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COVID-19 crisis and the automotive industry in Mexico: public policies and firm strategies

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Abstract: The automotive industry's performance in Mexico was affected by the health and economic SARS-CoV2-crisis. As part of the complex North American supply chain, several factors influenced decision-making on crisis management. We determined the multilevel governance mechanisms to characterise the process of implementing activities. The productive performance of the industry, capacity utilisation rate per plant, employment, and foreign direct investment were evaluated. The federal government's support was scarce, although subnational governments were more sensitive to cooperate with stakeholders. Companies had to adapt to pandemic conditions and also to changes in the political and institutional environment driven by the USMCA and tensions between the USA and China. As a result, inward FDI flows and nearshoring practices are growing in the northern Mexican regions, stabilising the supply chains.

Keywords: automotive industry; public policies; FDI and nearshoring; COVID-19; USMCA; Mexico.

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1 Introduction

The automotive industry is deeply affected by four innovation megatrends: connected, autonomous, electric and shared vehicles. This has caused an unprecedented technology and business model transformation. In addition, the carmakers in the USMCA region are

adapting to the new agreement, which came into effect on July 1, 2020. Within this dynamic, the COVID-19 outbreak plus commercial tensions between the USA and China caused additional stress on the industry.

The health crisis affected countries at different levels. Confinement measures were imposed to slow down the spread of the virus and avoid saturation of health systems. These measures deeply affected the economy. As a result, supply and demand for goods and services were depressed, firms and jobs were lost, and poverty increased worldwide.

In Mexico, the official provisions to prevent contagion risks were issued on March 24. Six days later, the government declared a health *emergency*, and suspension of all *non-essential activities* was ordered, while requesting to avoid layoffs (Secretaría de Salud, 2020a, 2020b). The automotive industry was considered as non-essential and had to stop activities restarting June first, only after a lobbying process that changed its status to *essential activity* and reopen facilities.

The pandemic came when the world economy was still recovering from the 2008 economic crisis and had an average growth rate of 2.8% from 2011–2019. Advanced economies supported the population with necessary fiscal measures amounting to 88% of the total fiscal stimulus granted worldwide. In contrast, the effort made by emerging economies was feeble (IMF, 2021), e.g., Mexico's funds to support the population and companies in the pandemic were scarce and weakly coordinated with local governments, so the human costs were very high (Cejudo et al., 2020).

COVID-19 affected the performance of the automotive industry in Mexico, decreasing production of light vehicles (20.23%), parts (21.2%), exports (20.85%), and domestic market sales (27.97%) in 2020 (Table 1). Employment began to decrease in May 2019, and then, due to the pandemic jobs in final assembly and supply was lost. Companies sought to contain the damage by adjusting their operational and financial dynamics by negotiating with their stakeholders. Non-essential expenses were reduced, plans for acquiring assets were frozen, and financing to meet obligations and support from the government was sought (Carrillo et al., 2022).

Table 1 Performance of the automotive industry in Mexico 2019–2021

	2019	2020	2021	% change 2019/2020	% change 2020/2021
Light vehicle production / million units	3.81	3.04	3.0	-20.23	-2.23
Parts production / billion dollars	99	79	94.9	-20.20	20.23
Exports / million units	3.38	2.68	2.7	-20.82	0.90
Domestic market sales / million units	1.3	0.95	1.01	-27.91	6.80
Contribution to GDP / % change	3.8	3.6	3.5	-5.26	-2.78
Contribution to industrial GDP / % change	20.6	19.4	18.3	-5.83	-5.67

Source: INEGI (2022b)

On the bright side, the economic crisis led to re-evaluating whether global value chains (GVCs) increase risks and vulnerabilities and whether more localised production would protect supply chains from disruptions (UNCTAD, 2020). As a result, diversification of abroad sources of supply was proposed. This tendency to reorganise production in countries close to markets (nearshoring) can already be observed in Mexico in 2022 as inwards foreign direct investment (FDI) flow benefits industry suppliers. Nearshoring

practices seek to avoid geopolitical and logistics problems, helping stabilise the US supply chains.

The automotive industry is adapting by forming a multi-pronged strategy to respond to the health crisis, to the new trade agreement, and to technological change. Here, we analysed the government and industry responses to the crisis caused by the COVID-19 pandemic. Particular attention was paid to public policies implemented by national and subnational governments and to the nearshoring increase observed in 2022.

We gathered data using documentary research techniques and telephone interviews. Multilevel governance mechanisms were defined to characterise decisions to deal with the pandemic. We evaluated the productive performance of the industry at the national level: production and capacity utilisation rate per plant, FDI and employment. We analysed whether this performance was related to agreements and government actions.

In addition to this introduction, our analysis is divided into four sections. Section 2 presents public policies designed to face the pandemic, including governance problems, responses from companies and regional governments, mechanisms for coordinating reopening plus the effects on employment; its fall, recovery, and regulation adjustments, such as the prohibition of subcontracting and the growth of the in-house staff jobs, and the new teleworking regulation. Section 3 studies the effects of the pandemic on light vehicle production in Mexico and the capacity utilisation rate. Section 4 looks at foreign investment in the auto industry, the downturn during the pandemic, and the recovery related to nearshoring. Finally, we present our conclusions in Section 5.

2 Public policies and governance mechanisms to face the pandemic

Mexican economy had contracted before the pandemic as a result of the deceleration in investment, private consumption, and uncertainty around the free trade agreement with the USA and Canada. Then, the health crisis accelerated this trend, and the gross domestic product (GDP) decreased by 8.2% in 2020 (World Bank, 2022). In addition, the Mexican labour market was affected, and unemployment rose to 4.5% in March (INEGI, 2022), in contrast Martínez (2021)¹ computed 24.9%. Finally, the drop in exports, the increasing oil prices, and the accumulated outflow of dollars from the government bond market also affected the Mexican peso, which depreciated 29% from March 1 to 25 (Banxico, 2022). However, it recovered before the end of 2020.

Mexico's public funds to support individuals or companies during the pandemic were scarce: lower than in most middle-income economies. Fiscal measures with direct effects included increased public spending and decreased fiscal income, all calculated at 0.7% of GDP. In comparison, the measures with indirect effects, such as loans to workers, reached 1.3% of GDP (IMF, 2021). The government did not want to increase public debt, which amounts to 45.7% of GDP (SHCP, 2022b) and opted for a slow economic recovery. Still, in November 2021, it accepted a flexible credit line arrangement of 50,000 USMD from the International Monetary Fund.

The federal government implemented three critical measures:

- 1 ensure resources for the Ministry of Health (0.4% GDP)
- 2 support households and firms, especially micro-enterprises
- 3 boost credit, strengthen liquidity, and guarantee proper functioning of financial markets (IMF, 2021).

The credits were directed to:

- 1 SMEs that did not fire workers or reduced wages, micro-enterprises, small shops and family businesses
- 2 housing and personal loans
- 3 old-age and disability pensions.

Also, the processes of VAT refunds were accelerated and housing social contributions for small and medium companies were deferred (IMF, 2021). In Mexico, 97.3% of the productive units are microenterprises and generate 45.6% of the employment, so they did qualify for resources dedicated to companies. Additionally, the Central Bank cut rates by 300 basis points, going down from 7% in February 2020 to 4% in February 2021 and controlled fuel prices until the end of the year. All these measures aimed to reactivate the economy.

Local governments also implemented independent measures to face the pandemic. Cejudo et al. (2020) located and analysed 629 public policy instruments belonging to 32 states of the Mexican Republic. They defined four categories: social assistance, fiscal and financial, social security and labour market. Almost half of the instruments were of fiscal or financial nature (47%). In addition, there were instruments for companies and individuals with business activity, including fiscal and administrative incentives or credits. Half were social assistance instruments (36%) aimed at caring for people with social vulnerability, marginalisation, or poverty, 11% were related to the labour market, and 6% to social security. Finally, 65% of the instruments were new, and designed to deal with the pandemic. Still, information gaps affected their effectiveness since they did not indicate the frequency of support delivery, duration or amount, nor the origin of the resources. The national effort to respond to the pandemic did include support for businesses. Still, it was mainly directed at micro-businesses considered substantial.

2.1 Governance problem, the response of companies and the subnational governments

The authority for formulating health system policies in Mexico rests with the Ministry of Health (SS), and epidemiological surveillance is one of its primary functions. The federal government intervened and provided resources and support to state governments responsible for providing medical services and organising and regulating public health. Traditionally, governance mechanisms have been command and control and monetised by assigning resources through the federation's expenditure budget. However, during the pandemic, the General Health Council (CSG)² formed for emergency cases was insufficient due to the magnitude of the problem, and there were constant tensions between different bodies and levels of government.

With 32 state governments and 2,465 municipalities, the federal government was overwhelmed, since conditions everywhere differed including the number of infections and the resources to deal with problems. Therefore, decisions were also different and sometimes contradictory. For example, when the government imposed curfews to guarantee the confinement of the population in states such as Baja California, Sonora, Chihuahua or Coahuila, command, and control mechanisms were applied. Sanctions such as fines and community work threatened the population (Peralta, 2020). In contrast,

other states like Mexico City used persuasion recommending staying at home without consequences for non-compliance.

Through the Ministry of Foreign Affairs and the Ministry of Health, the federal government was responsible for negotiating with supranational organisations, governments of other countries, and companies to obtain medical supplies and vaccines. Issues such as the acquisition, distribution, and application of vaccines were the exclusive responsibility of the federation, which led to disagreements from private and social sectors. However, due to the lack of agility in responding to the needs of the population during the pandemic, subnational governments, companies, and foreign governments developed independent vaccination programs for border state maquiladora employees.

Local governments, with a vision of problem management established cross-border cooperation policies to support the safety of workers and the operation of the automotive industry. The local US and Mexican governments, and the private sector coordinated the Cross-Border Vaccination Pilot Program. The first state to participate was Nuevo León in 2021, with the support of the mayor of Laredo, Texas, to vaccinate 1,500 workers who were in GVC (Flores, 2021).

In Mexico, the case fatality ratio (CFR) reported by the World Health Organization (WHO, 2022) was 4.75%, while worldwide was 1%. This difference reveals the significant problem that the country had to face. In 2020, the population contagion rate for 127 million inhabitants was 1.19%, and the average fatality rate was 10.15%. The following year, 2021, the contagion rate increased to 1.95%, and the fatality rate dropped to 5.97%, which still was very high (Conacyt, Centro Geo y Datalab, Database, 2022).³ Furthermore, Mexico was the country from the Organization for Economic Cooperation and Development (OECD, 2021) that applied fewer COVID-19 tests per thousand inhabitants at 0.6, while the average was 27.7. Since COVID-19 tests were unavailable, workers who felt sick still had to go to work (Cattan, 2021). Hence, when the cross-border vaccination program started, it was widely accepted. In addition, some automotive industry companies supported medical services by donating medical supplies and equipment to aid health sector workers who were most vulnerable.

Automotive industry assembly companies are located in eleven states, and six had infections of their population above the national average. COVID-19 hit the northern border harder. Sonora, Nuevo León, and Coahuila contagion rates were higher than the national average. As a result, the USA closed the border for tourism, allowing only essential travel and the commerce of goods, which was not affected. Restrictions throughout the pandemic began in late March and varied locally. The US Government lifted restrictions on visitors by land coming from Mexico in November 2021, provided they had an approved vaccination certificate. By contrast, Mexico never asked for proof of a COVID-19 vaccination to enter the country (Schulz, 2021).

2.2 Coordination in the opening: non-monetary and persuasive mechanisms

On February 3, 2020, the US Government declared a Public Health Emergency due to the coronavirus outbreak, and the economy contracted by 31.4% in the second quarter of 2020. On March 13, a national emergency was declared. Later, on March 26, the senate passed the Coronavirus Aid, Relief, and Economic Security (CARES) Act. It provided \$2.3 trillion (11% of GDP) in aid to hospitals, small businesses, the unemployed, one-time tax rebates, food safety, and forgivable small business loans and guarantees to

help enterprises to retain employees (IMF, 2021). However, at that moment, no US federal programs dealt with the automotive industry.

One-third of US capacity was reopened by May 11, and nearly 90% reopened a week later. Since 44% of motor vehicle parts came from Mexico, the reopening had to be synchronised in both countries. Later, the US vehicle sales recovered, but there was much disruption in the production supply chain, mainly due to semiconductor shortages (Dziczek, 2020).

Since activity suspensions in the USA were a few days earlier than in México, the companies had time to adjust inventories. Furthermore, companies implemented safety measures based on their experience in other plants worldwide, and special groups designed security norms. In Mexico, the automotive industry suspended operations in April and May, reopening until June. Meanwhile, companies in the automotive sector were lobbying to be labelled an *essential activity* since they feared that companies in Canada and the USA might look for suppliers in other parts of the world. In addition, they considered that commercial tensions between the USA and China were creating opportunities for suppliers in Mexico. Also, the US Government pressured its Mexican counterpart to reassess the *no-essential activity* designation of the industry, so it could resume operations once automotive plants in the USA started working.⁴ Michael Kozak, Acting Under-Secretary of the Department of State, and Ellen Lord, Under-Secretary of the Department of Defence, from the USA, made requests to avoid interruptions in supply chains and received a favourable response (Corona, 2020).

Cooperation and coordination were essential, as observed in the meeting of three Mexican state governors from Queretaro, San Luis Potosí, and Guanajuato with the Michigan vice-governor to make decisions on reopening for the automotive industry in Mexico (Rosas, 2020).

Industry associations also presented petitions to the Mexican Government requesting that associated companies be considered an essential activity. They also requested economic and fiscal support. Finally, governments, companies, and unions cooperated and coordinated to return to work, and non-monetary, persuasion and solidarity governance mechanisms prevailed in the negotiations. As a result, on May 29, the government published the agreement for reopening on June first and included the automotive industry as essential (Secretaría de Salud, 2020b).

Carmakers shared safety protocols and collaborated with government. However, the impact was different for each company. For example, Dekosys, a company that produces plastic components, did not have problems with its supply chain and had the opportunity to supply parts for Audi in the Chinese market (Mexico Business Publication, 2020a). In contrast, Robert-Bosch, Mexico, was short in supplies from China, and since the lockdown in the USA ceased operations at different times, they had zero income (Mexico Business Publication, 2020b).

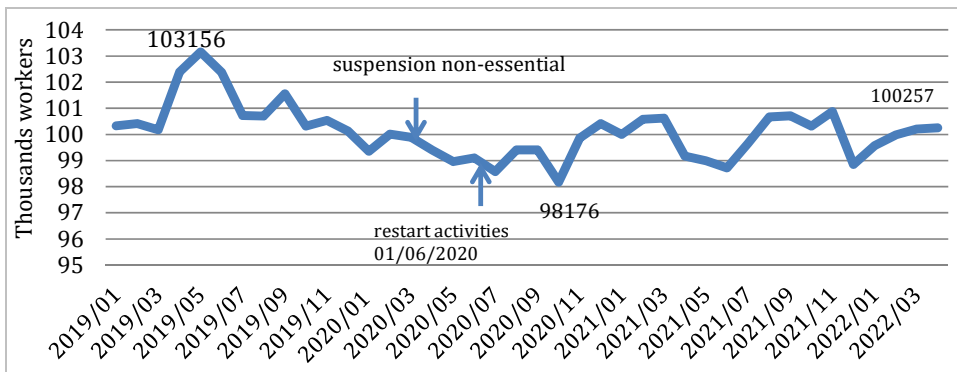
Business associations also initiated actions to support the partners. For example, in conjunction with equity link, the national auto parts industry designed a factoring scheme for auto parts companies that will help them have liquidity in the future. Several companies also expressed their desire to delay the entry into force of the USMCA without success.

2.3 COVID-19, employment, home-office and out sourcing

In 25 years of NAFTA, production, employment and productivity in the automotive industry in Mexico grew while worker wages deteriorated and union democracy decreased (Gómez-Zuppa, 2022; García Jiménez et al., 2021; Covarrubias, 2019). The wage restraint policy, the deregulation of the labour market, and the weakening of the unions explain these high levels of productivity with low wages (Carrillo and García-Jiménez, 2019).

In this context, the arrival of the pandemic affected employment even more; GDP fell 18% in the second quarter, and 12.5 million jobs were lost in Mexico (Casado, 2021). Still, the loss of employment in the automotive industry was not as drastic as in the rest of the country: Between March and June, 790 jobs were lost, and later, in October, another 922, adding a total of 1,711 positions that represented 1.7% of assembly employment. One year later, in April 2022, automakers accounted for 1,685 jobs more than when non-essential activities were suspended (Figure 1). However, the sector has not yet reached the level of employment that it had by March 2019.

Figure 1 Employment in vehicles and trucks assembly in Mexico (see online version for colours)

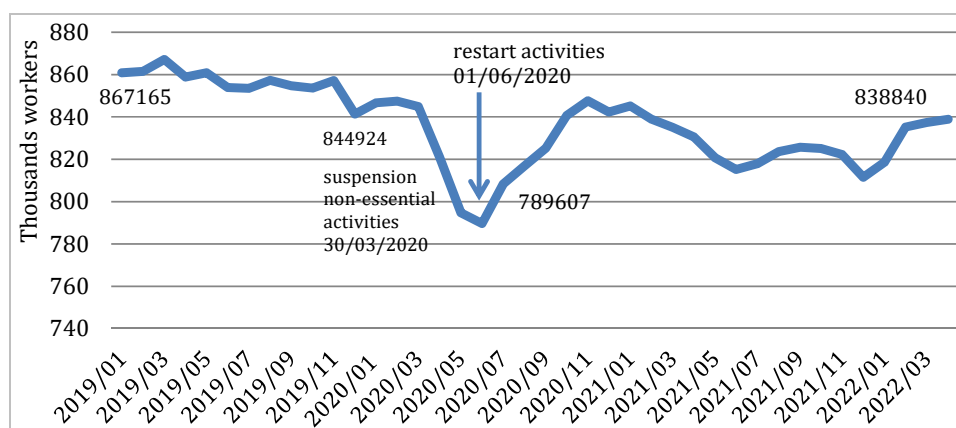


Source: INEGI (2022a)

In motor vehicle parts manufacturing 55,317 jobs were lost between March and June 2020, or 6.54% of the total. Most lost jobs were in electrical and electronic equipment manufacturing. However, by November employment had recovered, and there were 2,687 more jobs than at the beginning of the pandemic (Figure 2). Companies have developed multiple strategies for management of human resources. Layoffs with pay, remote work, and dismissal of people hired by outsourcing were the first few months' responses. Later, negotiations were for layoffs, reduced hours and salary reduction.

Multinationals decreased working hours, reduced shifts and wages, and implemented technical stoppages in response to adjustments in production reducing costs and overcoming the crisis. These actions were negotiated with unions and had fiscal repercussions (KPMG, 2020). Salary cuts were initially resorted to expecting quick reopening. Still, the extension of the lockdown and the drop in demand led companies to increase layoffs and avoid overproduction. In addition, many of the companies in the automotive industry implemented a working day outside the Federal Labour Law before the pandemic: 12-hour days four days a week and three days off. All this is under their collective contract (Gómez Zuppa, 2022).

Figure 2 Employment in motor vehicle parts manufacturing in Mexico (see online version for colours)



Source: INEGI (2022a)

Table 2 Automotive industry in Mexico: changes in production and plant capacity utilisation rate

State	Brand	% change in production 2018/2021	% change in production 2019/2021	Plant capacity utilisation rate 2019	Plant capacity utilisation rate 2020	Plant capacity utilisation rate 2021
Puebla	AUDI	-20.57	-12.23	125.83	99.56	110.44
Guanajuato	GM	-7.09	-0.27	110.49	110.02	110.20
Coahuila	Stellantis	23.47	15.92	90.38	83.80	104.77
Baja California	Toyota	-18.91	-24.30	121.55	85.35	92.01
Guanajuato	Honda	42.40	-9.54	101.42	77.44	91.74
Nuevo Leon	Hyundai-Kia	-25.53	-23.45	115.10	83.05	88.11
Aguascalientes	Nissan	-23.95	-17.58	95.04	75.20	78.33
Puebla	Volkswagen	-32.38	-33.60	89.04	60.03	59.12
Guanajuato	Toyota	0.00	12024.20	0.47	27.22	57.33
Guanajuato	Mazda	-30.54	9.24	46.80	58.39	51.12
Coahuila	GM	46.88	-39.71	79.87	65.26	48.16
San Luis Potosi	BMW	0.00	178.40	17.04	38.44	47.45
Aguascalientes	COMPAS	264.37	230.49	12.17	44.46	40.21
Sonora	FORD	-25.21	-22.00	49.40	31.05	38.53
Morelos	Nissan	-55.80	-32.40	57.00	38.91	38.53
Edo Mexico	Stellantis	-81.38	-74.65	107.47	68.62	27.25
Edo Mexico	FORD	-4.49	42.86	16.58	2.50	23.68
San Luis Potosi	GM	-83.68	-80.80	111.30	78.25	21.37
Jalisco	Honda	-100.00	-100.00	16.52	0.00	0.00

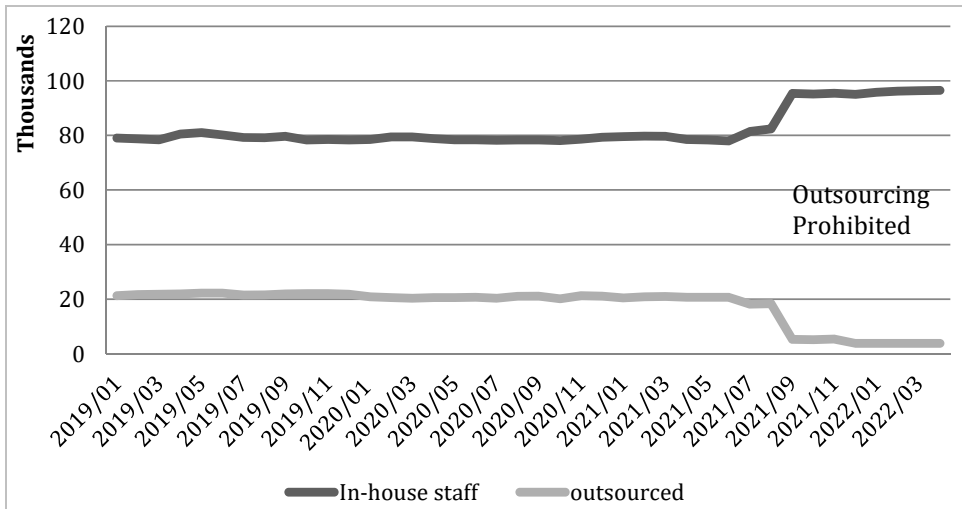
Source: Own elaboration with data from Automotive News Data Center (2018, 2019, 2020, 2021) and AMIA (2022)

Carrillo et al. (2022) indicate that auto parts firms in the northern region of Mexico estimated a shorter recovery time than those in the Bajío, which may be related to the dynamic of the region in which these are located. In Ramos-Arizpe, Coahuila, the loss of employment was the highest between March and June, which coincides with the drop in the capacity utilisation rate of GM and Stellantis (Table 2).

Companies also implemented home-office schemes for administrative staff. However, challenges arose in managing time and creating control metrics. In addition, at home, there was confusion differentiating between the workspace and the coexistence space (Zárate and Sánchez, 2020). These problems led to the approval of new regulations on teleworking or home-office activities. As a result, labour law changed, adding chapter XIIB is in ‘teleworking’ and reforming Article 311 in January 2021 (Congreso de los Estados Unidos Mexicanos, 2021). Provisions are for workers who develop more than 40% of their activities at home. The scheme is part of the collective contract and must observe a gender perspective.

Later, in August 2022, the official standard NOM-037-STPS-2022 on teleworking was published. Two points were controversial: flexibility in the working day because schedules lost precision, and technology to supervise the worker depending on the work to be done did not guarantee people’s privacy. In addition, psychosocial risks were not included in the regulation, even though 75% of Mexican workers suffered from fatigue, anxiety, and high-stress levels (IMSS, 2022). The hybrid format seems the most widespread, with days in the office and others at a distance and administrative areas used it more (Fernández, 2022).

Figure 3 Assemblers: in-house staff and outsourced jobs

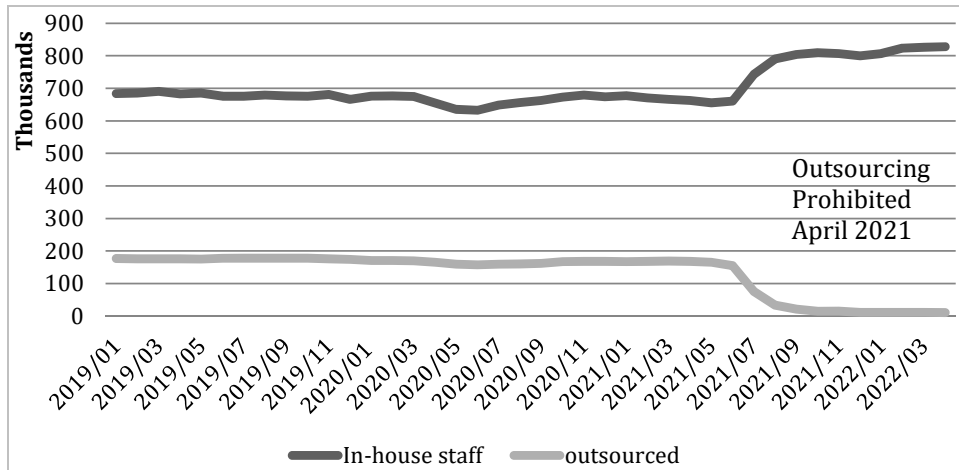


Source: INEGI (2022a)

During the pandemic, the reform to the law that prohibits outsourcing workers in Mexico came into effect on April 24, 2021. Outsourcing is a scheme used by large companies to save the benefits they would have to give their workers and evade tax and social security responsibilities. The pandemic did not drive the ban on outsourcing; nevertheless, its regulation has been significant in improving the conditions of workers in the country. In

addition, its effect on automotive multinationals was substantial since the industry was a significant user of this scheme, outsourcing 26.3% of OEM workers and 23% of suppliers' workers. Nevertheless, a year after the law came into force, the share of workers hired by outsourcing decreased to 3.92% and 1.35%, respectively (Figures 3 and 4).

Figure 4 Suppliers: in-house staff and outsourced jobs



Source: INEGI (2022a)

The government has managed annual increases in the minimum wage and promoted essential changes in the Federal Labour Law, the regulation of outsourcing, and teleworking, all under the new USMCA Trade Agreement. The labour reform went into effect on May 1, 2019, USMCA Chapter 23 is applicable as of June 2020, and the outsourcing regulation went into effect on April 23, 2021. Even though the pandemic paralysed the productive structure, these changes were institutionalised and are now in the process of achieving their application, which is mandatory. Bensusàn Areous et al. (2022) analyse the construction of a new labour model in Mexico that responds to these challenges and considers that although the USMCA provides rules and mechanisms that contribute to the implementation of the labour reform, there is a confrontation with those who benefit from the status quo, preferring to maintain Mexico as a platform for cheap manufacturing.

3 The effects of the pandemic on the light vehicle production in Mexico

The automotive industry in Mexico was seriously affected by the pandemic. Between 2019 and 2021, its contribution to the GDP and the manufacturing GDP decreased by approximately 5%. By 2020, the production of light vehicles decreased by 20.23%, as well as parts (20.2%), exports (20.82%), and sales to the domestic market (27.97%). A year later, it had a slight decrease despite the recovery of the US market. However, for 2022, an auto parts recovery is expected, and only a slight increase in production and sales for the domestic market (Table 1).

3.1 Production and capacity utilisation rate in the light vehicle manufacture plants in Mexico

The automotive industry in Mexico may manufacture 5 million light vehicles, and in 2018, it reached a capacity utilisation rate peak of 77.5%. However, in 2019, the utilisation rate slightly decreased to 75.3%, because of the slowdown in demand in the US market, and in 2020 it fell to 60.13%, which was its lowest production.

Government orders to stop activities classified as non-essential, the drop in vehicle sales during the quarantine, the closure of borders causing shortages of auto parts and microchips, as well as the increase in the prices of raw materials led OEMs to reduce production and prevent overproduction. In 2021, the problem increased with the blockade of ports and the growth in logistics costs, so the use of installed capacity remained low (59.90%), and the price of vehicles increased. In addition, the war in Ukraine, which caused the rise in oil and food prices, contributed to the increase in inflation in the world that had begun as a response to the expansive monetary policies that the developed economies used to alleviate the crisis. Even so, at the end of 2022, companies forecasted to increase the production of light vehicles and reach a 76% utilisation rate of capacity, which would be above the 2019 record (Table 2).

The capacity utilisation rate per plant (Table 2) shows different behaviours. Stellantis in Coahuila (Ram Pick up, Promaster) and GM in Guanajuato (Silverado and Sierra) performed well during the pandemic, occupying their installed capacity above 80%. These models are sold in the US market; neither the shortage of auto parts nor the pandemic affected production. In contrast, the Audi plant in Puebla had a high capacity utilisation rate and still lost production between 2018 and 2022. It is also noteworthy that GM in Guanajuato maintained a high utilisation rate every year despite strikes and worker protests. Stellantis and GM facilities had the most significant downfalls in production. Stellantis, in the State of Mexico, dropped 74.5% of Dodge Journey, Fiat Freemont, and the Jeep Compass production. In San Luis Potosí, GM dropped 80.5% of Chevrolet Onix, Equinox, Trax, and Terrain production. In addition, they went from using 100% of their capacity in 2019 to using only 21% and 27% in 2022. The Nissan plant in the state of Morelos also shows a drop in production and low use of capacity (25.5%) in 2022.

4 Foreign investment in the automotive industry: the fall in investment during the pandemic and the recovery due to nearshoring

The pandemic made evident the vulnerability of the structure of the automotive industry because GVCs were impacted at different times and in different ways, cutting supplies, causing a lack of coordination between links, stopping plants and modifying production. These events contributed to the debate regarding whether to maintain GVCs versus favouring regional chains and ensuring supply by increasing the number of suppliers. “The new trend might be towards simplifying the production process, less fragmented value chains, more concentrated value added, a model that reverts from unbundling to rebundling, from offshoring to reshoring, and from outsourcing to insourcing. As a result, outcomes may imply lower relocation and GVC trade” [UNCTAD, (2020), p.156].

Gereffi (2020) considers that adjusting to sudden disruptions would require boosting domestic production capacity and diversifying overseas sources of supplies.

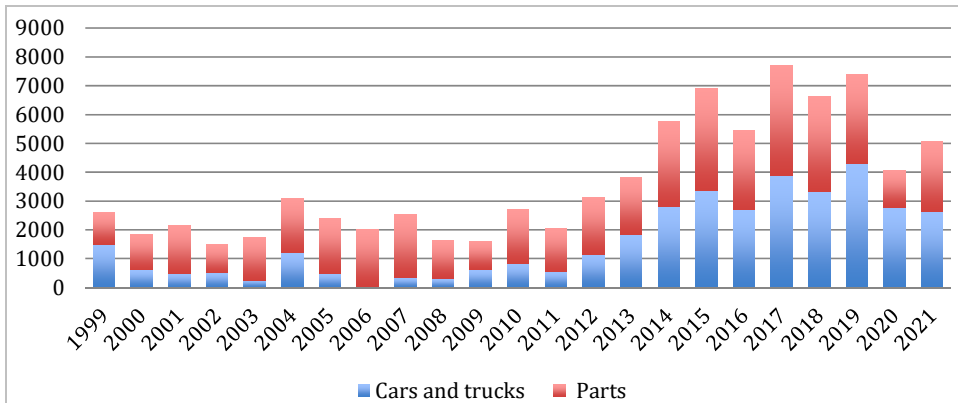
Nevertheless, Kearney’s annual reshoring index, which tracks trends in manufacturing returning to the USA from 14 low-cost countries and regions in Asia, has been negative for two years in a row: -87 in 2020 and -154 in 2021, meaning that the US companies relied more on manufacturing operations in low-cost countries. However, the tendency is to try reorganising production in the USA or nearby countries (Kearney, 2021).

Relocation of companies to countries where it seems to be guaranteed to keep value chains running has already begun. Investment is arriving in Mexico to relocate plants in order to avoid logistical and political problems. The behaviour of FDI inward flows in Mexico from 2020 to 2022 allows us to observe this trend.

In 2020 global FDI flows fell by 42.5%, and developed countries flows plummeted by 69% due to the suspension of projects in the face of the inevitable recession in the economy (UNCTAD, 2020). On the contrary, Mexico ranked fourteenth as a recipient country of foreign investment in 2020, with a share of 2.8% of the total, which was equal to 27.9 million dollars, and in 2021 it rose to ninth place with a share of 1.9%, which was equivalent to 31.6 million dollars (UNCTAD, 2020, 2021).

Inwards FDI flows in the automotive industry in Mexico also fell 40% in 2020, reaching 4,420 USMD (29% auto parts and 70% assembly). However, by 2021, FDI had recovered 22%, reaching 5,396 USMD (45% auto parts and 55% assembly) (Figure 5).

Figure 5 Mexico: automotive industry FDI inward flows 1999–2021 US million dollars (see online version for colours)



Source: Secretaría de Economía (2022)

In the first quarter of 2022, Mexico received 524 USMD in auto parts, and it is forecasted to reach 3,000 million dollars in December 2022. Significant investments are:

- Nissan, with 700 USMD to improve facilities, re-equipment, automation and training.
 - Volkswagen’s 7,100 USMD to build some capacities in order to manufacture electric cars in Puebla and Guanajuato plants, as well as a battery research unit in Chattanooga, TN (Vellequette, 2022).
- The arrival of five Tesla suppliers to Nuevo León in order to produce seats, sensors, cameras, and the brain of electric vehicles (Cluster Industrial, 2022).

- Magna's investment in Coahuila supplies GM's vehicle electric parts, such as power trains, inverters, motors and onboard chargers.

The FDI growth in auto parts is related to relocation practices of Asian companies that seek to supply the US market from Mexico. Reshoring is observed in companies from Asia that decided to move to less risky locations (González, 2022). Since companies are expected to move auto parts production for internal combustion vehicles (ICVs) to Mexico and focus on producing cars with new technologies in developed countries, these productive changes will increase (Pineda, 2022).

In this context, the Ministry of Finance, Nacional Financiera, and the Inter-American Development Bank (IDB) agreed to finance the reconfiguration of GVC and nearshoring in Mexico. The IDB estimated that Mexico's potential gain in the short and medium term due to the relocation of companies is 35 US billion dollars annually, equivalent to 2.6% of GDP. These actions emphasise supporting companies in the south-southeast region, where significant investments have been made in the *Istmo de Tehuantepec Interoceanic Corridor*, allowing better access to the Asia-Pacific commercial market (SHCP, 2022a).

Klier and Rubenstein (2022) argue that the new USMCA would deepen regional integration. However, the new trade agreement rules will reshape the industry's geography in the region, benefiting the USA and Canada (Holmes, 2022). The production forecasts indicate that Mexico will decrease its participation in the production of ICVs, and electric model production will concentrate in the USA. The plug-in electric vehicle (PEV) production will comprise 43% in the USA, 38% in Canada, and 17% in Mexico by 2029 (Dziczek, 2022).

Electrification of automotive production and USMCA rules of origin will drive part of the capacity of the automotive industry in Mexico obsolete during the next decade. In Mexico, inward FDI flows can cause redundancy in the industry as the number of companies and competition increase. Still, eventually, a consolidation process will drive a change toward a new productive structure. In this context, the supplier's nearshoring practices can give the country more time to adapt to a new industrial structure in the region where employment will probably reduce.

5 Conclusions

At the onset of the pandemic, conditions for the world economy and the automotive industry were already unfavourable. The recovery from the 2008 crisis was difficult, and even the automotive industry slowed down its production and consumption in 2019. Then, the pandemic deepened these trends.

We summarise findings in two points: first, support from the federal government to the automotive industry during the pandemic was scarce. However, local authorities achieved better communication and cooperation with multinationals. Second, company strategies did not respond only to the pandemic; instead, changes in the political and institutional environment imposed by the USMCA, the tensions between the USA and China, and the technological environment were considered and conditioned the response.

Mexico's public funds to support individuals and companies during the pandemic were scarce, lower than in most middle-income economies. Command-control and monetised governance mechanisms guided health strategy for pandemic management: the lockdown, company reopening, and population vaccination. The economic response was

limited, and scarce funds were doled out preferentially to the civilian population and micro-enterprises. Nevertheless, some achievements of the enterprise associations were observed, such as coordinating discount documents and achieving supplier liquidity. Industrial-public policies were not considered, and support for large companies was on the fiscal side, especially payroll subsidies and deferral of service payments.

Tensions and lack of coordination among the three levels of government were solved at the territorial and cross-border levels addressing health and safety problems. Local governments established cross-border vaccination programs for maquiladora employees. Persuasion and solidarity were necessary to vaccinate employees in advance of the dates assigned by the federal government. This lowered the health risk for workers and maintained production and employment.

In the first months of the pandemic, companies sought to contain damages by adjusting their operational and financial dynamics and negotiating with stakeholders. Non-essential expenses were reduced, plans to acquire assets were suspended, and the search for financing to meet obligations was implemented. Also, they staggered strikes, reduced working hours, and employees hired by outsourcing were dismissed. Cooperation, communication, and support among companies and local governments became evident in planning the opening of the automotive plants.

Production indicators, use of installed capacity, FDI, and employment, have shown a downward trend since 2019. Then, the trend deepened with the pandemic. The automotive industry has infrastructure underutilisation problems, but it is noteworthy that some plants have maintained the use of installed capacity above 90% since the pandemic began as Stellantis in Coahuila (Ram Pick up, Promaster) and GM in Guanajuato (Silverado and Sierra). This result shows that the pandemic and the lack of microchips are not necessarily why production is suspended. There may be other reasons, such as falling demand or future changes in production mandated by the USMCA or new electric car technologies.

Employment recovered gradually after the lockdown. Since coming to power, the federal government has insisted on forbidding the outsourcing of people in Mexico. We found that about a quarter of the employees of the assemblers and suppliers were outsourced employees, with minimal benefits and low wages. This situation in the country is explained by 'widespread unemployment' that reaches 24.9% of the economically active population. It also makes it possible to understand the acceptance of public policies restricting wages, the lack of vigilance to enforce labour regulations, and the weakening of unions. The pandemic accelerated the regulation of teleworking, which was already in process; USMCA's Chapter 23 has been of great relevance for changing the labour environment in Mexico.

Relocation of companies to countries where the political and institutional environment is perceived to be more secure to keep value chains running has already begun. The behaviour of FDI flows in Mexico between 2020 and 2022 show this trend. Investment is arriving in Mexico to relocate plants, avoiding logistical and political problems. New digital technologies, electrification of automotive production, and the trade agreement will make part of the capacity of the automotive industry in Mexico obsolete. This is why the relocation of auto parts companies to Mexico has been so well received. At the moment, multiple investments can cause redundancy in the industry, increasing competition but eventually, the consolidation process will drive a change toward a new productive structure. These trends are driving the relocation of auto parts

companies to Mexico. In addition, the arrival of these companies can give the country more time to adapt to a new industrial structure. Employment may stagnate or decrease due to new digital technologies, the production of electric vehicles that require fewer auto parts, or the establishment of new production processes in the USA.

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Notes

- 1 Change refers to the % of the potential labour force (usually active population + those who may be available for work but are inactive and with no intention of looking for a job).
- 2 The Minister of Health chairs the General Health Council Board, which is composed of the Secretaries of State, the Directors of the Social Security Institutes (IMSS, ISSSTE, DIF), the Presidents of the Mexican Academy of Medicine, the Presidents of the Mexican Academy of Surgery, and the Dean of the National University of Mexico, UNAM.
- 3 Calculations by state were made with Conacyt, Centro Geo y Datalab, Database (2022) *COVID-19 México* [online] <https://datos.covid-19.conacyt.mx/#DownZCSV> (accessed 30 October 2022).
- 4 Letter from the National Association of Manufacturers addressed to President López Obrador on April 22, and the letter from the Motor and Equipment Manufacturers Association (MEMA), on May 5, addressed to Secretary of State Mike Pompeo. Both to advocate for an industry-wide motor vehicle parts manufacturing reopening date in Mexico.