

TRADE AND DECENT WORK IN MEXICO'S AUTOMOBILE SECTOR: THE ROAD TRAVELLED AND THE UNCHARTERED TERRITORY AHEAD, 2005-2019

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Abstract

The North American Free Trade Agreement (NAFTA) marked a turning point in Mexico's economic landscape by granting the country privileged access to the markets of Canada and the United States. This unique advantage triggered a substantial increase in Mexico's exports of manufactured goods, with a particular focus on the automotive industry. The subsequent replacement of NAFTA with the United States–Mexico–Canada Agreement (USMCA) further deepened this trading relationship. Despite the automotive industry's remarkable export performance, this prosperity has not translated into a commensurate dynamism in employment. This research investigates the employment trends within Mexico's automotive sector, analyzing both the quantity of jobs created and the progress towards decent work conditions. It is evident that while Mexico's automotive industry plays an increasingly significant role in global value chains (GVCs), it remains somewhat isolated from domestic producers. This isolation contributes to the industry's inability to catalyze robust growth in other domestic sectors, despite its export-driven success.

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1. Introduction

In capitalist economies, especially in semi-industrialized ones that lack universal and effective social protection, the welfare of their people is closely linked to the evolution of their labour markets. In fact, for the very vast majority, their present and future wellbeing heavily depends on the nature of employment of the head of the family and of other adult members; not to mention the dramatic situations in which children are forced to work.

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In this regard, the International Labour Organization (ILO) has been for years forcefully argued that economic and social development depends not only on the volume of employment but on, say, the quality of employment.

There is consensus that having a job is a necessary, but far from a sufficient condition to guarantee an acceptable standard of living for a worker and his or her dependents. As ILO has repeatedly stressed, for this to happen, the employment in question must comply with a number of qualitative aspects, related to, inter alia, wages, contracts, security, health environment, labour rights, that are defined as Decent Work.

Given the globalized market system, the evolution of employment in any economy is linked to the nature and dynamism of its foreign trade. Currently, to the extent that its productive activities participate in dynamic Global Value Chains (GVC), with robust forward and backward linkages, and based on competitive advantages that increasingly rest on innovation rather than on low wages, it is more likely to create better and more jobs. In brief it is able to advance in the unrelinquishable quest for Decent work.

Understanding, in depth, the relations between foreign trade and labour market performance at the national level as well as for selected industries has been a persistent commitment of the ILO Research Department. The present study forms part of such efforts. Focused on the Mexican case, its objective is to analyse for its automotive industry, the links between its export success and its employment performance on quantitative but also on qualitative terms. Its analysis gives emphasis to two considerations.

The first is to consider the different characteristics between, i) exports associated with GVCs and ii) the more traditional exports not associated with GVCs. The second is to highlight the qualitative aspects of employment that serve to benchmark the evolution of Decent Work following ILO's Toolkit on Trade and Work.

The present study is an extension of a previous comparative analysis carried out by the authors on Trade and Decent work in Mexico's textile and automotive industries (see Moreno Brid, et al 2021),

,which had some statistical limitations linked to the reliability and lack of sufficient data for the analysis. . One aspect was the lack of reliable and comparable input-output tables for trade in value added for Mexico and its commercial partners for more recent years than 2011.

The analysis in this paper relies on comparable annual input-output tables up to 2019. Another statistical limitation was rooted in the lack of official data on a number of qualitative aspects of Mexico's labour performance regarding the disaggregation of information on the industries' employment by gender, by status, by qualifications and by levels of remunerations. These lacuna in the data impeded, at that time, the construction of various indicators of key axis of Decent Work as identified by ILO.

Thanks to the cooperation of the Ministry of Labour, for the present study we have solved such statistical problems and thus have managed to construct a more comprehensive and deeper set of indicators. Consequently, we have now achieved a better benchmarking of the evolution of Decent Work cum Trade for the Mexican automotive industry.

An additional contribution is a reflection on the possible effects of the USMCA trade agreement now fully in place since 2019, as well as on the lessons learned in terms of the data collection requirements to have in the future a more timely, more detailed and comprehensive picture of the evolution of the different variables that conform to Decent Work,

The paper is organized as follows. After this brief introduction, the first section discusses the expected transformations and challenges of Mexico's automobile sector due to the combined effects of the launch of the USMCA *pari passu* with the New Labour Law market.

Due to the futility of resorting to econometric analysis -as these institutional transformations were just launched before the pandemic- we pinpoint and assess the reactions, so far, of key stakeholders in Mexico, including key government officers and instances, representatives of the private sector in particular carmakers, and major trade unions. An additional major source of information is the reports of think tanks and of experts either on Mexico's automotive industry or on trade agreements like NAFTA and the USMCA.

The second section discusses the main results of the analysis of trade and decent work in Mexico's automotive industry using input-output methodologies focusing on the key aspects mentioned above, in particular on employment by gender, by status and years of schooling.

The third section examines the evolution of Decent work in Mexico's automotive sector through data sets specially constructed by the authors in accordance with ILO's Toolkit on Decent Work indicators based on official statistics, disaggregated to cover diverse dimensions of its relevant axis.

The fourth and final section presents the lessons learned to overcome the diverse data limitations. In this matter, we make several suggestions for the National Institute of Statistics, the Ministry of Labour and the Ministry of Economic Affairs on the data needed on a systematic basis in order to better monitor the Mexican industry's progress towards Decent Work at disaggregated and relevant levels of activity and dimension of foreign trade. Emphasis is placed on identifying key information that should be available for policy purposes related to the automotive industry in the context of the USMCA.

An Appendix presents the methodologies and definitions followed in the construction of the various indicators of Decent Work cum trade performance here utilized. It also includes a table summarizing the main conditions of the USMCA regarding the automotive industry, contrasting them with those stated in 1994, decades ago, in the launch of the North American Free Trade Agreement (NAFTA).

2. Mexico's automotive industry and the USMCA: Pressure and opportunity for structural change?

Mexico's automotive industry is, by far, the most successful experience of the nation in joining and becoming an important player in Global Value Chains. Indeed, the result of, on the one hand, an active industrial policy in the late 1970s that brought a profound structural transformation that overhauled and modernized all its automotive manufacturing plants and, on the other hand, of the shift towards trade liberalization cum NAFTA in the 1990s that gave additional impulse to its transformation making it more outward oriented, the Mexican automotive industry has become a unique privileged export platform to North America; especially to the United States.

Indeed, from a macro perspective, from years ago it holds a special position as a source of foreign exchange given its spectacular performance in generating net exports and in attracting foreign direct investment. As an illustration, the Bank of Mexico's reports on economic perspectives years ago began to include in its balance of payments' assessment a special table on Mexico's trade balance both with and without the automotive industry's results. However, as we concluded in (Moreno Brid, et al 2021) and coinciding with the expert's consensus, the automotive industry's performance in terms of employment and Decent Work is found wanting.

It has major limitations, rooted in its weak domestic internal backward and forward linkages.¹, which rests in its character more as a "destiny" of value added generated abroad character is that the Automotive sector's multiplier effect on domestic output and employment is low, relative to its effect on the balance of payments and on commercial accounts. Thus a rebalancing is needed to strengthen the industry's impact on economic activity and Decent Work through a combination of active industrial and labour policies, framed in a new agenda for inclusive and sustainable development.²

Today, December 2021, the Mexican automotive industry is entering an uncharted and uncertain territory. The way these uncertainties unfold and the reactions of key actors in the economic, social and political arena in Mexico and abroad will determine whether the industry undergoes another round of profound transformation of its productive and employment structures. Such structural transformation, as we argue in this study, is rather urgent for the industry to meet its new and old challenges.

These challenges include "climbing" to more technologically sophisticated links in the GVC as source of valued added, and in this process strengthening its capacity to generate, not only jobs, but Decent Work. Another of its longstanding challenges is to keep attracting foreign direct investment (FDI) to persistently expand and modernize the industry's capacity cum stimulating domestic investment in order to preserve and potentiate its unique position as an export platform to the United States.

The automotive industry's future in Mexico depends on the reactions of many actors in the domestic arena (public, private and workers sectors) and in the international one composed by the main centres of global auto manufacturing.

The objective of this section is to identify crucial areas in which certain policy actions and political compromises may be necessary to remove the uncertainties that restrict the Mexican automotive industry entry into a path of robust, sustainable development and Decent Work.

We thus begin with the USMCA, the trade agreement between Mexico, the United States and Canada that was formally approved in December 2019 and implemented six months later, in July 2020. It replaced NAFTA, the pathbreaking trilateral trade agreement, signed in 1993, that became the key tool of the trade liberalization reform in the country.

The USMCA's launch -after months of threats from the Trump administration denouncing NAFTA as the worst trade agreement ever signed- was a relief for the Mexican government and its business community. It removed a major uncertainty that was clouding the investment climate for too long as it menaced to cancel Mexico's special commercial relation with the United States and Canada. This relation, granted by NAFTA, had been the lynchpin of Mexico's market reforms and development agenda for decades.

The López Obrador incoming government (2018-2024), already from its campaign trail and first days in office, persistently stated that one of the main priorities on economic matters of his administration was to ensure the successful renegotiation of NAFTA towards the signature of a new subregional free trade agreement. In an effort to boost those renegotiations, Mexico's Congress accelerated the approval and enactment of a New Labour Law.

This new legal framework was very much in line with ILO's Decent Work initiative and, most important, it was fully consistent with the conditions on Mexico's labour regulations imposed by the United States and Canada in the trade renegotiations.³ By May 2019, the New Federal Labour Law was implemented, drastically changing the role of the State in the labour market, and bringing about a fairer, more levelled field in employees and employers' negotiations. This legal framework now welcomed workers' freedom of association, with room to create new independent trade unions and labour organizations. It also introduced elements to warrant election of union leaders via universal, confidential and direct voting.

It transformed legal processes to solve labour disputes, moving all of them to the judiciary arena; thus, in principle, isolating them from the usual suspects' economic and political influences more linked to the employers.

¹ The analysis based on input output inter-country matrices of trade in value added for 1994-2011.

² See inter alia, the numerous contributions of UNAM's *Grupo Nuevo Curso de Desarrollo* for forceful arguments to rebuild the Social Pact and center it on a new agenda for development in Mexico.

In 2021 an important modification was approved in the Labour Law to limit subcontracting in Mexico, forcefully arguing that it was traditionally used to “dispossess workers of their legal entitlements and defund ..the IMSS” (González J., 2021).

Now, as argued in Moreno Brid et al (2021), the analysis of the USMCA -even in not fine print- leads to perceive it as a blessing, certainly, but a mixed blessing. The agreement has pros, cons and most important it poses major challenges. We now proceed to discuss such aspects in this section. But first let us say that we find striking that to date, there is no official study published by the Mexican government on the expected or likely impacts of the USMCA neither on the Mexican economy as a whole, nor specifically on the automotive industry. This is in stark contrast with the situation in the United States where the Office of the United States Trade Representative (USTR) - which is part of the Office of the President of the United States already in 2019 published a full study on its estimated impacts on the U.S. automotive sector.⁴

On the positive side the USMCA ratifies and consolidates for some time Mexico’s unique position as a privileged production site to manufacture exports to North America with the benefit of lower tariffs cum trade restrictions. This, by itself, is a strong incentive to attract FDI to Mexico’s automotive industry, or manufacturing in general. Such incentive has special significance in the current post- pandemic international context, where a solid and persistent recovery of the Mexican economy is still more a hope than a reality. Indeed, though Mexico’s GDP is forecast to increase 5.9% in 2021, the consensus of estimated rate of growth is just above 2% as annual average for the next ten years.

To discuss the other, if not adverse, certainly more demanding implications of the USMCA, it is important to take into account that, from the US perspective, this agreement had a different perspective than NAFTA in a key issue. It now wanted, besides continuing with a system of preferential trade in North America, to encourage “a shift of protection from Mexico to the United States”.

³ For a detailed account of the swift and major changes of Mexico’s Labour Legislation, the modification of Article 123 of the Federal Constitution, and their links to the negotiation of the Transpacific Partnership negotiations and of NAFTA/USMCA, see Moreno Brid et al (2021) and the various analysis of Bensusán and Middlebrook.

⁴ The USTR concluded that “over the course of five years, the USMCA should result in approximately: US \$34 billion new automotive investments, US \$23 billion of new annual auto parts purchases and 76,000 new jobs in the automotive sector in the United States. For comparison matters, according to the USTR in 2009-18 automotive investments in Mexico totaled US\$24.8 billion. See USTR (2019).

Any advance in achieving this shift, *per forza*, reduces Mexico's benefits derived from the USMCA and with these additional restrictions "inevitably it will increase production costs in the United States and elsewhere in North America". (See Gantz 2020). Having said so, we proceed to analyse the provisions that *a priori* seem more challenging for Mexico's automotive industry

In this regard, one provision that immediately raised concern is the capacity it granted to signing parties to impose restrictions very rapidly on Mexican exports in the event of violations of the Federal Labour Law.⁵ These violations include the denial of labour rights such as the celebration of free elections of trade union's leaders. Another explicit new requirement of the USMCA on Mexico's auto industry is the rule on value added so that 40–45% of auto's content must be manufactured in a plant physically located in North America and whose workers earn on average no less than US\$16 per hour (USTR 2020).

These two conditions are substantial challenges for the Mexican automotive industry, if they are not to become major trade restrictions. The wage it aims to impose is well above the average received by workers in automotive plants in Mexico. And, given the productive and employment structure of the sector, and the fact that the Mexican economy is barely coming out of a deep recession that led to a decline in its GDP of 8.5% in 2020 and is not forecasted to return to its pre-pandemic levels before 2024, it is unlikely that such a large wage gap can be closed in the foreseeable future. Moreover, the target wage rate is set in US dollars, thus the gap is affected by the exchange rate and will automatically widen with any depreciation of the Mexican peso vis a vis the US currency. However, on this matter Jesús Seade -once chief negotiator of the USMCA- stated that this requirement "can be met in Mexico through the salaries of engineers and administrative staff" with no need to shop floor wages to rise. (González, A, 2021). In addition, it should be stressed that in case the vehicles produced in Mexico do not comply with the USMCA rules and thus are not granted the benefit of tariff-free exports to the rest of North America, they would have to pay a tariff of 2.5%; that of the WTO's "most favoured nation". (See Serrano, 2020, and White and Case 2021). As Flavi Volpe, President of Canada's Automotive Parts Manufacturers' Association, this tariff may not look as too high if satisfying the regional value content (RVC) rules is found too cumbersome. (See Martin and Laing, 2021). Two endogenous forces in Mexico's labour market may somewhat help to move in a direction to comply with the last condition.

⁵ Quoting the official text: "This dispute settlement mechanism provides for expedited enforcement of workers' free association and collective bargaining rights at the facility level... and, in cases of non-compliance with key labour obligations, provides for the suspension of USMCA tariff benefits or the imposition of other penalties, such as denial of entry of goods from businesses that are repeat offenders". See Office of the United States Representative (2020).

The first one is that the New Labour Law and menace of USMCA sanctions may lead to the emergence of new independent trade unions in the industry, and to the replacement of leaders in some large, traditional unions whose bosses have systematically been not very responsive to workers' demands. In fact, the new institutional framework for organized labour has already had an impact in the GM plant at Silao whose trade union elections had to be repeated as the original processes were considered to be rigged.

As Angulo (2021) states "this is the first major test of labour rules under the USMCA". It is too early to know whether this episode is a red-herring or the beginning of a new phase in which the -actual or potential- threat of arbitration in the context of the USMCA will help to reverse Mexico's historical trend to cheapen labour and to undermine labour rights in Mexico. One potential danger to the USMCA's prospects is that this mechanism of rapid response, if not judiciously used, comes gradually to be perceived in Mexico as a mere excuse to restrict imports to the US. (See Gantz 2021)

The second factor is the federal minimum wage policy of the current administration. Since the first year in office, it has authorized an annual increase in it well above inflation as measured by the variation of the consumer price index. But the extent to which a rise in the federal minimum wage induces a significant rise in average wages in the automotive sector is limited; given the large difference between them.⁶ This may change in the future as the difference between the minimum wage and the median wage in the industry is significantly reduced.

The rule on specific percentages of regionally generated value added required in certain activities or products of the automotive industry a few months ago ignited a dispute at the highest instances of the USMCA institutions. In fact, in August, 30 Mexico made a submission for formal consultation with the United States "for the purpose of avoiding or settling a potential dispute" regarding the rules of origin for automotive goods. This is an important issue since the USMCA raises over a three-year period the threshold required for passenger vehicles and trucks to be granted a tariff-free trade, from NAFTA's 62.5% of net cost to reach, 75% by July 1, 2023.⁷

⁶ For empirical analysis of the impact of the minimum wage on median and average wages in the case of Mexico see *Comisión Nacional de Salarios Mínimos* (2016).

⁷ Under the "transaction value method" the percentage lies between 75% to 85%. The discussions on the RVC were perhaps the most contentious ones in the USMCA negotiations given the conflicting priorities of the United States of, on the one hand, stimulating domestic output and employment and, on the other hand, strengthen the overall competitiveness of the Subregion as a whole. For a detailed analysis of these points in dispute, see White and Case (2021). Canada and Mexico "argue in favour of a "roll up" method so that any product that "reaches the 75% requirement should be able to be rounded up to 100% for calculation purposes of the RVC of the overall vehicle in order to receive tariff-free treatment. The United States is against this view. (See Nuñez, 2021).

It is still not clear whether the dispute will be solved by mere consultation or if a formal panel proceeding will be required. In any case this unsettled situation introduces an important element of uncertainty on investment decisions in the sector.⁸ Extending this reflection, let us share our belief that from a development perspective the Mexican automotive industry must fulfil the following three objectives:

- i) meet the USMCA's conditions indispensable to at least preserve her role in the GVC as a unique export platform to the United States,
- ii) share the spirit and writing of the New Labour Law, and thus align the industry's labour and human resources practices, norms and rules with ILO's Decent Work perspective and, most important, iii) carry out the necessary technical innovations cum transformation of its productive capacity to become a dynamic engine of growth, not only of exports, but of domestic value added and employment.

These objectives will not be met without a profound structural change in the industry's modernizing its plant, equipment and manufacturing processes to densify its domestic -forward and backward- linkages- to improve the skill composition of its personnel, and strengthen its international competitiveness based on innovation. Such structural transformation requires enormous investments in fixed capital and human resources; investment that will have to be carried out by the major American, European and Asian car manufacturing companies given there are no Mexican car manufacturers.⁹

To an important extent such investment overhaul requires creating synergies with the Federal and local governments to coordinate their plans in infrastructure and human capital formation. A firm involvement of the State in such a major structural transformation of a key sector of the economy seems unavoidable given the array of actions associated with it that fall in the policy space of the Ministries of Labour, of Economic Affairs, of Public Works, and of Finance inter alia, not counting the relevant local authorities in the federal entities.

These challenges unfortunately, are not the only ones that the renovation of the automotive industry faces at the current cross road. In our view there are additional concerns on top of the USMCA that impinge -hindering or stimulating- on the investment drive concomitant with such an ambitious structural transformation.

⁹ This is a critique that has been levelled to Mexico's industrial strategy in comparison to that followed by India, China not to mention Korea who developed national automotive companies that compete internationally. For example, Crossa and Ebner (2020) "refutes the narrative... that Mexico is an automotive powerhouse-state ...(it) occupies the most labour-intensive and low value-added segments of regional production chains".

The first one that we identify is related to the impact the pandemic has had on international trade. Indeed, the confinement it led to turned into a massive short-circuit of the GVC; as key parts of these chains were unavailable and out of stock. As their supply could not be replaced from other sources, the whole manufacturing process was distorted and the production of vehicles collapsed. Once the economic recovery started in 2021, the pent-up demand for certain intermediate inputs coupled with problems in the regular resumption of sea freight transportation, made it more difficult to solve the supply constraint. In other words, for the automobile GVC, the pandemic suddenly made shockingly evident that the efficiency benefits of outsourcing and fragmenting manufacturing activity in multiple steps in different countries were dwarfed by the massive costs of lost resilience that made the whole process collapse.

These effects of the Covid-19 pandemic, may stimulate “U.S., Canadian, and Mexican trade and investment ...within North America in the future and reduce the region’s imports from elsewhere. (See Gantz, 2021).

A second element that pushes for a major overhaul of the industry’s plants and processes, and to a certain extent also linked to the pandemic, is the increased social pressure in the United States -and the world in general- for vehicles whose manufacturing and use has zero emissions. Adding to this demand pressure, is the fact that on the supply side the production of such vehicles, electric as well as autonomously driven, is lead worldwide by manufacturing firms by “regions and players outside the traditional automotive clusters...(with) new competitors from the emerging economies (that) threatens the established structure (of the automotive industry)”. (See Simonazzi et al 2020).

In response to this challenge the Biden administration’s executive order, signed in August, setting the goal that half of all new cars sold in the USA by 2030 be electric or zero emissions hybrids.¹⁰ Mexico has complained that this initiative- already approved by the House of Representatives, includes an incentive of between 7,500 and 12,500 dollars for buyers of an electric car with 50% of components manufactured in the United States and thus violates the rules agreed in the USMCA. On November 1st, 2021, the Mexican embassy in the US and embassies from 20 other countries sent a letter to the US Congress complaining against such initiatives of the Biden administration describing them as discriminatory against non-American automotive and auto part manufacturers. (See Cantú, 2021). On December 1st, Ms, Tatiana Clouthier, the Minister of Economic Affairs, announced that to defend the auto industry she “values requesting the start of a dispute resolution panel and escalating the matter to the World Trade Organization if necessary”. (See Barragán. 2021).

One can safely assume that Mexico’s domestic private sector is or will support the government in this matter. Recall the words of Carlos Salazar, at that time President of the *Consejo Coordinador Empresarial*, “The automotive industry is the driver of growth...and the most important part of Mexican

exports. The days in which oil was the most important part of what we sold abroad are gone, and therefore it deserves that we take priority over that". (See Nuñez, 2021).

A third factor is the tendency towards automatized self-driven vehicles and robotization of the assembly lines. And finally, we note too that the pandemic's economic and social impacts, and their far from uniform effects among the population -hitting relatively more the poor and vulnerable groups, have intensified social pressures to create better jobs along the lines of Decent Work.

These four factors, coupled with the industry's need to face the challenges above mentioned reassessment will lead, sooner or later, to a new wave of massive investment and technological revolution to produce vehicles - electrical ones or based on non-fossil energies demanded by the post-pandemic brave and clean new world. All these factors -and some of the ones previously identified push in the same direction. They push in favour of a strategical reassessment of the road ahead for the automotive industry, a massive "Big Push" if investment and a redesign of its international matrix of assembly/manufacturing plants. What part will the Mexican automotive industry play in this new post-pandemic stage?

The answer is in the air, but some elements in Mexico's current economic policies and political climate are not reassuring. First of all, the business climate in Mexico has been steadily deteriorating from an already bad position in the final years of the previous administration to a most worrying one today. Part of this deterioration is explained by the economic recession brought about by the pandemic's impacts. But part too is explained by the political polarization that has accompanied the present administration, coupled with a persistent rhetoric of poor vs the privileged, and certain official decisions of the Executive on resource allocation.

Among these decisions stands out the 'proposed energy and electrical reform that rolls back the advances made in a transition to cleaner energies and instead embraces oil, coal and gas in an attempt to guarantee self-sufficiency. As Enrique Provencio (Provencio, 2021)-one of Mexico's top experts in environmental matters- has stated, has reacted to this proposal, "Mexico has explicit and irresponsibly neglected environmental concerns in the design of its economic and social policies".

In this context, private investment has plunged in real terms and as a proportion of GDP to levels unseen in years, and the figures of foreign capital outflow are at their highest levels in many months.

¹⁰ In line with this push for a structural change in the automotive industry, in August, Ford's chief executive stated the company's objective that by 2030, 40% of its global sales of new cars will be totally electric.General Motors's target, more ambitious, is to sell only electric cars by 2035. (See Laborde, 2021).

In November 2021, General Motors publicly declared that if the energy reform proposed by the Executive -yet to be approved by Congress- is put in operation it will cease to consider Mexico in the corporation's investment plants as it would put at risk its commitment to move towards clean energy and Zero emissions. Mr. Gautier Mignot, the EU's ambassador in Mexico, on December, 2021, declared that the uncertainty regarding Lopez Obrador's proposed energy reform has led to a virtual paralysis of investments in Mexico from the European Union. (See Santos Cid 2021)

On the basis of the various challenges that Mexico's automotive industry faces and in the absence of a Social Pact centred on a new agenda for development, we still stand by the conclusions, drafted twelve months ago, on the social and economic impact of USMCA and the New Labour Reform in the industry and actually on the whole Mexican economy:

“.. the legal and regulatory ...overhaul of the labour market, ...and the menace of sanctions under the USMCA may be insufficient to make decent work a reality for all but a small proportion of the employed population in Mexico”.

3. Trade and job generation in the Transport Equipment industry: an input-output approach

3.1. Mexico's transport equipment integration in Global Value Chains

A good starting point is the analysis of the changing pattern of Mexico's incorporation into Global Value Chains (GVC) in the Transport Equipment Industry. For this purpose -and continuing with the same methodology adopted in our previous report for ILO carried by the authors (Moreno-Brid et al., 2021)- we rely on the information from Multi-Region Input-Output Tables (MRIO) to calculate the value-added by each country incorporates in exports by this industrial activity. This methodology allows us to identify and measure the value-added contributed by each one of the different countries that participate in the relevant GVC. In other words, as it is well known and in contrast with traditional approaches, this procedure guarantees that in the data collection process major effort were made to ensure that it does not consider the portion of the value of intermediate products that are “counted” several times in the final price of traded goods; a double counting phenomenon that inherently appears in conventional trade statistics.

In contrast with our most recent contribution for ILO -reported in the above paragraph- our present analysis now relies on a most complete database recently released by the Asian Development Bank (ADB) here onwards referred to as ADB-MRIO. This is detailed and most professionally built database of annual series of multi-regional input-output tables with interlinked information of 62 countries from 2000 to 2020¹¹. It comprises detailed information for 35 sectors, following the International Standard Industrial Classification of all Economic Activities Revision 3 (ISIC Rev.3). Of these 35 sectors, 14 belong to manufacturing. Diverting from our 2020 study, where we dealt also with the textile industry, we now focus only on the transport equipment sector as defined in ISIC Rev.3. In this statistical

classification, the industry covers also other types of transport vehicles, the automotive sector represents, on average, 93 per cent of the total GDP of the transport equipment sector in the period of study. Moreover, according to data on firms that are mainly exporters, the value-added in the automotive industry represented, on average, 98 per cent of the total value added in the transport equipment between 2005 and 2019 (INEGI 2018).

The input-output methodology decomposes the total value of gross exports into the four categories:

i) domestic value-added (DVA); ii) foreign value-added (FVA); iii) value-added re-exported to the home country; and iv) pure double counting (Wang, Wei, and Zhu, 2013). For the case of Mexico we concentrate on the analysis of the first two categories, DVA and FVA, because the last two categories account below 5 % of the total exports DVA corresponds to the value generated in the country of analysis (in our case, Mexico), and it can refer to final or intermediate goods further processed in destination countries. It measures the country's participation as, say, a "supplier" of value-added in international export markets.

In contrast, FVA captures the country's position as a, say, "user" of value-added incorporated by and from other countries. It captures the contribution of value-added, originated in other countries, but used as inputs in the country of analysis' exports (Mexico, in our case). Both indicators are measured as a proportion of total exports in the industry. These indicators serve to focus on two features of Mexico: i) Its relevance in the global trade network for the Transport Equipment industry and ii) Its level of participation in this type of trade relative to its total exports.

The first empirical analysis is carried out from a global network perspective. This is done by examining the bilateral flows of value-added between a pair of countries; as obtained by the Wang, Wei, and Zhu decomposition. In this regard, the network graph in Figure 1 depicts the interchange of DVA among pairs of countries as well as the relative importance of individual countries in the global exchange of DVA; all for the transport equipment industry. Each country, or group of countries (the EU15 and EU13) is represented as a node or circle in the graph. The domestic value-added exported from country i to country j (w_{ij}) is illustrated, in the graph, by the line linking both countries.

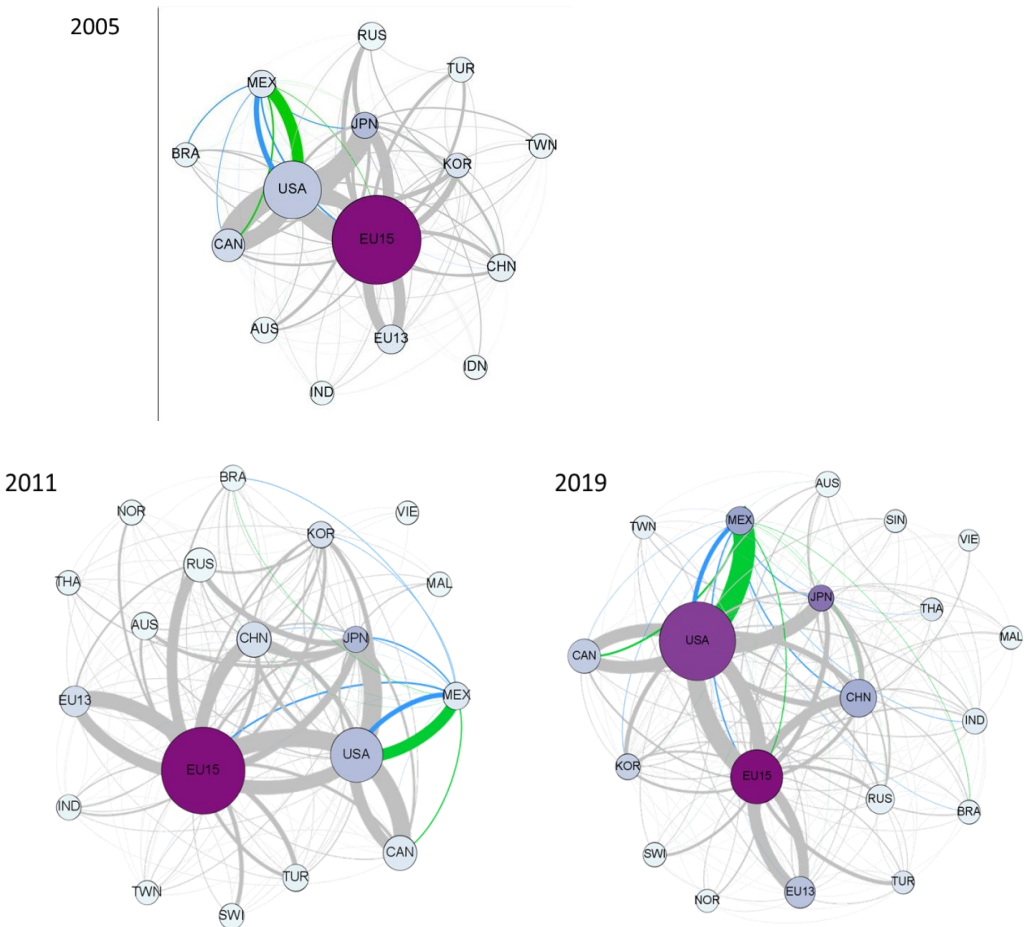
The resulting network is directionally marked and weighted in order to easily depict the direction and the intensity of commercial relations between countries. For the sake of simplicity or parsimonious purposes, we do not show all links in the graph. If w_{ij} is smaller than 0.01 per cent of the total DVA in exports, it will not be shown in it as a link between countries "i" and "j". The size of the nodes represents the weighted so called "out-degree" or the sum of DVA that the country exports to other countries. The colour of the nodes shows the weighted "in-degree" or the sum of DVA received from other countries.

¹¹ We have yearly input-output tables of 2000 and from 2007 to 2019.

Finally, the thickness of the lines captures the magnitude of the DVA exchanged between two countries. In Mexico's case, the outgoing lines are coloured green, and the incoming lines are blue.

Figure 1 shows the global network for DVA in transport equipment only for three years: 2005, 2011, and 2019.

Figure 1. DVA in the global export network for transport equipment, 2005, 2011 and 2019



Source: Authors' elaboration based on ADB-MRIO database. The acronyms and countries are defined in Annex 1. Note: The size of the nodes represents the weighted out-degree. The intensity of the purple colour in the nodes shows the weighted in-degree. In Mexico's case, the lines of DVA sent (outgoing) are green, and the DVA lines from other countries (incoming) are blue.

Note: The size of the nodes represents the weighted out-degree. The intensity of the purple colour in the nodes shows the weighted in-degree. In Mexico's case, the lines of DVA sent (outgoing) are green, and the DVA lines from other countries (incoming) are blue. In the case of EU15 and USA we use a darker shade of gray to indicate DVA sent.

In 2005 the most significant node in the network regarding incoming and outgoing value- added was the EU15 group of countries. In second place of relevance was the United States as it traded with all other countries in the graph, especially with Canada, Japan, EU15, and Mexico. In the case of Mexico, not surprisingly, its leading trade partner was the United States; as the thicker green and blue lines reveal. Mexico exports DVA to the EU15 and Canada, and received it through imported inputs mainly from Brazil, Canada, and Japan.

By 2011, the most relevant change in the network was that the trade interchanges between the EU15 and the United States were more diversified than in 2005. In addition, the lines' thickness is of a much more noticeable size, and their number increased *pari passu* with the larger quantity of partner countries than before

For example, the exchange of DVA between the EU15 and China is more noticeable now than in 2005. In the case of Mexico, the interchange with the United States continues to be the most relevant one. But now, new green lines have appeared, thus meaning that Mexico exported to more countries, including China and Brazil than six years before. Also, the links indicate that Mexico is importing value added from more countries (in particular, South Korea, Taipei, Russia, and China) along with its previous partners (Canada, Japan, and Brazil).

Finally, the graph for 2019, the year just before the pandemic, shows the United States consolidated as the leading exporter of DVA, dwarfing the 15 European union countries group.

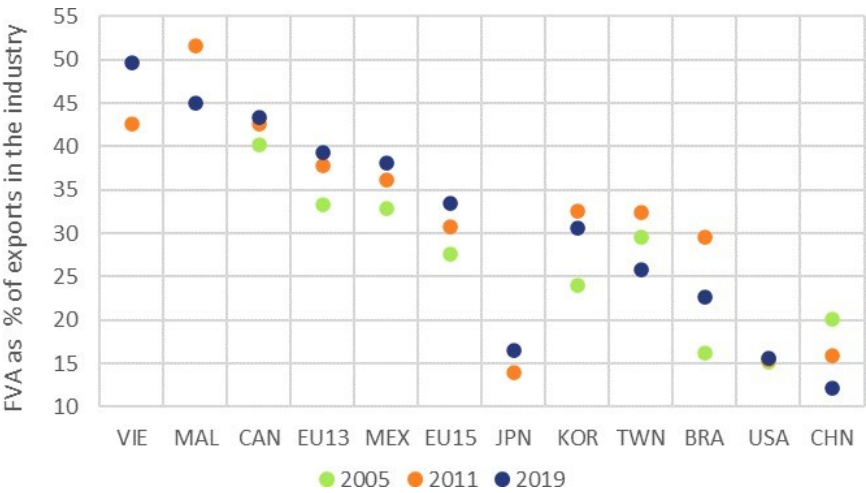
As a result of the trading agreements between Mexico and its Northern neighbours -and more precisely the cross-border activities of American automotive firms with plants in both countries- the greater relevance of the United States automatically increased Mexico's presence in the network. These changes are noticeable in the node's size, colour and thickening of DVA's exchanges with the United States and with other countries. One salient fact is that Mexico exports more DVA to the United States than it receives from it. This connection is the biggest for the USA, at least in terms of the DVA received. Another important fact for Mexico is that in these years it kept augmenting the number of countries to where it exports DVA including now as partners Australia, India, Switzerland and the EU13. Also, in that year, Mexico imported value from Thailand, India, and Turkey.

As has been stressed before in the literature, the integration of Mexico with the United States has been systematic for many decades and is currently at an advanced stage, favoured by special trade agreements. Nevertheless, as shown in the graphs, Mexico now imports value added from a larger set of countries. Such diversification of its trade may not necessarily continue with a strong pace in the near future, in light of the strict regulations imposed by the USMCA on regional content of value added to be able to benefit from tariff preferences in exports to North America. Recall that the USMCA, as

discussed in the first section, tightened some Regional Value Content (RVC) rules, in particular for the automotive sector (Okabe, 2019). The new measures imply that the essential, primary, and complementary parts necessary to manufacture a car, must comply with a certain percentage produced in one of the three countries. And, as we have seen, Mexico incorporates imported value that is originated in countries outside the region.

It is, thus, essential to analyse the FVA and DVA trends that account for Mexico’s changing participation in the transport equipment GVC. Plotting the FVA as a proportion of each country's gross exports, as in Figure 2, reveals interesting patterns. Almost in all countries this proportion increased between 2005 and 2019, except in Taiwan, South Korea, Brazil, and Malaysia (all these countries had higher values in 2011). China experienced a reduction in its coefficient in the period. Note that Mexico shows a high FVA compared to economies like Brazil (almost doubling it) or South Korea (10 percentage points above). Nonetheless, Mexico's figures for this industry are not the highest of the economies here shown.

Figure 2. FVA in the transport equipment industries, 2005–2019, selected countries (percentages of total exports)

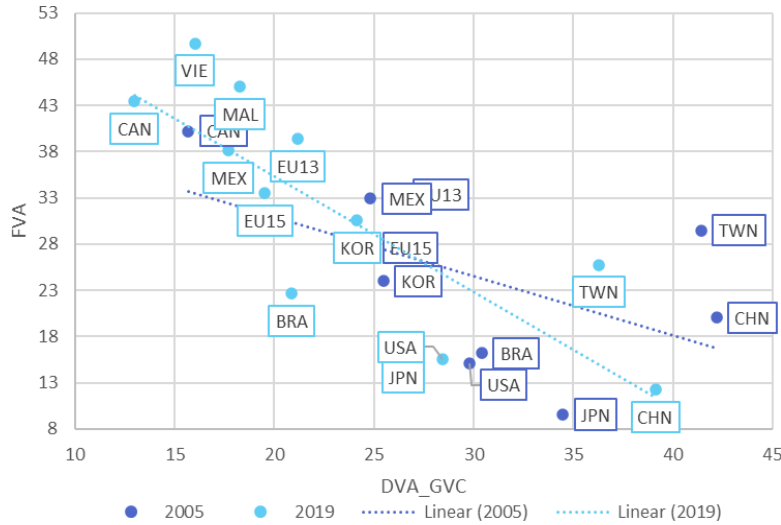


Source: Own elaboration based on ADB-MRIO data.

As discussed in Moreno-Brid et al. (2020), to better assess any industry’s trade performance and relation with its productive structure, one must examine the evolution of both the FVA and the DVA. Of particular interest in this matter, is to consider the portion of DVA that corresponds to intermediate exports used to produce exports in the importing country (DVA_GVC). (Following Wang Wei and Zhu, 2013). The higher the level of FVA and DVA_GVC as a percentage of exports, the higher the participation of a given country in the GVC. But there are frequent examples too of industries with fragmented processes of production, marked by a higher level of FVA and a

lower level of DVA_{GVC} . Such is the case for the automotive sector, one characterised by medium/high technology whose production involves multiple steps and manufacturing processes of intermediate inputs. On this regards, Figure 3 reports data on FVA and DVA_{GVC} as a percentage of exports.

Figure 3. Transport Equipment: Participation in GVC by FVA and DVA_{GVC} , selected countries, 2005 and 2019 (percentage of exports)



Source: Own elaboration based on ADB-MRIO data.

Countries with high FVA tend to register a lower level of DVA_{GVC} . Strong examples are Vietnam, Malaysia, Canada, and Mexico, reflecting their need for a higher use of imports to be able to export. In other words, these nations participate mainly in the assembly portion of the GVC. The figure also suggests that countries with lower FVA tend to register a higher level of DVA_{GVC} . But there are some exceptions; for example, Taiwan Province of China has an elevated level of DVA_{GVC} for the transport equipment industry, but its level of FVA is not significantly low. Conversely, Brazil has a low level of DVA_{GVC} but also a relatively low FVA. It may be important to note that both countries have a somewhat minor presence in the relevant network.

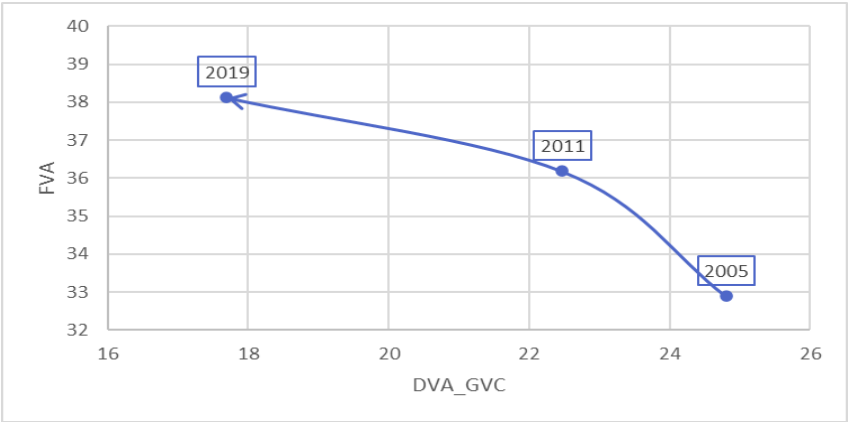
The figure shows too that the United States and Japan, countries that house major automotive manufacturers at world scale, register relatively low levels of FVA and, simultaneously, some of the highest levels of DVA_{GVC} . One reason behind this stylized fact is the motor companies in these countries do own the intellectual property and brand names and, thus, can capture higher portions of DVA all along the GVC.

Also, from figure 3, we detect a slight change in the slope of the linear trend.

In comparison, the trend of the data of 2019 has a steeper slope than the corresponding one of 2005, this means that in 2019 the values of FVA were in general higher than in 2005, and conversely, the values of DVA_{GVC} are lower for all countries.

As figure 4 shows, Mexico's participation has shifted to the left of the graph. Even though Mexico's participation in the network grew, it has been at the expense of reducing DVA produced internally (it decreased seven percentage points) and growth of the proportion of intermediates imported from other countries (in 2019, it was 5 points higher).

Figure 4. Mexico's participation in the transport equipment industry's GVC: 2005-2019 (Percentage of exports)



Source: Own elaboration based on ADB-MRIO data.

In conclusion, between 2005 and 2019, the role of Mexico as an essential link in the automotive GVC, particularly concerning the United States, consolidated. This trend was already identified in Moreno- Brid et al. (2020) though for a shorter, different period (1996-2011).

In comparison from 2011 onwards, the relative importance of the United States grew in the global network of DVA, and so too Mexico's opportunity to increase the number of trade partners in this industry.

However, this has meant an increasing proportion of FVA included in Mexico's exports but not an increase in the value added that Mexico incorporates in other countries' exports. Mexico has not yet taken the opportunity to incorporate more value-added into this GVC by taking advantage of the interconnection inherent to being one of the leading trading partners of the United States in this industry.

On the other hand, as the USMCA has shifted the RCV rules and become more rigorous, the reliance of Mexico's export on high imported contents from various countries might imply that many firms outside of the region, may cease to benefit in the not-too-distant future from Mexico's membership of the USMCA.

3.2. Mexican automotive industry: jobs, gender and trade

As mentioned in the introduction. one of the main objectives of the present study is to examine the relation between Mexico's improved export performance and increased participation in this GVC and the qualitative aspects of the employment being generates, with emphasis on characteristics such as gender, status and level of schooling.

Table 1. Mexico: Employment and Domestic Value Added by manufacturing industry, 2005, 2011 and 2019 (share of total %)

Industry	Employment			Domestic Value Added		
	2005	2011	2019	2005	2011	2019
Food, Beverages and Tobacco	23.5	24.3	25.2	4.5	7.4	7.0
Transport Equipment	7.7	7.8	14.6	28.4	21.3	41.0
Textiles and Textile Products	19.4	17.4	12.6	7.2	4.1	2.5
Manufacturing, nec; Recycling	9.7	10.1	9.2	5.6	5.2	4.6
Basic Metals and Fabricated Metal	9.1	9.1	9.1	9.4	14.3	7.0
Electrical and Optical Equipment	6.6	6.3	6.2	25.3	20.9	20.9
Rubber and Plastics	3.4	3.8	4.8	3.5	2.5	1.9
Other Non-Metallic Mineral	5.0	5.3	4.0	2.2	1.9	1.3
Other industries	15.6	15.9	14.2	13.8	22.5	13.8
Total manufacturing industries	100.0	100.0	100.0	100.0	100.0	100.0

Note. "nec" = not elsewhere classified. Source: Own elaboration based on ADB-MRIO 2021 and STPS-SIEL.

We now first proceed to discuss in broad terms the evolution of employment in the transport equipment sector. Subsequently, after a brief overview of the methodology used, we examine the different patterns of jobs associated with, on the one hand, activities for the domestic market and, on the other hand, with those producing final and intermediate exports. Having done that, in the following subsection, we analyse Mexico's employment statistics for this sector disaggregated by gender and by level of schooling, and we examine too changes in the gender wage gap.

In the three selected years whose data we analyse, (2005, 2011, and 2019) employment in manufacturing represents around 16.7% of total employment in the Mexican economy. Nonetheless, in 2005 manufacturing production represented 59% of the domestic value-added exported in Mexico.

By 2019 this share increased to 75%, proof of its much larger labour productivity relative to the service and the primary sectors.

The transport equipment industry represented in 2005 less than 8 per cent of the total employment in manufacturing. Its share almost doubled by 2019 to 14.6 per cent, by then becoming the second most important employer in manufacturing, just below the Food, Beverages and Tobacco industry (See table 1). On the other hand, in terms of DVA generation, this industry has remained the most important for the Mexican economy and increased its share from 2005 to 2019 in 13 percentage points. None other industry in the country experienced such dynamic export performance in that period.

3.2.1. Jobs related to trade

In line with Moreno-Brid et al. (2020) we adopted Wang et al. (2017) classification of productive activities into: i) domestic production, ii) related to final exports or iii) intermediate exports (GVC production).

For methodological clarification, and following standard practice in input-output analysis, let us write the following expression that was fundamental to calculate the number of jobs involved in selected activities from a source country directly or indirectly involved in the final production in a given sector:

$$\hat{\mathbf{B}}\hat{\mathbf{Y}} = \hat{\mathbf{L}}\hat{\mathbf{Y}}^{\mathbf{P}} + \hat{\mathbf{L}}\hat{\mathbf{Y}}^{\mathbf{F}} + \hat{\mathbf{L}}\mathbf{A}^{\mathbf{F}}\hat{\mathbf{B}}\hat{\mathbf{Y}}$$

The term $\hat{\mathbf{L}}\hat{\mathbf{Y}}^{\mathbf{P}}$ represents employment associated to domestic activities using the local Leontief inverse matrix and a vector of final domestic demand. $\hat{\mathbf{L}}\hat{\mathbf{Y}}^{\mathbf{F}}$ shows employment incorporated into exports of final goods or "traditional" trade. The last term, $\hat{\mathbf{L}}\mathbf{A}^{\mathbf{F}}\hat{\mathbf{B}}\hat{\mathbf{Y}}$ uses both inverse matrices, local and global, and uses a matrix of imported coefficients that altogether shows employment included in exports/imports of intermediate goods and services, these jobs are part of the interchange of production between countries or GVC activities.

As done in the previous section, we use the ADB-MRIO data base to calculate the matrices

$\mathbf{B}$, $\mathbf{L}$, $\hat{\mathbf{Y}}$, $\hat{\mathbf{Y}}^{\mathbf{P}}$, $\hat{\mathbf{Y}}^{\mathbf{F}}$ and $\mathbf{A}^{\mathbf{F}}$; while $\hat{\mathbf{E}}$ is obtained from data for Mexico from INEGI and the Ministry of Labour (STPS-SIEL). To account for the number of persons engaged in each type of activity, we look at the sum of each row of the resulting matrices. For the domestic and final exports activities, we can assess whether those jobs correspond to the industry under analysis, or they relate to inputs from other industries, making them indirect jobs. In the case of the third term, GVC trade, we cannot differentiate between jobs generated "inside" and "outside" each industry. Such jobs include those pertaining to inputs that originated in the country of analysis as well as those from other countries embedded in intermediate imports.

In table 2, we show the results for the transport equipment industry and the manufacturing sector as a whole.

Table 2. Mexico: Jobs associated with domestic production, traditional trade and GVC trade as a percentage of total jobs (% of total jobs in the industry)

Industry	Year	Domestic	Traditional Trade	GVC trade	Total industry
Transport equipment	2005	37.8	36.6	25.6	100.0
	2011	32.5	27.0	40.5	100.0
	2019	11.0	60.5	28.5	100.0
Manufacturing	2005	59.6	21.6	18.8	100.0
	2011	33.8	22.1	44.1	100.0
	2019	40.7	33.5	25.8	100.0

Source: Own elaboration based on ADB-MRIO data.

In the case of the former, we observe a tendency to increase the importance of jobs associated with traditional trade and GVC activities. Conversely, in it, employment in domestic production reduced its share in total employment. Compared to manufacturing, there is a decrease in the importance of jobs in domestic activities. However, the reduction is not particularly steep.

The employment shares in 2011 differ significantly from those presented in Moreno-Brid et al. (2020), where GVC activities in transport equipment accounted for almost 30% of total jobs. In this document, the corresponding share was significantly larger (by a margin of ten percentage points). The cause of this difference may be rooted in a revision of the statistics used.

Indeed, the WIOD tables (used in our previous study) were released in 2013, and the ADB-MRIO tables are much more recent, 2021. However, the trend is similar in both studies, and point to a decrease in domestic production jobs' importance. In any case, GVC activities account for one-third of the employment by transport equipment and a quarter of that of total manufacturing. Another major difference with our previous study is that the ADB MRIO database does not consider socio-economic accounts, as WIOD did. Thus, we rely on official statistics for Mexico from INEGI, and from the databases of ILO and the OECD (ILOSTAT and OECDSTAN) for the other countries included in the analysis.

¹² Where $\hat{\mathbf{E}}$ is a diagonalized vector of employment coefficients it can represent total employment or remunerations for different types of employees as in the next section, $\mathbf{B}$ is the global inverse Leontief matrix, $\mathbf{L}$ is the local inverse Leontief matrix, $\hat{\mathbf{Y}}$ represents a diagonal matrix with information on final production for domestic absorption, $\hat{\mathbf{Y}}^{\mathbf{F}} = \hat{\mathbf{Y}} - \hat{\mathbf{Y}}^{\mathbf{P}}$ is the diagonal matrix of final products exports, and $\mathbf{A}^{\mathbf{F}} = \mathbf{A} - \mathbf{A}^{\mathbf{P}}$ is an off-diagonal block matrix of imported input coefficients.

Table 3. Mexico: Number of jobs generated within or outside the transport equipment industry according to production destination, 2005, 2011, and 2019 (thousands)

		2005	2011	2019	Difference 2019-2005
Domestic	Within	185.8	163.0	128.3	-57.5
	Outside	18.1	22.6	18.9	0.8
	Total	204	185.6	147.3	-56.7
Traditional Trade	Within	195	151.6	803.4	608.4
	Outside	2.8	2.7	3.0	0.3
	Total	197.8	154.3	806.5	608.6
GVC trade		137.8	231.1	380.2	242.4
Total industry		540.8	571.0	1333.9	793.1

Source: Own elaboration based on ADB-MRIO data.

Table 3 registers the number of jobs created within the transport equipment sector versus the number of indirect jobs (generated as a result of the demand of other inputs from the rest of the economy).

It is evident that the linkages to indirect jobs are almost nil in this industry in both domestic and export production.

The data indicates a reduction in the number of jobs linked to domestic production; a reduction more than compensated by the rise in the number of jobs in traditional export and GVC activities.

3.2.2. Female jobs in Mexico's transport equipment sector

As a background comment before entering into the analysis of gender aspects of employment, it may be useful to point out that, although in recent years Mexico has begun to enact some policies aimed at empowering women, it has a long way to go to correct the acute and blatant gender inequalities that mark our social and economic lives.

The country had a lower female share of the labour force for the total economy than the average of the OECD (44.4%) in 2019. When we compare the indicator for the total economy, Mexico's manufacturing sector presented a smaller share of female employment. The female share of employment in the Transport Equipment industry is even lower. These results may be taken as

evidence that this industry's labour force has been and continues to be predominantly masculine. However, between 2005 and 2019, there was a certain increase in the female share in the it.

Also, in table 4, we report the female share of the labour force disaggregated by levels of schooling¹³. The figures are larger in the lower classifications, reaching 47.9% in 2019, around 12 percentage points higher than in the total economy and three points higher than in manufacturing. In the medium level of schooling, women participate in a similar proportion than in the total economy and two percentage points higher than in manufacturing.

Table 4. Mexico: Female share of the labour force by schooling: 2005, 2011 and 2019 (% total labour force)

Level of Schooling		2005	2011	2019	Change (percentage points)
Total	Total Economy	36.6	37.7	39.1	2.5
	Manufacturing	38.7	36.6	37.3	-1.4
	Transport Equipment	34.8	32.5	36.9	2.1
Low	Total Economy	33.9	34.5	35.4	1.5
	Manufacturing	45.1	43.1	44.1	-1.0
	Transport Equipment	41.8	43.2	47.9	6.1
Medium	Total Economy	38.8	38.6	38.6	-0.3
	Manufacturing	35.8	34.0	35.9	0.1
	Transport Equipment	35.9	32.3	38.1	2.2
High	Total Economy	38.5	41.7	45.0	6.5
	Manufacturing	25.9	30.7	33.1	7.2
	Transport Equipment	18.3	24.3	27.2	8.9

Source: Own elaboration based on official data

Finally, in the highest level of education, we observe two important facts. First, in the period here considered, it is the level of schooling with the highest expansion of the female share in the labour force: six percentage points in the total economy, seven points in manufacturing and almost nine points in the transport equipment industry.

The second fact that drew our attention is the large difference between the evolution of this indicator at the level of the aggregate economy and that of transport equipment. In the former we observe the highest share of women in employment for this schooling level, contrary to what is shown for transport equipment where the share is half from the that of the total economy, and it represents the lowest share of women.

¹³ “Low level of schooling” considers employees with at most complete primary education. Medium level encompasses those with secondary up to high school education. High level includes employees with higher education degrees and postgraduate education.

To a certain extent these differences in the transport equipment industry reveal patterns associated with educational bias in math and scientific education, with a bias against women. It seems safe -but sad- to say that women tend to be systematically interrupted in their educations in so called STEM Education; which in turn limit their training and job options to go into these fields (Hill et al., 2010).

A key aspect of Decent Work is gender equality in employment, a component of which is measured by structural differences in earnings or -as named by several studies- the gender wage gap. Among the different methodologies to assess this gap, the consensus is that women consistently earn less than men. In this study, our first step was to compare the respective shares of men and women in total remunerations.

The first salient feature is that the Transport Equipment Industry the share of women in total remuneration is much smaller than in the manufacturing sector as a whole. Moreover, by 2019 the difference for the manufacturing sector had shrunk from 44.5 percentage points to 38. But, for the Transport Equipment Industry, the trend went in the opposite direction; by 2019 the gap was somewhat larger than in 2005. Given that this measure of the wage gap is influenced by the relative size of men and women in employment, we examined the respective contributions by gender to the total amount of hours worked.

This labour gender gap, thus measured, is smaller than the above reported of their shares in total remunerations, thus suggesting a conspicuous gap -biased against women, in average remunerations per employed person. In the case of the Transport Equipment Industry the share of hours worked is nearly the same for both men and women; again, leading to confirm the presence of a substantial gap in average remunerations by gender, in favour of men. In manufacturing, the gap reached 33 percentage points. By level of schooling, in the context of a slight decline in men's share in the total number of hours worked in manufacturing. Table 5 shows nevertheless an increase in the corresponding share of men with medium level education, that was more than compensated by the sharp reduction in the share of those with low levels (3.5 percentage points) combined with the decline, albeit smaller (one percentage point), in the corresponding slot of high education levels.

The figures for women's share in total hours worked show a similar shift in their composition; though in a context of an overall increasing presence from 30.4% to 33.2% in the total. Indeed, such increase rests solely on the rise of nearly 4 percentage points of those with a medium level of education, while the presence of the other groups moderately declined. In the Transport Equipment Industry, the gender wage gap, as measured in terms of average

remuneration per hour of work widened much more than in manufacturing. Indeed, as can be seen in table 5, while the share of men and women in total remunerations remained with scant changes, the women's share in the total of hours worked augmented ten percentage point from 39.6% in 2005 to 49.2% in 2019.

Table 5. Mexico: Share of remunerations and hours worked. by gender and level of schooling, 2005, 2011 and 2019 (percentages)

	Total Remunerations			Hours worked		
	2005	2011	2019	2005	2011	2019
Manufacturing						
Men's share	72.3	71.1	69.1	69.6	68.6	66.8
High	16.9	14.8	12.3	8.5	8.6	7.5
Medium	43.8	46.2	47.5	36.4	37.2	38.2
Low	11.6	10.1	9.4	24.6	22.8	21.1
Women's share	27.7	28.9	30.9	30.4	31.4	33.2
High	5.3	4.8	4.3	2.9	2.9	2.7
Medium	16.8	19.1	21.5	15.0	17.2	18.9
Low	5.6	5.0	5.0	12.6	11.3	11.6
<i>Gender Gap %</i>	<i>44.5</i>	<i>42.1</i>	<i>38.2</i>	<i>39.2</i>	<i>37.2</i>	<i>33.6</i>
Transport Equipment Industry						
Men's share	62.8	64.1	63.9	60.4	51.4	50.8
High	7.2	7.1	7.1	4.9	4.4	3.8
Medium	48.8	51.8	51.7	41.9	35.5	35.6
Low	6.7	5.2	5.1	13.6	11.5	11.4
Women's share	37.2	35.9	36.1	39.6	48.6	49.2
High	4.4	4.3	3.8	3.0	3.2	2.8
Medium	26.5	26.9	27.6	23.0	30.6	31.4
Low	6.3	4.7	4.7	13.6	14.8	15.0
<i>Gender Gap %</i>	<i>25.5</i>	<i>28.2</i>	<i>27.8</i>	<i>20.8</i>	<i>2.9</i>	<i>1.7</i>

Source: Own elaboration based on INEGI-KLEMS (2021). Gender Gap %=Gap in percentage points.

Disaggregating by level of schooling we see that the, thus measured, gender remuneration gap widened much more for women with medium levels of education; precisely the group whose presence in the industry's working force increased more in the period of analysis. Note, also, the relative decline in female participation with high levels of education in terms of their presence measured by hours worked or by their share in total remunerations. Our results confirm the hypothesis of a widening gender wage gap in the industry, but the increasing trend and pace it has registered in the transport equipment industry was somewhat surprising.

There is certainly much room to incorporate women in the industrial labour force, in terms of hours worked as they now cover 33% of the total. The window of opportunity in this matter is most evident at the top levels of education, where by 2019 women's share in the total number of hours worked is a third of men's share. But the pressing challenge is to increasingly have them -as well as men- in jobs that can be safely described as Decent Work; in jobs in which their remunerations are on a par level with the remunerations of men with similar skills and training.

The evolution of the Transport Equipment industry in these labour aspects has an also considerable room for improvement but with somewhat different challenges. Indeed, women's participation in the total number of hours worked has increased to be practically 50% -50% with men's, but their participation in the total of remunerations actually decreased thus revealing a widening gap in the pay relative to that of men.

Certainly, more in-depth studies are needed to better understand the determinants of the gender wage gap, and of the impacts that trade may have on its evolution, per level of schooling, status of employment in different industries and national economies. The vast amount of literature on this topic has not yet reached a consensus on the nature and significance of such effects, if any. For example, Rocha and Winkler (2019) used the Enterprise Surveys Global Database, covering information at firms' level in 140 countries for 2006-2017, to compare female labour share in trading (exporters, importers, GVC participants and FDI firms) and in non-trading firms.

- NAFTA. The reason behind this effect, so they conclude, is that firms' response to an investment that in their perspective tends to be associated with a higher proportion of female employment. In turn, Oostendorp (2009) favourable demand shocks has been to invest more in technology; conducted a cross-country study of the impact of globalization on gender wage inequality. His findings suggest that the occupational gender wage gap declined with trade liberalization in high- income countries, but found no such relation in low-income ones.

¹⁴ By exposure we mean the extent to which an industry's activities are potentially affected by an increase in import penetration to Mexico or by a reduction in the restrictions to export to the USA and Canada due to the implementation of NAFTA. Sauré and Zoabi (2014) focused on state-level variations in manufacturing sector's, "exposure" ¹⁴to NAFTA and concluded that such trade has tended to reduce female participation in the labour force as well as their relative wages in the U.S. Juhn et al. (2014), starting from a "female labour to capital" complementarity assumption, showed that the gender gap in the labour market has somewhat declined in Mexico due to -or since?

They found higher female labour shares in types of trading firms, versus non-trading ones.

In what follows we present our results, based on Wang et al. equation

$$\hat{E}^B \hat{Y} = \hat{E}^L \hat{Y}^D + \hat{E}^L \hat{Y}^F + \hat{E}^L A^F B \hat{Y}$$

where $\hat{E}$ represents total earnings for women and men for each level of schooling.

**Table 6. Mexico's manufacturing and transport equipment industries:
Gender remuneration gap by schooling levels, 2005, 2011 and 2019
(Women's remuneration as a percentage of men's remunerations)**

Year	Transport Equipment Industry				Manufacturing industry			
	Av.	High	Medium	Low	Av.	High	Medium	Low
2005	90	100	99	93	93	96	96	107
	88	92	99	84	84	79	93	99
	88	114	99	71	87	101	94	70
	89	100	99	84	88	93	93	95
2011	68	85	70	75	87	96	86	95
	66	83	66	70	90	99	91	103
	65	83	67	68	91	98	90	106
	67	83	67	71	89	97	90	100
2019	64	75	65	70	96	98	93	100
	69	77	69	75	92	95	87	94
	65	76	66	75	94	96	92	94
	65	75	66	72	95	98	91	98

Source: Own elaboration based on ADB-MRIO data, INEGI-KLEMS. Note: We use average hourly remuneration in each schooling category. 100% means that women's and men's remunerations are equal.

This procedure allows us to identify differences in the gender wage gap in domestic production vis a vis traditional trade as well as trade in GVC. When we thus analysed remunerations, we did not have the needed information per type of work.

Usually, gender wage gap is calculated based on data on permanent workers' average remunerations. In our case, we focused on average hourly remuneration, and we could not distinguish between full-time jobs, half-day jobs, or other part time or hourly jobs. We want to stress too that our calculations do not make any inference on the evolution or levels of remunerations in real terms.

From our results presented in table 6 some salient facts are immediately evidenced.

First, in the transport equipment industry, the gender remuneration gap has widened in the recent years. When we look at average remuneration, women received 89% of that of men in 2005, a percentage that decreased to 65% in 2019. This trend is contrary to what happened in Mexico's manufacturing sector, where the gap narrowed down considerably. One possible explanation is that, as we have recorded, nominal remunerations for men are in general higher in the Transport Equipment than in the overall manufacturing sector as a whole, but the remunerations for women in both industries are rather similar.

Second, the smallest remuneration gap appears in the highest schooling level in the three years that we are analysed. The data suggests too that women with higher education have better remuneration opportunities than women with lower education. It is interesting to note that women in the medium level of schooling, which is the category of schooling with a more significant share of hours worked by them, register the widest gender gap in terms of remunerations.

On the other hand, when we compare this indicator between production activities, we observe that average remunerations in the domestic production sector in the Transport Equipment Industry and in Manufacturing Sector registered the smallest gap both in 2005 and in 2011. But this did not hold for the highest level of schooling, which women's remuneration was higher than men's in GVC production activities. However, 2019 present a different panorama, and final exports' production registers the lowest gender remuneration gap for the transport equipment industry.

And contrary to the years before, in the manufacturing sector as a whole, domestic activities report the smallest gender remuneration gap. GVC activities, both in 2011 and in 2019- report the largest gender remuneration gap in the Transport Equipment industry on average (this would be in line with the literature that emphasizes that this type of production in developing countries tend to be labour intensive and tend to compete internationally through lower wages).

Nonetheless, there are mixed results according to levels of schooling particularly for the manufacturing sector. For example, in 2011, the lowest schooling level presents a say more favourable situation regarding the wage gap for women. This can be an indication that at levels of scanty qualified jobs, the gap is cut by the effect of a minimum wage policies -that equally applies both for men and women. This phenomenon, however, may not apply to the Transport Equipment industry given that it tends to pay higher

remunerations on average relative to the overall manufacturing sector.

Mexico's importance in GVC has increased since the launch of NAFTA. And although it is not among the five leading players worldwide, Mexico is the main trading partner of the United States who in 2019 was the top exporter of DVA in this industry. Mexico also increased the number of partner countries to which it exports DVA, as well as the ones from where it receives FVA. In that sense, and considering the new USMCA RVC rules, the increase in FVA from countries other than the United States and Canada can become a challenge, a problem for some firms in Europe. We have seen too that Mexico's participation in GVCs is characterized more as a destination/recipient of value-added in foreign trade, rather than as a source/provider of value-added through its export in manufacturing, but this does not occur in the Transport Equipment Industry, where the nation is a main source, a main generator of DVA in manufacturing.

In our previous study, we found that Mexico's Transport Equipment industry was not especially relevant in generating jobs. However, by 2019 it has become the second main employer in manufacturing in the nation, although it does generate few jobs outside the industry.

Another result here corroborated is the importance of GVC and Final Exports activities in the generation of jobs in this industry in detriment of domestic activities. In conjunction with the growing need of FVA to export, this industry participates predominantly in the assembling part of the GVC.

Another contribution of the present study is to have been able to "construct" an employment vector by gender and levels of schooling to work with in accordance with the input-output methodology here adopted. We again found support for the standard conclusion that GVC activities present more significant gaps in remuneration on average as a mechanism to compete with other countries that participate in the same GVC. We identified a rather large gap between the share of female participation in the labour force (it is below the OECD average) as well as a gender remunerations gap in the Transport Equipment industry that widened in the period of analysis.

The analysis per schooling level revealed that the challenge for incorporating women in the labour force is even more demanding at the highest level of schooling. Note that the gender remuneration gap for the group at this level of education is smaller in the Transport Equipment industry than in lower levels of it.

One limitation of this study is that we do not have statistics on average

remunerations for full-time jobs in the industry, compatible with the input-output tables utilised. Another one is that although recent studies point that, in addition to gender, race and skin colour may be significant determinant of employment and wage gaps. Unfortunately, in Mexico, the labour statistics collected on race and skin pigmentation are still scarce and do not provide relevant information at the level of disaggregation of industrial activity by us required. Although we have certainly updated, extended and deepened the results and analysis carried out in our previous study on trade and decent job, there is still ample space for improvement. This will depend on INEGI's capacity and ability to identify, collect and process data on variables that can more adequately and timely capture any advances or regressions towards Decent Work. A priori, such data collection should distinguish between segments related to i) production destined for the internal economy, ii) production destined for final exports and iii) production destined for intermediate exports within GVCs for variables that are relevant indicators of the different axes of Decent Work identified by ILO.

The next section proceeds to address this fundamental issue through the construction of multidimensional indicators and qualitative aspects of employment, thereby facilitating an approximate assessment of the evolution of decent work in the textiles and automotive industries in Mexico.

4. Decent Work in Mexico's Automotive Industry: 2005–2019

For the empirical analysis carried out in this section, and as done in our previous study (Moreno Brid et al, 2021), the automotive industry is defined as the set of economic activities dedicated to the manufacture of cars, buses, heavy and light trucks, and auto-parts. In this set, the most relevant one, the largest one in terms of output and total exports is the final assembly of vehicles. Perhaps needless to say, such auto assembly is just the tip of the iceberg of a series of industries, of activities that manufacture a vast amount of intermediate goods and services for car production. In terms of Mexico's formal statistical taxonomy, i.e., the North America Industrial Classification System (NAICS), all of them are grouped at the subsector level defined as "336 transportation equipment manufacturing". This subsector is, in turn, composed by: "3361 motor vehicle manufacturing", "3362 motor body and trailer manufacturing", "3363 motor vehicle parts manufacturing" and "3369 other transportation equipment manufacturing".

A challenge of the present study was to build a more comprehensive set of indicators of Decent Employment for the Transport Equipment industry, than the one we produced in our previous research effort for ILO whose results were published in its research paper collection more than a year ago. In the same spirit, we were fortunate in, say, the recollection of statistical

information from official data sources to be able now to carry out a deeper and more ample assessment of the road travelled and pending challenges for Mexico's Transport Equipment industry in its -deliberate or imposed- quest to make Decent Work a reality. The methodological sounding board, or toolkit for the present analysis was ILO's Guidelines for Producers and Users of Statistical and Legal Framework Indicators. As there indicated, we have built a set of indicators to cover the following aspects, or axes of Decent Work identified by ILO: i) employment opportunities; ii) equal opportunity and treatment in employment; iii) safe work environment; iv) social dialogue, workers and employers' representation; v) adequate earnings and productive work, vi) decent work time, and vii) stability and security of work.

The data we used to build the wide array of indicators of the listed aspects of Decent Work were generously made available by Mexico's Secretary of Labour by granting us virtually unrestricted access to its superb databank; Labour Statistical Information System (LAIS). With this information and additional one systematically collected by INEGI in the National Surveys of Occupation and Employment (ENOE) we built time-series indicators of selected axis of Decent Work from 2005 to 2019 for the manufacturing sector, the Transport Equipment subsector and its components. Data from the Mexican Institute of Social Security (IMSS) helped to construct indicators of Employment Security.

As we did for the analysis in the previous section, the indicators here built cover the 2005-2019 period. Many of the data series here used are collected and updated on a quarterly basis, but for consistency purposes we concentrated the research on the trends, structures and patterns revealed by annual data. As we stated in the introduction, in the present study we refrained from extending the analysis to 2020, This was due, not only for the reason given before linked to the "outlier" character of this year in terms of the labour market and foreign trade performance due to the pandemic and its devastating impact on commerce, productive activity, and employment. But an additional reason was that due to the pandemic the National Statistical Institute stopped its Surveys, or more precisely it changed their data collection methodology. It ceased carrying out door to door, in person interviews and moved to doing them by telephone and other electronic means of communication. This change implied a fortiori in the comparability of the data series, as the pre-pandemic results are not necessarily consistent with those collected in more recent and troubled times. We now move to the next subsection to present in more detail the axis of Decent Work and the methodological choice we made to build the series of relevant indicators for the industry.

4.1 Selected Decent Work indicators for the Automotive Industry

The battery of Decent Work indicators, for the automotive industry, we constructed for the present study, again following ILO's guidelines; are divided into seven axes:

1. Employment opportunities:

As ILO argues, this axis is a key pillar for the promotion of Decent Work. It has as its principle the promotion of "opportunities for women and men to obtain decent and productive work in conditions of freedom, equity, security, and human dignity." On the one hand, this notion requires the existence of employment opportunities -in fair conditions, for all who seek work. In other words, it measures employment access from a positive perspective covering the relevant population base. On the other hand, employment opportunities can also be measured in a negative sense, focusing on its inadequacies or flaws, inter alia, unemployment, underemployment, precarious job, and lack of opportunities (ILO, 2008).

For this axis we decided to mix both approaches and focus on two main indicators. The first one is informal employment rate. We chose it due to the consensus among experts of labour markets that, much more than open unemployment figures, it is a key aspect of the quality of employment of developing economies. And it is an indicator that can be measured for manufacturing activities, at any level of disaggregation. The second one is employment by status in employment. It "provides information on the array of jobs actually being held, classified on the basis of the type of economic risk and the type of authority of job incumbents over establishments and other workers" (ILO, 2013, pg. 54). For the Mexican case and from such perspective -according with INEGI's guidelines-, the occupied population is divided in four categories: i) employers, ii) employees, iii) self-employed and iv) unpaid workers.

2. Equal opportunity and treatment in employment

Another pillar established in the Millennium Development Goals was "to promote equal opportunity and treatment in employment for all men and women." As the 2008 ILO Declaration on Social Justice for a Fair Globalization states, "gender equality and non-discrimination must be considered essential characteristics of Decent Work". Currently, this is a cross-cutting issue in the Sustainable Development Goals in the 2030 Agenda framework. The indicators we selected to measure this axis are also two. The first is occupational segregation by sex, which provides us information on the tendencies, on the patterns of men and women to work in different occupations. An occupation is formally defined as a "set of jobs whose main tasks and duties are characterized by a high degree of similarity" (ILO, 2013,

pg. 143). The second one is female share of employment in senior and middle management. It gives a more nuanced view of “glass ceiling” gender discrimination through figures of the changing (or not) proportion of females in total employment in top white-collar positions. i.e. senior and middle management occupations- and the third one is gender wage gap, which measures the relative difference between the average salary pay for men and for women. In the previous section we derived some estimates of it with input output methodology and data on total remunerations and total number of hours worked, by gender and other qualifications of employment.

3. Safe work environment

This vital component of Decent Work addresses “the protection of the worker against sickness, disease, whether or not work-related, and occupational injuries” as fundamental elements of Social Justice. In 1985, the International Labour Conference adopted the Labour Statistics Convention that says, “statistics of occupational injuries shall be compiled in such a way as to be representative of the country as a whole, covering, where possible, all branches of economic activity.” In Mexico, the Mexican Institute for Social Security (IMSS) covers formal workers employed in private firms. It compiles and publishes information on such population covered, including injuries and illnesses at work. For the deeper analysis here carried out, we disaggregated by gender the indicators relevant for this axis to identify the different vulnerability that institutionally marks men and women in their insertion at work in the automotive industry.

4. Social Dialogue, workers and employers’ representation

This axis covers “all types of negotiation, consultation, or simply exchange of information between representatives of governments, employers, and workers, on issues of common interests relating to economic and social policy” (ILO, 2008, pg. 86). Fundamentally important, in the world of labour, Social Dialogue requires “effective freedom of organization and trade union association for workers and employers and guaranteed, periodic collective bargaining” (ILO, 2013, pg. 303). Selected indicators for Social Dialogue at the national and industrial level as pointed out by ILO in its guidelines are “strikes, summons to strikes, conciliations, and collective labour agreements”. However, such data must be interpreted with caution as, for example, the absence of strikes may be a result of impeccable democratic negotiation processes between the relevant parties or, also, as a consequence of authoritarian policies and regime that ban or severely punish workers’ demonstrations and strikes.

5. Adequate earnings and productive work

It is -according with the Declaration of Philadelphia- to ensure “a just share

of the fruits of progress to all, and a minimum living wage to all employed and in need of such protection”. For this axis of the Decent Work agenda, we selected two indicators, The first one is working poverty rate, which measures the proportion of persons that, despite being employed, do not earn enough to avoid living in poverty. The second one is employees with low pay rate, and it indicates “the percentage of employees whose hourly earnings -in all jobs they simultaneously hold- amount to less than two- thirds of the median hourly earnings of all employees” (ILO, 2013, pg. 76).

6. Decent Work Time

It covers indicators that are related to employment and working time. For this purpose, we were able to build only one indicator, one that we believe measures this essential aspect of Decent Work. Employees in excessive working time shows the proportion of employees that is working more than forty hours weekly.

7. Stability and security of work

It is the dimension that monitors the “proportion of those employed whose contracts, whether verbal or written, are of relatively short duration or can be terminated on short notice” (ILO, 2013, pg. 129). Having described in very broad terms their characteristics we now proceed to present the results of our empirical analysis based on such indicators, specifically constructed for this research project on Mexico’s automotive industry’s trade and employment performance.

4.2. Measuring Decent Work in Mexico’s Automotive Industry

One major achievement of the Mexican automotive industry has been the ability to create formal jobs in a country where nearly half of the occupied population is working in informal conditions. According to table 7, this situation has improved even more as informality in this industry fell from an already low percentage of 3.99% to 2.11%. Additionally, employment in this industry -by status in occupation - has a structure completely different from the national average. As the table shows, almost the entire occupied population in the industry is an employee.

The presence of employers, self-employed and unpaid workers is minimal. In contrast, at the national level, 70% of all workers are employees, about 20% are self-employed, and the rest are employers (5%) or unpaid workers (5%). The proportion of employers has actually declined from the already very small percentage of 0.66% it registered in 2005 to 0.18% in 2019! It is important to stress that a marked characteristic of this industry is that it is made up of very large companies, functioning in a virtually oligopolistic context. And in the case of Mexico, the vast majority of them are either

foreign owned or transnational corporations. According to the extensive specialized bibliography, large companies retain a much larger share of formal employees than SMEs.

As shown in table 7, in 2019 employment in the automotive industry has increased significantly in the period to reach 1.4 million.

Table 7. Mexico’s Automotive Industry: Employment Opportunities, selected indicators (2005, 2011 and 2019)

	Indicator	2005	2011	2019
Informal Employment rate	Percentage of employed population	3.99%	3.38%	2.11%
Employment by status	Total (persons)	540,762	636,788	1,333,970
	Employers	0.66%	0.31%	0.18%
	Employees	98.96%	99.38%	99.66%
	Self employed	0.23%	0.08%	0.06%
	Unpaid worker	0.14%	0.22%	0.10%

Source: INEGI, National Employment and Occupation Survey (ENOE).

Actually, a substantial part of the high level of employment that year is associated with BMW beginning of operations in San Luis Potosí, generating about three thousand direct jobs and close to 30,000 indirect jobs. Note too, that the level of informality is very low, among the lowest in Mexico’s manufacturing, not to mention in the whole economy. In terms of equal opportunity and treatment in employment (as shown in table 8), this industry is still facing enormous challenges. Although the female labour participation rate increased from 34.8% in 2005 to 36.9% in 2019, it maintains a similar structure to the rest of manufacturing.

However, at the overall national level the pattern is different. According to INEGI (2021), the participation of women in employment during the last ten years has grown by about 15 percentage points. By 2019 it represents the 44.9% of the occupied population.

The share of women participating in the industry is low and has thus remained in the period of analysis. On the other hand, the indicator of gender pay scales measures the proportion of women earning more than five minimum wages¹⁵ compared to the number of men in the same category, suggests that in this aspect the situation has somewhat improved in the automotive industry.

However, this is true in a limited way, since that a closer look -not here reported in detail- reveals that this evolution in the thus calculated gap has

come about accompanied by a deterioration of the wage scale composition of employment, with increasing proportions of both men and women being in jobs paid at relatively low scales in terms of multiples of the minimum wage.

Table 8. Mexico's Automotive Industry: Equal Opportunity and Treatment in Employment selected indicators (2005, 2011 and 2019)

	Indicator	2005	2011	2019
Occupational segregation by sex	Percentage of women among total employed	34.8%	32.5%	36.9%
Female share of employment in senior and middle management	Percentage*	n.a.	21.5%	21.3%
Gender pay scale	Ratio (Wwomen / Wmen)**	0.15	0.18	0.26

*Female share of employment in senior and middle management indicator for 2011 corresponds to 2012, year in which INEGI incorporated more variables into the National Employment and Occupation Survey. ** Wwomen and Wmen means average wage for women and average wage for men, respectively. Source: INEGI, National Employment and Occupation Survey (ENOE).

As shown by the indicators of safe work environment, the number of labour injuries through the period 2011-2019 in the automotive industry showed a reduction from 8,662 labour injuries in 2011 to 5,585 in 2019, which means a decrease of 36% in labour injuries.

¹⁵ In Mexico's official statistical information, workers and employees' earnings are usually reported in multiples of the minimum wage. See INEGI's National Employment and Occupation Survey.

Nevertheless, the proportion of labour injuries in terms of the employed population of the automotive industry has been low; it was 1.4% in 2011 and 0.4% in 2019, that is a reduction of one percentage point as a share of the automotive employed population. Disaggregating the indicator by gender, men suffered more labour injuries than women in absolute terms. In 2011 there were 5,983 labour injuries of men vs 2,576 of women; which means that 70% of all labour injuries in the industry were suffered by men. By 2019. The figures show 3,265 labour injuries of men (58% of the total in the industry) and 2,319 of women (from 30% up to 42%).

This can be explained by two factors. The first one is that there are more men employed than women in the automotive industry. The second one is related to the occupation status in which men and women are employed in the industry, where men tend to be in more operative areas, working with heavy and dangerous machines, while women tend to get more administrative or clerk positions or linked to services within the plants.

However, the incidence of labour injuries among the male employed population in the industry was 1.4% in the automotive industry in 2011, and of women 1.2%. For 2019 the incidence rates declined to 0.4% and 0.5% respectively¹⁶. By then, the gender difference in this indicator is practically unnoticeable. Their decline, for both men and women, to such low levels must be taken as a positive step towards Decent Work in the automotive industry. Regarding the second indicator, i.e., the percentage of permanent workers in the total employed population, we see an improvement in the automotive industry in terms of safe work environment.

Table 9. Mexico's Automotive Industry: Safe Work Environment (2005, 2011, 2019).

		2005	2011	2019
Number of labour injuries	Total	n.a.	8,662	5,584
	Men	n.a.	5,983*	3,265
	Women	n.a.	2,576*	2,319
Permanent workers as a percentage of total employed	Total	74.0%	71.7%	65.9%
	Men	74.6%	70.3%	64.3%
	Women	72.8%	74.6%	68.8%

*\ Note: The sum of men and women labour injuries in 2011 does not add up to the total in that year because there is a component called "not specified" that contains the 103 labour injuries missing. Source: Mexican Institute for Social Security (IMSS).

According to table 9, permanent workers represented the 74% of the total employed in the automotive industry in 2005 and the percentage dropped to 65.9% by 2019. The reason behind this may be due to a deterioration of the labour market or due to a change in the composition of firms in the industry with an increase in small and medium enterprises (SME). Also, it may respond to changes in the industry's outsourcing patterns to incorporate more workers in scantily qualified tasks that, from the firm's viewpoint, need not be covered by a permanent contract.

¹⁶ The number of men employed in 2005 was 352,392 and 842,263 in 2019 while the number of women employed were 188,370 and 491,707 in 2005 and 2019 respectively.

Another possible explanation is the global tendency towards “flexibility” and reduced protection that has marked the evolution of labour markets in many nations. In any case, for the moment, this question remains unanswered.

From a gender perspective, in this industry there is no great difference neither in the share of women with permanent contracts compared to that of men, nor in the declined path that both have followed in the period of analysis. It is important to underline that this industry has one of the highest rates of permanent workers in the Mexican industrial complex. Indeed, at the national level, the figure is less than half of it (around 30%).

It is possible that this result is due to the more specialization nature of work in the sector also to the high foreign/domestic ratio in ownership of the main firms or the massive presence of large corporations in the industry. The results imply that the safe work environment in the automotive industry is rather good in relative terms of the Mexican economy and has improved through the time.

In terms of the chosen indicators to monitor Social Dialogue, the automotive industry showed an improvement in terms of the presence of collective bargaining agreements (CBAs) in this period. The industry’s CBAs represented 4% of the total number of CBAs at the national level in 2005, a proportion that reached 7% in 2019.

At the same time, the Summons to Strikes in this industry did show an increase. They went from representing the 2.9% of the national figure in 2005 to 3.1% in 2019. The actual strikes in it record an impressive increase, going from 10% of the national figure in 2005 to 22.2% in 2019. However, the actual numbers this recent year were very low, in 2019 of a total of 151 summons only two of them were actually enacted. These results do not allow us to fully assess the social dialogue in the industry. We have information related to labour disputes only from a very limited perspective.

Why were such strikes actually detonated, why many other summonses did not lead to an actual strike? How were they resolved? As Bensusán, (2020) and others have argued, Mexico has been marked for a long time by a deliberate weakening of union power by the government, inter alia through the signing of protection CBAs and the put in place of a repressive policy aimed to cut down labour unrest, a policy that was at a time publicized as a commitment to “preserve peace in the labour market”. That is why, although we can see in the table 10 important changes in the indicators that suggest an improvement in social dialogue conditions, such conclusion is at best debatable and at worst blatantly wrong.

Table 10. Mexico's Automotive Industry: Social Dialogue, Workers and Employers Representation selected indicators (2005, 2011 and 2019).

Indicator		2005	2011	2019
Summons to strikes	Total	195	204	219
	Percentage of national	2.9%	1.9%	3.1%
Strikes	Total	5	0	2
	Percentage of national	10%	0	22.2%
Colective bargaining agreements	Total	201	274	151
	Percentage of national	4%	3.90%	7.20%

Source: Secretary of Labour (STPS).

Table 11. Mexico's Automotive Industry: Adequate earnings and productive work, Decent Work Time and Stability and security of Work; selected indicators (2005, 2011 and 2019).

Adequate earnings and productive work				
	Indicator	2005	2011	2019
Working poverty rate	Percentage of workers earning less than the poverty line	1.7%	0.9%	7.3%
Employees with low pay rate	Percentage of workers earning less than 2/3 of median earnings.	64.2 %	64.1 %	74.8 %
Decent Work Time				
	Indicat or	2005	2011	2019
Employment in excessive working time	Percentage of persons working more than 40 hours weekly	94.4 %	92.7 %	68.3 %
Stability and security of work				
	Indicat or	2005	2011	2019
Precarious employment rate	Indicator	6.5%	7.7%	14.2%

Source: INEGI, National Employment and Occupation Survey (ENOE) and CONEVAL.

Employees in the automotive industry are characterized by having higher wages compared to the rest of the industries, and way above the national average. As a consequence, the percentage of workers with incomes equal to or below the poverty line is very low. In this case, we took as a reference the poverty line estimation that CONEVAL estimates as the minimum amount to satisfy the most basic needs. If we look at the composition of employment by wage levels within the industry, we note that most of the occupied persons in the automotive industry earn an amount equal to or less than 75% of the median wage of the whole industry.

Between 2005 and 2019, both indicators showed a deterioration in working conditions to an extent most probably associated with a series of global challenges to the automotive industry. Indeed in 2019, prior to the arrival of Covid 19, global demand for automobiles had fallen and overall production contracted 5.2%; in the case of Mexico, it fell 2.8% in the context of the beginning of an economic recession.

However, that year employment levels did not contract in the industry. Perhaps this was due to a response by employers to cut down wages and number of hours worked instead of slashing jobs. We must also consider that the percentage of people who worked more than 40 hours a week acutely fell from 94.4% to 68.3%.

As can be seen in the stability and security or work axis, the precarious employment rate, which includes the share of employed persons who work less than 35 hours by week, plus those with excessive hours that exceed 48 hours a week and, those who work more 35 hours and -simultaneously- receive an income below the minimum wage; This proportion doubled between 2005 and 2019, which also confirms what we have argued regarding the reduction of working hours and the precariousness of wages in the industry. In the next section we present the study's conclusions and suggestions.

5. Conclusions and suggestions for monitoring Decent Work

The analysis here put forward of the situation and prospects of Mexico's automotive sector has contributed to a better understanding of the relations between Trade and Decent Work in a most successful industry in GVCs in a semi-industrialized economy. The results, now extend to cover much more recent years -up to 2019- period confirmed our general assessments and conclusions argued twelve months ago in Moreno Brid et al (2021). And, most important, the present study has thrown light on a number of qualitative aspects of employment from a Decent Work perspective that due to data limitations we had been unable to consider before. These are, in our view,

important inputs for policy makers interested in ensuring that trade in GVCs can and should be conducive to Decent Work.

In addition, this study in continuation of the previous one, has helped us to identify a number of issues and suggestions related to data collection and systematization that could help to monitor better the evolution of any industry's employment in the diverse qualitative aspects that conform the axes of Decent Work as defined by ILO.

In this regard we begin by admitting that the input-output methodology as applied in this study presents some limitations some due to the processes followed by WIOD in the construction of their series of matrices, and some due to the characteristics of the available data and statistics for Mexico, in particular on employment. Indeed, the construction of the MRIO tables, though a superb exercise of homologation of national statistics between different countries, per forza implied a rather strict classification of industrial activities at aggregation levels of the data that allowed for international comparisons but may not necessarily be the optimal one required for policy analysis in the Mexican case. Analogously, the level of disaggregation of the data -in particular on employment- for this exercise in input-output is rather limited.

One suggestion to be able to build better indicators that relate trade and employment performance in this perspective would require additional coordinated efforts of national statistic agencies of various countries to have MRIO with greater analytical disaggregation and more recent and timely collection of data. Additionally, we urgently need labour statistics on decent employment indicators collected and presented with the same sectoral classification as in the input-output matrix. One such example of this concern that arose in the present study was the lack of data on average remunerations or wages for full-time jobs in the industry compatible with standard calculations for gender wage gaps.

Moreover, the existing data on ethnic and race for Mexico is not classified in a way compatible with employment surveys such as ENOE. Therefore, it was not possible for us to build indicators of Decent Work that captured this factor, this characteristic which is recognized to be a potential target for economic or social discrimination. It would be most positive if INEGI could design some questions in the relevant employment to systematically collect data on this matter, by status of employment, gender, level of schooling, etc.

Also, one assumption of input-output analysis is that in each industry and in

its interrelations with the rest of activities, constant productivity prevails over time; in other words, the matrix coefficients do not change significantly over time. In addition, the analysis presumes that all firms in a given sector have the same production function. Thus, by sheer construction, one assumes away the implications of such firms' heterogeneity in the economy. This is a severe limitation, considering actual firms' characteristics as studied in the literature. But there are no databases and trade/labour statistics that incorporate such information disaggregated at that business level, ever in conjunction.

Hence, one way to strengthen the analysis of the relationship between trade and decent work would be to put effort into collecting data on a regular basis to identify exporting and importing firms versus firms dedicated to domestic production; their size, the nationality of capital, as well as employees' remuneration (identifying age, sex and hopefully race or skin colour), hours worked, access to social security, just to mention the most important. We note that a number of recent studies for Mexico conclude that race or skin pigmentation can be a significant determinant of wage gaps and other aspects of Decent Work. Unfortunately, in Mexico, the statistics collected on race, trade and labour are scarce.

With or without making use of input-output techniques, we stress that the main obstacle to benchmark and monitor Decent Work in any industry is the lack or limited availability data of many relevant variables to build indicators of the relevant axes. Fortunately, in the case of Mexico, INEGI has made great efforts to consider in its employment and occupation surveys data that may serve as indicator of certain aspects of Decent Work. However -from our perspective-, to have a more complete picture, it is necessary to collect more information related to some of the axis that employment surveys do not cover.

It is pertinent to clarify that our suggestions are limited solely and exclusively for data to be used at a disaggregated level of analysis; say 'per industrial activity and not at the macroeconomic level. In this regard, we consider that the relevant institutions -INEGI, STPS and IMSS- collecting data in employment should continue the efforts to standardize the information under the same classification criteria of NAICS. This would not only allow better analysis at the local level, but also could provide the opportunity to develop more robust comparative research between industries in Mexico, USA and Canada.

In terms of Employment Opportunities axis, the appropriate indicators to measure Decent Work were available only at the national level in the Mexican case. There are dimensions of Decent Work where data was simply

not available, but that actually is irrelevant in the automotive industry -like the proportions of own-account and contributing family workers in total employment. Such data, however, may be necessary for studies on trade and labour in agricultural activities.

Regarding the Equal Opportunity and Treatment Employment axis, ILO's manual suggests measuring gender wage gap based on the differences in average earnings for women and men. But data availability impeded such straight forward calculation. The alternative we chose was to build a proxy measure of this indicator based on aggregate data on earnings measured in multiples of the minimum wage; focusing on the shares of women and of men earning more than five minimum wages. This was a far from satisfactory solution, as it fails to capture the magnitude of the gap in detail. Our unsatisfaction is to be noted as data on the evolution of the wage gap by gender are important inputs for policy matters aimed at reducing it. In this regard, we suggest that Mexico's employment surveys do a better job in capturing data on workers' income; so that one could know their composition in terms of wages, benefits, bonus, profit sharing etc. Identifying these components may help for better comparative analysis of earning between countries, mainly in the USMCA subregion.

In terms of Social Dialogue, the information used came from the Secretary of Labour's databank. But it is very limited. The variables chosen by ILO's fail to capture what is understood as such dialogue. For example, in the Mexican case Social Dialogue between representatives of workers, employers and government officers happens in different institutional spaces. The most conspicuous one are the National Minimum Wage Commission, the Labour Courts (previously known as Conciliation and Arbitration Board) and in selected for a and colloquiums including those organized by ILO and the civil society.

To better capture such instances of Social Dialogue, the Secretary of Labour could perhaps compile and systematize selected data of these events that could serve as inputs to build better indicators. Among these one could hope for data at the industry level on: i) the trade union density rate, ii) the employer's organization density rate and iii) the indicator of days not worked due to strikes and lockouts. It is important to mention that the indicators of the number of strikes and summons to strikes are rather opaque as a measure of social dialogue. They fail to detect whether a low number of strikes is due to a harmonious climate of negotiations among workers and employers conducive to a peaceful resolution of conflict, or to repressive actions from an authoritarian government that represses workers' organization and

demands.

Related to the Safe work environment axis, there was no information available to build the indicator of time lost due to occupational injury neither at the industry level nor at the national one. Another key indicator that was lacking is that of labour inspections and their role in ensuring an enforcement of the legal provisions relating to conditions of work and the protection of workers. We strongly encourage INEGI or the STPA to make an effort to collect and make available the needed data at the industry level. Digging in selected inspection reports may help to assess progress on the compliance of employers with legal framework of the labour conditions.

Furthermore, an important issue is that the USMCA has brought new needs related to Mexico's labour market performance on specific, very detailed issues inter alia wages, regional content and value added at the plant level. Thus, such needs may be taken as an opportunity to press the corresponding entities that have a voice in the USMCA to systematically collect data on relevant indicators of trade, wages and value added. This information will help to build detailed indicators of Decent Work at perhaps the level of plants per industrial activity and measure any progress in terms of the rules/conditions agreed by all parties in the USMCA. As a suggestion, a new indicator should soon be built with relevant and timely data collected to identify the percentage of workers in the automotive industry that earn at least 16 dollars per hour.

In this sense, it is also important to establish a common mechanism/methodology agreed by the three USMCA parties to identify the key variables on trade and decent work that should be systematically collected in each of the three countries to better monitor progress to and deviations from the commitments and obligations mutually agreed. This data set could go a long way in monitoring the USMCA application on matters that are considered so relevant to merit trade restrictions if they do not move in the correct direction or meet certain benchmarks

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1. Annex

6.1. USMCA and NAFTA: selected sections related to labour and the automotive industry

The following tables show the main points identified in the trade agreements of Mexico related to the Automotive Industry and the labour market conditions. These tables were taken from a previous study where it can find more information related to the topic.

United States–Mexico–Canada Agreement (USMCA)
Automotive industry
The USMCA requires that 75 per cent of auto content be made in North America.
It increases the RVC for passenger vehicles and light trucks from 62.5 per cent to 75 per cent, phased over three years after its entry into force.
It increases RVC requirements for core, principal and complementary auto parts for passenger vehicles, and it requires that core vehicle parts be produced in North America from regionally sourced steel, aluminium and other key parts and materials.
It increases RVC requirements for principal and complementary parts for heavy trucks and establishes a requirement that at least 70 per cent of the value of steel and aluminium purchased by the vehicle producer in the North American region be of originating goods.
It requires more auto production in North America to qualify for duty-free treatment by eliminating the “deemed originating” loophole in NAFTA.
It includes a first-of-its-kind labour value content (LVC) rule, which requires that 40-45 per cent of auto content must be produced in a North American plant or facility by workers making an average wage of at least US\$16 per hour.
Labour
The chapter on dispute settlement establishes a first-of-its-kind rapid response mechanism that will provide for monitoring and expedited enforcement of labour rights in Mexico at particular facilities while respecting sovereignty and due process.
The USMCA requires the Parties to ensure that migrant workers are protected under labour laws.
It requires the Parties to prohibit the importation of goods produced by forced labour, including forced child labour.
The Parties are required to adopt and maintain in law and practice core labour standards as recognized by the ILO (including freedom of association and the right to strike), to enforce their labour laws effectively and to not waive or otherwise derogate from their labour laws.
Mexico is required to create the conditions to allow for real union democracy, including elections by personal, free and secret ballot, the challenging of union leadership and the demonstration of worker support for collective bargaining agreements, thereby creating conditions for fairer competition between US and Mexican workers.
The USMCA includes specific legislative actions that Mexico must take to reform its system of labour justice, provide for the effective recognition of the right to collectively bargain and guarantee workers a vote by secret ballot on collective bargaining agreements.

North American Free Trade Agreement (NAFTA)	
Automotive industry	
“Mexico shall eliminate any restriction that limits the number of motor vehicles that a manufacturer may import into Mexico...”	
“Mexico may adopt or maintain a prohibition or restriction on the importation of autotransportation vehicles of another Party until January 1, 1999 ...”	
“For each of the years 1994 through 1998, Mexico shall allow any manufacturer of autotransportation vehicles to import ... a quantity ... equal to at least 50 percent of the number of vehicles of such type that the manufacturer produced in Mexico in that year.”	
“Mexico may not require that an enterprise attain a level of national value added in excess of 20 percent of its total sales as one of the conditions to qualify as a national supplier or enterprise of the auto parts industry.”	
“Mexico shall eliminate the Mexican Decree for Development and Modernization of the Autotransportation Vehicle Manufacturing Industry ...”	
“For the first 10 years after the date of entry into force of this Agreement, Mexico may maintain prohibitions or restrictions on the importation of new automotive products provided for in existing items ...”	
Labour	
“The Government of the United States of America, the Government of Canada and the Government of the United Mexican States: Recalling their resolve in the North American Free Trade Agreement (NAFTA) to: create new employment opportunities and improve working conditions and living standards in their respective territories, and protect, enhance and enforce basic workers’ rights; ...”	

6.2 ADB / MRIO. Countries and territories.

Country	Acronym /Group	Country	Acronym /Group
Australia	AUS	Japan	JPN
Austria	EU15	Korea R	KOR
Belgium	EU15	Lithuania	EU13
Bulgaria	EU13	Luxembourg	EU15
Brazil	BRA	Latvia	EU13
Canada	CAN	Mexico	MEX
Switzerland	SWI	Malta	EU13
China PR	CHN	Netherlands	EU15
Cyprus	EU13	Norway	NOR
Czech R	EU13	Poland	EU13
Germany	EU15	Portugal	EU15
Denmark	EU15	Romania	EU13
Spain	EU15	Russia	RUS
Estonia	EU13	Slovak R	EU13
Finland	EU15	Slovenia	EU13
France	EU15	Sweden	EU15
UK	EU15	Turkey	TUR
Greece	EU15	Taipei,China	TWN
Hungary	EU13	USA	USA
India	IND	Malaysia	MAL
Ireland	EU15	Thailand	THA
Italy	EU15	Viet Nam	VIE
		Singapore	SIN

6.3 Methodology: Mexico's automotive industry Decent Work indicators per axis (2005–2019)

The estimation of decent work indicators for the Mexican economy and, more precisely, for the automotive industry were based on the 2013 ILO manual of decent work indicators. Based on this document and on the statistical information available, we created a set of indicators across 7 axes: employment opportunities, adequate earnings and productive work, decent work time, stability and security of work, equal opportunity and treatment in employment, safe work environment and social dialogue, workers, and employers' representation. Most of them were disaggregated by gender given the availability of the data. To that end, it was necessary to incorporate variables obtained from the Mexican National Institute of Statistics and Geography (INEGI), the Mexican Secretariat of Labour and Social Welfare (STPS) and the Mexican Institute of Social Security (IMSS).

Axis 1. Employment Opportunities indicators

Informal Employment Rate (IER)

Measurement objective: Informal employment is a job-based concept and encompasses those jobs that generally lack basic social or legal protections or employment benefits and may be found in the formal sector, informal sector, or households. The informal employment rate (IER) is defined as the percentage of persons in total employment who are in informal employment.

Data Sources: INEGI (National Employment Survey and National Occupation and Employment Survey).

Method of computation:

$$\text{IER}\% = (\text{Persons in Informal Employment}) * 100 / (\text{Total Employed Persons})$$

Employment by status in employment (ESE)

Measurement objective: Employment by status in employment (ESE) provides information on how jobs held by persons are classified based on the associated type of economic risk and the type of authority of job incumbents over establishments and other workers. Employment by status in employment (ESE) refers to the number of workers in each category of the status in employment classification given as a percentage of the employed population.

Data Sources: INEGI (National Employment Survey and National

Occupation and Employment Survey).

The status taken in consideration in this study are i) employers, ii) employees, iii) self employed and iv) unpaid worker.

Method of computation:

$$ES\% = \frac{\text{Employed persons in a given status category}}{\text{Total Employed Persons}} * 100$$

Axis 2. Equal Opportunity and treatment in employment indicators

Female share of employment

Measurement objective: This indicator provides information on the tendency for men and women to work in different occupations, – where an occupation refers to a set of jobs whose main tasks and duties are characterized by a high degree of similarity. In this way, the indicator sheds light on the extent to which women and men benefit from different opportunities and treatment in work life.

Data Sources: INEGI (National Employment Survey and National Occupation and Employment Survey).

Method of computation:

$$\text{Employed Women Population} / \text{Employed Population}$$

Gender Wage Gap

Measurement objective: Percentage of employed women with three or more minimum wages, with respect to the number of employed men with three or more minimum wages.

Data sources: INEGI (National Employment Survey and National Occupation and Employment Survey).

Method of computation:

$$GWG = \frac{\text{Women earning more than 5 minimum wages}}{\text{Men earning more than 5 minimum wages}}$$

Axis 3. Safe Work Environment

Number of Labour Injuries (LI)

Measurement objective: Represents the number of accidents during work.

Data sources: Mexican Secretariat of Labour and Social Welfare (STPS) & IMSS (Mexican Social Security Institute).

Method of computation:

$$LI = \text{Number of accidents during work}$$

Permanent workers as percent of the employed population

Measurement objective: Represents the percentage of permanent workers registered in the Mexican Social Security Institute (IMSS), with respect to the employed population

Data sources: Mexican Secretariat of Labour and Social Welfare (STPS) & Mexican Social Security Institute (IMSS)

Method of computation:

$$PW\% = (\text{Number of permanent workers insured in IMSS}) \times 100 / (\text{Employed Population})$$

Ais 4, Social Dialogue, workers and employers' representation

Summons to strike

Measurement objective: Total of summons to strike.

Data sources: Mexican Secretariat of Labour and Social Welfare (STPS) Method of computation:

Number of total of summons to strike

Strikes

Measurement objective: Total of strikes.

Data sources: Mexican Secretariat of Labour and Social Welfare (STPS) Method of computation:

Number of total of strikes

Collective Bargaining Agreements (CBA)

Measurement objective: Total of Collective Bargaining Agreements. Data sources: Mexican Secretariat of Labour and Social Welfare (STPS)

Method of computation: *Number of total of collective Barging agreements*

Axis 5. Adequate earnings and productive work

Working Poverty Rate

Measurement objective: INEGI defines precarious as the employed population working less than 35 hours a week for market reasons, plus those who work more than 35 hours a week with a monthly income below the minimum and those that work more than 48 hours a week, earning up to two minimum wages. Based on ILO's (2013), the working poverty rate is the percentage of precarious employment (as INEGI states), with respect to the employed population.

Data Sources: INEGI (National Employment Survey and National Occupation and Employment Survey).

$PER = \text{Number in precarious employment} * 100 / \text{Employed population}$

Employees with low pay rate

Measurement objective: The employees with low pay rate (ELPR) aims to capture the percentage of employees that are working for low wages. It is defined as the percentage of employees whose hourly earnings in all jobs equal less than two-thirds of the median hourly earnings of all employees.

Data Sources: INEGI (National Employment Survey and National Occupation and Employment Survey).

Method of computation:

$ELPR\% = (\text{Number of employees paid less than } 2/3 \text{ of median earnings})$
 $\times 100 / (\text{Total Employees})$

Axis 6. Decent Work Time

Employment in excessive working time

Measurement objective: EEWT is defined as the percentage of the employed population whose hours actually worked in the reference week in all jobs are more than 48 hours, i.e. 49 hours or more, per week. It is an indicator of exposure to overwork, i.e. of persons experiencing working time that exceeds the threshold beyond which negative effects on workers become visible—not

only on workers' health, but also on their safety (e.g. increasing injury hazard rates) and on work-life.

Data Sources: INEGI (National Employment Survey and National Occupation and Employment Survey).

Method of computation:

$$EEWT\% = (\text{Number of employed persons whose number of hours actually worked is more than 48 hours per week}) \times 100 / (\text{Total number of employed persons})$$

Axis 7: Stability and Security of Work

Precarious employment rate

Measurement objective: The precarious employment rate (PER) provides information regarding the share of the employed whose contract of employment, whether verbal or written, is of relatively short duration or whose contract can be terminated on short notice. The PER is defined as the percentage of employed persons who are in precarious employment. The indicator is calculated as follows: Data Sources: INEGI (National Employment Survey and National Occupation and Employment Survey).

Method of computation:

$$PER\% = (\text{Number of persons who are in precarious employment}) \times 100 / \text{Total number of employed persons}$$