02	0.00	0.00
Apparel and Accesories										
3159 Apparel Accessories and Other Apparel Manufacturing	6.26	7.92	58.38	40.58	1.66	-17.80	-993.49	29.92	963.58	367.48
Chemicals										
3251 Basic Chemical Manufacturing	3.10	2.70	16.69	17.99	-0.40	1.30	0.00	96.84	0.00	0.00
3254 Pharmaceutical and Medicine Manufacturing	0.39	0.39	2.41	7.57	0.00	5.16	0.00	12.78	0.00	0.00
3255 Paint, Coating, and Adhesive Manufacturing	7.60	10.94	9.20	5.29	3.33	-3.92	-115.80	19.59	96.21	26.73
3256 Soap, Cleaning Compound, and Toilet Preparation Manufacturing	10.86	12.78	13.66	7.73	1.93	-5.93	-1071.87	211.06	860.81	217.68
3259 Other Chemical Product and Preparation Manufacturing	5.59	3.98	22.35	11.63	-1.62	-10.72	-2000.78	39.44	1961.34	760.87
Plastics and Rubber Products										
3261 Plastics Product Manufacturing */	10.14	10.89	41.94	37.91	0.75	-4.02	-2108.69	551.30	1557.39	292.17
Machinery, Except Electrical										
3331 Agriculture, Construction, and Mining Machinery Manufacturing */	12.48	11.82	12.64	11.53	-0.66	-1.11	-566.37	616.55	0.00	0.00
3332 Industrial Machinery Manufacturing	2.01	3.35	24.63	15.03	1.34	-9.60	-3244.83	1172.68	2072.15	125.25
3333 Commercial and Service Industry Machinery Manufacturing	8.81	4.38	28.95	22.13	-4.43	-6.82	-938.89	244.30	694.59	131.25
3335 Metalworking Machinery Manufacturing */	1.16	1.50	13.45	9.76	0.34	-3.69	-578.70	53.55	525.15	177.93
3339 Other General Purpose Machinery Manufacturing	10.68	11.86	21.76	18.34	1.19	-3.42	-2404.93	487.02	1917.92	474.96
Computer and Electronic Products										
3341 Computer and Peripheral Equipment Manufacturing	20.88	27.15	60.41	46.06	6.27	-14.35	-19933.93	8709.06	11224.86	0.00
3342 Communications Equipment Manufacturing	9.97	8.20	62.43	49.29	-1.78	-13.14	-17495.82	1900.30	15595.51	5098.02
3343 Audio and Video Equipment Manufacturing	37.88	35.13	39.43	27.61	-2.75	-11.83	-4900.91	1698.12	3202.79	262.24
3344 Semiconductor and Other Electronic Component Manufacturing	6.01	6.48	28.59	13.04	0.47	-15.55	-17186.26	2406.50	14779.76	4468.01
3345 Navigational, Measuring, Electromedical, and Control Instruments Manufacturing	16.60	15.56	12.85	7.65	-1.04	-5.20	-3455.75	669.43	2786.32	712.87
3346 Manufacturing and Reproducing Magnetic and Optical Media	2.75	7.60	42.83	2.95	4.85	-39.88	-6956.07	1663.05	5293.02	1119.38
Electrical Equipment, Appliances & Components										
3351 Electric Lighting Equipment Manufacturing	15.33	14.13	67.02	55.11	-1.20	-11.90	-1788.80	24.66	1764.13	690.86
3353 Electrical Equipment Manufacturing	33.08	34.67	19.84	12.97	1.58	-6.88	-3224.54	404.82	2819.72	885.00
3359 Other Electrical Equipment and Component Manufacturing	21.77	16.54	34.70	27.05	-5.23	-7.65	-6110.72	2381.28	3729.44	63.01
Transportation Equipment										
3362 Motor Vehicle Body and Trailer Manufacturing */	41.16	60.18	19.99	10.91	19.01	-9.08	-563.03	1232.44	0.00	0.00
3364 Aerospace Product and Parts Manufacturing	3.94	4.70	1.81	1.67	0.76	-0.13	-64.19	365.75	0.00	0.00
Others										
3371 Household and Institutional Furniture and Kitchen Cabinet Manufacturing */	4.68	7.68	58.72	34.91	2.99	-23.80	-10269.98	1566.84	8703.14	2541.15
3391 Medical Equipment and Supplies Manufacturing	15.79	17.45	14.28	14.87	1.67	0.59	0.00	898.25	0.00	0.00
3399 Other Miscellaneous Manufacturing	3.27	3.25	42.84	42.83	-0.02	0.00	-2.89	339.60	0.00	0.00
Total	10.96	11.72	30.90	23.45	0.76	-7.45	-106107.40	32554.42	80547.83	18414.86

Note: */ Unskilled intensive sectors included in the analysis

Table 8. 2-digit sector-level GDP gains from nearshoring (% of each sector´s 2022 GDP)

	% of Sector-level GDP (2022)		
2 digit NAICS	Realized	Potential	Total
11 - Agriculture, Forestry, Fishing and Hunting	0.51	0.20	0.71
21 - Mining, Quarrying, and Oil and Gas Extraction	0.55	0.20	0.75
22 – Utilities	1.21	1.00	2.21
23 – Construction	0.01	0.01	0.02
31-33 – Manufacturing	3.37	2.92	6.29
43 - Wholesale trade	0.51	0.46	0.97
46 – Retail	0.51	0.46	0.97
48-49 - Transportation and Warehousing	0.22	0.17	0.40
51 – Information	0.13	0.13	0.26
52 - Finance and Insurance	0.09	0.08	0.17
53 - Real Estate and Rental and Leasing	0.16	0.15	0.31
54 - Professional, Scientific, and Technical Services	0.39	0.39	0.78
55 - Management of Companies and Enterprises	0.40	0.28	0.68
56 - Adm. & Support & Waste Mgmt. and Rem.	3.30	2.48	5.78
61 - Educational Services	0.02	0.02	0.03
62 - Health Care and Social Assistance	0.00	0.00	0.01
71 - Arts, Entertainment, and Recreation	0.00	0.00	0.00
72 - Accommodation and Food Services	0.04	0.04	0.07
81 - Other Services (except Public Administration)	0.11	0.08	0.19
93 - Public Finance, Taxation, And Mon. Policy	0.00	0.00	0.00
Total	1.02	0.86	1.88

Notes. See main text for details. Computed using the 2018 Mexican Input-Output Matrix available in: https://www.inegi.org.mx/temas/mip/#tabulados

Table 9. Mean contract Intensity, complexity and product differentiation of 4-digit NAICS manufacturing (excludes NAICS code 3361, Motor Vehicles)

	28 highlighted sectors			Remaining sectors
	All	Particular interest to policymakers	Remaining highlighted sectors	
Contract Intensity (Nunn, 2007)	0.627	0.734	0.577	0.455
	(0.036)	(0.058)	(0.042)	(0.025)
Complexity (Costinot, 2009)	20.48	20.42	20.51	15.93
	(1.102)	(0.958)	(1.578)	(0.811)
Differentiation (Rauch, 1999)	0.852	0.931	0.814	0.611
	(0.048)	(0.056)	(0.065)	(0.053)

Sources: Computed with Census Bureau´s 4-digit NAICS U.S. Imports, Rauch (1999), Nunn (2007) and Costinot (2009). Standard errors are reported in parentheses.

About the project

The Georgetown Americas Institute's Latin America in the Global Economy (LAGE) program is a multiyear initiative to advance research and promote dialogue within the academy and with governments, the private sector, and civil society around the most critical economic challenges facing the region. A critical focus will be the emerging position of Latin America and the Caribbean (LAC) in a new global economic trade architecture characterized by deep structural changes.

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