Trade and decent work in Mexico's manufacturing sector

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▶ 5

▶ Introduction

Over the past two decades, efforts to improve working conditions in Mexico have delivered mixed results. On the one hand, there has been some important progress, for example with respect to narrowing the labour force participation gender gap, reducing the share of youth not in employment, education or training, the abolition of child labour, and increasing the share of women in senior and middle management roles. But on the other hand, some outcomes have been insufficient, and in some cases quite worrying, particularly with respect to adequate earnings (i.e. a minimum living wage), decent working time and work stability (Aleman-Castilla and Cuilty Esquivel 2020). And even though workers in manufacturing have typically fared better in this respect than those in other economic sectors, the differences have tended to decrease.

Between 2005 and 2020, the share of employed persons who live in a household with a total income below the national poverty line increased by nine percentage points, as did the ratio of this indicator for persons employed in the manufacturing sector with respect to that for persons employed in non-manufacturing. The share of employed persons working more than 48 hours per week remained roughly unchanged at the national aggregate level. However, the difference between the manufacturing and non-manufacturing sectors almost disappeared, as working time conditions worsened in manufacturing. On the bright side, the share of women in senior and middle management positions increased by ten percentage points nationally, and the difference between manufacturing and non-manufacturing industries decreased by just over a quarter, as the former sector caught up with the rest of the economy.

Although the recent evolution and current state of working conditions in Mexico are clearly the products of various overlapping factors, including the 2008–09 Great Recession (Busso and Messina 2020; Silva et al. 2021; Freije, López-Acevedo and Rodríguez-Oreggia 2011) and long-term social and structural changes (Piras 2006; Inchauste Comboni et al. 2021; Visser 2019), the disappointing performance in respect to some elements of the

Decent Work Agenda[1] could raise doubts about the alleged benefits of free trade and globalization.[2] This is especially so when it is considered that Mexico has made a remarkable and continued effort towards integration through trade liberalization and globalization since the country joined GATT in 1986. While in general both theory and empirical evidence on trade and its implications for labour markets are quite extensive (Aleman-Castilla 2020), much of the attention has focused on a restricted group of outcomes, such as wages (Helpman et al. 2017; Lee and Lee 2015; Krishna, Poole and Senses 2014; Kovak 2013), employment (Dix-Carneiro and Kovak 2017; Coşar, Guner and Tybout 2016; Autor, Dorn and Hanson 2013) and informality (Dix-Carneiro et al. 2021; Ben Salem and Zaki 2019; Ulyssea and Ponczek 2018; Cruces, Porto and Viollaz 2018). And although there has recently been an increase in the study of some additional aspects of labour markets (see, for example, Ben Yahmed (2017), Hakobyan and McLaren (2017) and Juhn, Gergely and Villegas-Sanchez (2014) on gender disparities, or Kis-Katos and Sparrow (2011), Edmonds, Pavcnik and Topalova (2010) and Olarreaga, Saiovici and Ugarte (2020) on child labour), evidence regarding other important characteristics of the world of work is still scarce. This latter group includes working poverty, excessive working time, and female participation in management positions, which are some of the most significant features of the Mexican labour market to have shown contrasting performances. A better understanding of the relationships between trade and these other labour market outcomes is even more important in the present context of job and income losses due to the COVID-19 pandemic, which have resulted in greater poverty and inequality; and although the accommodation and food services sector has been the worst affected worldwide, the manufacturing sector and its GSCs have also been severely disrupted by the crisis and containment measures (ILO 2021c).

Thus, in order to provide evidence regarding the impact of trade on these other labour market features somewhat neglected by the empirical

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1   For the ILO (1999, 2008, 2013, 2021a, 2021b), decent work is central to poverty reduction and for achieving equitable, inclusive and sustainable development. The Framework on the Measurement of Decent Work covers employment opportunities; adequate earnings and productive work; decent working time; combining work, family and personal life; work that should be abolished; stability and security at work; equal opportunity and treatment in employment; safe work environment; social security; and social dialogue, employers' and workers' representation.

2   Keynes (2021) argues that "a widespread perception that the ideology of free trade has failed to deliver its promises" has been gaining momentum in recent years, and that politicians in rich countries "have seen furious backlashes against trade agreements and complaints that liberalisation has created losers as well as winners, leaving many workers behind". The President of Mexico has been a devoted critic of neoliberalism, of which free trade is a fundamental part; see for example his speech on 30 September 2021: https://bit.ly/3om7akR.

literature, this chapter extends the analysis presented in Aleman-Castilla (2021) to study the effects of non-preferential trade liberalization and exposure to globalization on working poverty, working hours and female workforce participation in the Mexican manufacturing industries between 2003 and 2018. For this purpose, two complementary estimation strategies are applied. First, a panel data approach is used with the 2003–08 Annual Industrial Survey (EIA) and the 2009–18 Annual Manufacturing Industry Survey (EAIM) to estimate the effect of exposure to globalization on gross daily wages per employee, daily hours worked per employee and the share of women in total employment within manufacturing firms. Second, a three-stage least squares estimation procedure is used to link the establishment data from these data sources to the worker data from the 2005–20 ENOE, along with the 2003–17 industry-level trade data from the WTO's DATA and Tariff Download Facility, to estimate the effect of both non-preferential trade liberalization and exposure to globalization on the working poverty rate for employed persons, the share of employment in excessive working time and the share of women in senior and middle management positions in manufacturing industries, after controlling for establishments' and workers' characteristics.

The main results are consistent with the theories on trade in the presence of firm heterogeneity (Sampson 2014; Yeaple 2005; Melitz 2003) and with previous findings from related empirical studies (Matthee, Rankin and Bezuidenhout 2017; Verhoogen 2008; Schank, Schnabel and Wagner 2007). First, within the manufacturing sector, it is found that firms that are more productive and firms with the largest share of income stemming from participation in GSCs pay higher wages and require shorter working hours. Second, it is found that greater exposure to globalization has contributed to lower levels of working poverty in those manufacturing industries that depend more on GSCs as a source of income. Third, while non-preferential trade liberalization has had a positive impact on reducing working poverty and excessive working time for the tradable industries in general, its consequences for the manufacturing sector have been mixed, with export tariff elimination giving only a small benefit and import tariff elimination having a negative effect. Last, it is found that higher non-preferential export tariffs are associated with higher shares of women in senior and middle management positions in all tradable industries, but when focusing on such industries in the manufacturing sector they have had no significant differential effect. In other words, these results suggest, on the one hand, that firms in the manufacturing sector that are more exposed to globalization have better working conditions; and on the other hand, that while further trade liberalization in the form of non-preferential tariff reductions may have contributed to lowering working poverty and excessive working times for

the tradable industries as a whole, this has not necessarily been the case for the manufacturing industries in particular, and female inclusion in both the workforce and management positions has also not improved accordingly.

The rest of the chapter is organized as follows. Section 5.1 briefly describes the trends in the relevant trade and decent work indicators for Mexico during the period of interest. Section 5.2 presents the data used in this study and a preliminary distribution analysis thereof. Section 5.3 presents the econometric approaches implemented and the corresponding results. Section 5.4 concludes.

▶ 5.1 Trade and decent work trends

As mentioned in the introduction, Mexico has achieved mixed results with respect to working conditions over the past 15 years. Although there have been improvements in some labour market outcomes, the country's performance regarding certain elements of the Decent Work Agenda has been disappointing. Most of its decent work indicators exhibit trends that are influenced by several common factors, such as the business cycle, social and structural changes, and adjustments to public policies; and even though workers in manufacturing have typically experienced better results than those in other sectors, their relative advantage has tended to decrease.

Consider first the working poverty rate for employed persons *(working poverty*, figure 5.1a), one of the main statistical indicators for measuring adequate earnings (ILO 2013). This rate – which is the proportion of employed persons living in households with an income below the national poverty line – increased considerably, by nine percentage points, between 2005 and 2020. The trend during this period was striking: growth in the wake of the 2008–09 Great Recession, followed by a reduction from 2018 onwards. These observations seem to confirm that wages were the main margin of adjustment in the Mexican labour market during the recession (Freije, López-Acevedo and Rodríguez-Oreggia 2011), and also that recent mandated increments in the minimum wage contributed to the reduction in the working poverty rate after 2018 (CONASAMI 2019; CONEVAL 2020a). In addition, the gap between manufacturing and non-manufacturing narrowed throughout the period of study, as the difference in working poverty between the two groups decreased from roughly seven percentage points in 2005 to five percentage points in 2020, mainly due to a faster deterioration of labour income in manufacturing.

A second interesting trend can be seen in the share of employees subject to excessive working time (*excessive hours*, figure 5.1b), taken to be the fraction of employed persons working more than 48 hours per week, the ILO's main statistical indicator for decent working time. Since 2005, around 27 per cent of employed persons in Mexico have had an inadequate working time arrangement, which undermines the balance between work and personal life and increases the risks to physical and mental health. Kaplan and Piras (2019) show that the Mexican labour market is characterized as demanding the third longest working hours among Latin American countries, just below Bolivia (Plurinational State of) and Colombia. The rate remained roughly unchanged for the overall economy, but it tended to worsen for the manufacturing sector, for which it increased by almost three percentage points between 2005 and 2020.

Last, Mexico's partial progress towards better working conditions could be exemplified by the share of women in senior and middle management positions (*female management*, figure 5.1c), a key indicator for equal opportunity and treatment of employment, measured as the share of women in decision-making and management roles in the public and private sectors. This indicator increased by around ten percentage points between 2005 and 2020. It displays a clear upward trend, which could partly be explained by such long-run social changes as the increase in female education, the need to supplement family income, and also the change in the age structure of the population, all of which have facilitated the reintegration of women into the labour market, especially after motherhood (Piras 2006). The ratio of this indicator between manufacturing and non-manufacturing industries increased by 26 per cent, as the share of women in management positions in the former rose at a pace that doubled that of the latter throughout the period.

On the other hand, during the same period (2005–20), Mexico continued to deepen its trade liberalization and globalization processes, initiated when the country joined GATT in 1986 and then the WTO in 1995, followed by the signing of 7 new trade agreements[3] (totalling 13 with 50 countries) and 17 new agreements for the promotion and reciprocal protection of investments (totalling 32 with 33 countries), among other measures (Mexico, Secretaría de Economía 2016). This continued integration effort translated into an

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3   These were signed with: Uruguay (2004); Japan (2005); Peru (2012); Central America (2013); Panama (2015); Colombia, Peru and Chile for the Pacific Alliance (2016); and Australia, Brunei Darussalam, Canada, Chile, Japan, Malaysia, Peru, New Zealand, Singapore and Viet Nam for the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) (2018), which has not entered fully into force because it is still awaiting approval by some Members. On 30 December 2018, it entered into force for Australia, Canada, Japan, Mexico, New Zealand and Singapore; and on 14 January 2019 for Viet Nam.

additional 11 percentage point reduction in the country's trade-weighted average non-preferential import tariff *(import tariff)* and a 27 percentage point increase in its aggregate level of trade openness.[4] Meanwhile, the trade-weighted average non-preferential tariff on Mexican exports to the country's 2018 top five trade partners (*export tariff*) remained roughly unchanged and low.[5]

▶ **Figure 5.1   Decent work trends in Mexico, 2005–20**

a. Working poverty rate of employed persons (working poverty): percentage of employed persons living in households with incomes below the national poverty line[1] [2]
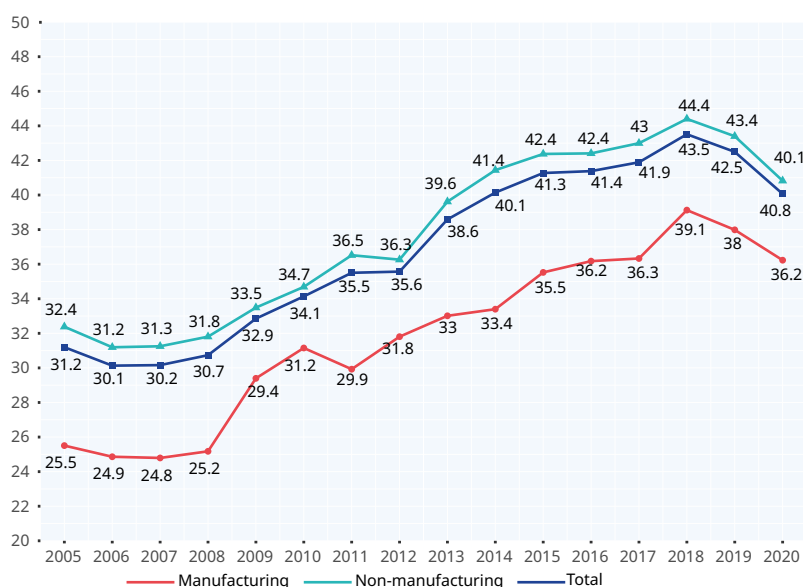
Note: [1]Based on labour force data from the ENOE (INEGI). [2]Based on the national urban poverty lines (CONEVAL).
**Source:** Author's calculations using the two sources cited in the notes.

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4   Trade openness is measured as the sum of a country's exports and imports as a share of that country's GDP.

5   According to data from The Atlas of Economic Complexity, produced by the Growth Lab at Harvard University (available from https://atlas.cid.harvard.edu/), Mexico's top five trade partners in 2018 were the United States (75.8 per cent of total gross exports), the EU (5.8 per cent), Canada (5.1 per cent), China (2.4 per cent) and Japan (1.1 per cent). These countries and weights are used here in the construction of the export tariff.

b. Employment in excessive working time (excessive hours): percentage of
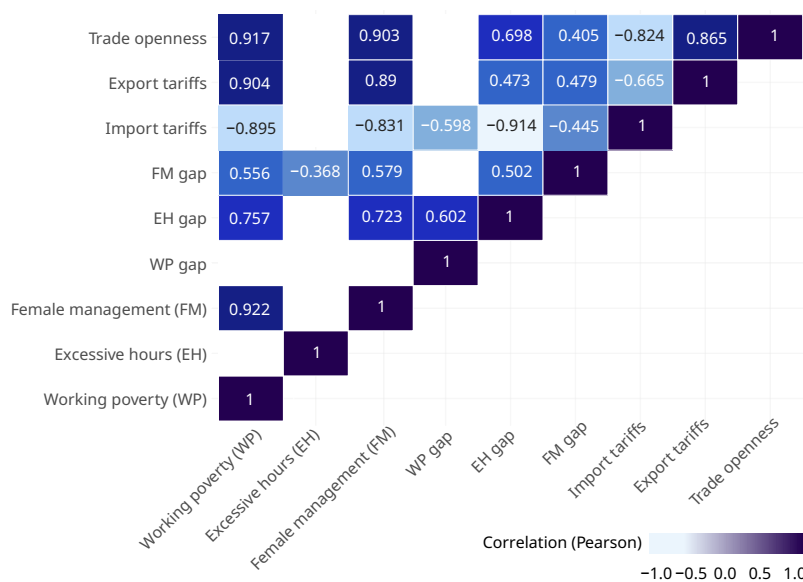employed persons working at least 48 hours per week[1]
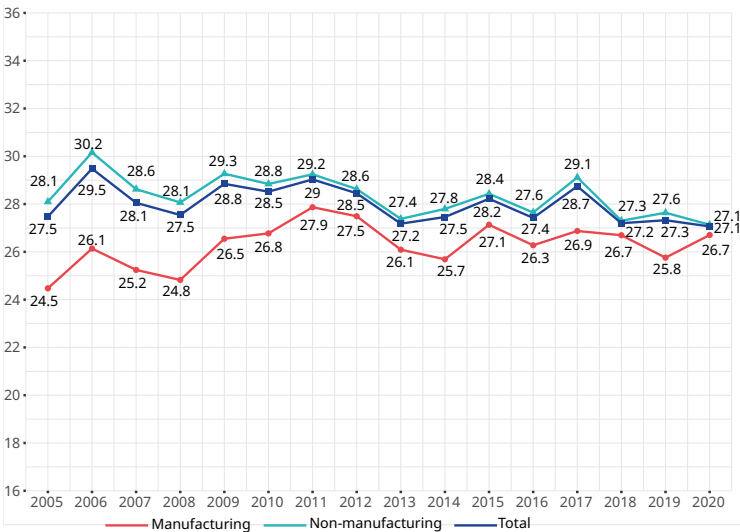
c. Women in senior and middle management (female management): percentage of
occupied workers aged 15+ in senior and middle management positions[2]
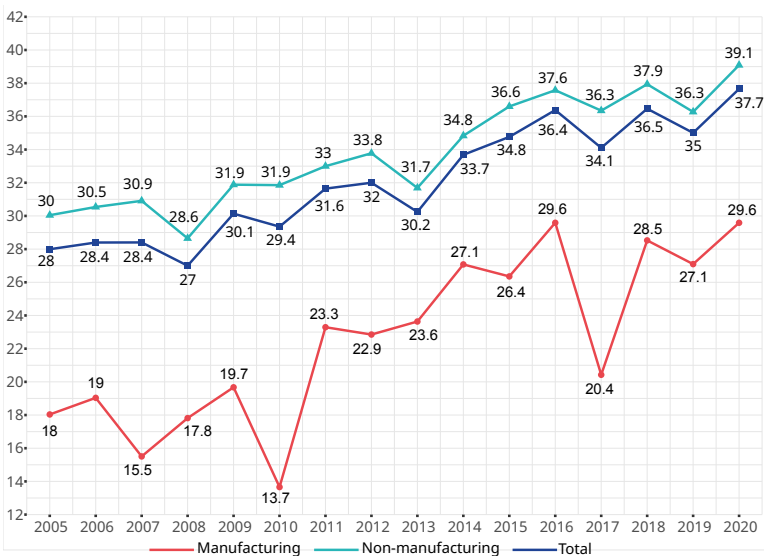
Note: [1]Based on labour force data from the ENOE (INEGI). [2]Based on the national urban poverty
lines (CONEVAL).

Source: Author's calculations using the two sources cited in the notes.

► **Figure 5.2**   **Correlations for trade and decent work indicators**

	Working poverty (WP)	Excessive hours (EH)	Female management (FM)	WP gap	EH gap	FM gap	Import tariffs	Export tariffs	Trade openness
Trade openness	0.917		0.903		0.698	0.405	−0.824	0.865	1
Export tariffs	0.904		0.89		0.473	0.479	−0.665	1	
Import tariffs	−0.895		−0.831	−0.598	−0.914	−0.445	1		
FM gap	0.556	−0.368	0.579		0.502	1			
EH gap	0.757		0.723	0.602	1				
WP gap				1					
Female management (FM)	0.922		1						
Excessive hours (EH)		1							
Working poverty (WP)	1								

Correlation (Pearson)

−1.0 −0.5 0.0 0.5 1.0

Note: WP gap = WP manufacturing/WP non-manufacturing; EH gap = EH manufacturing/ EH non-manufacturing; FM gap = FM manufacturing/FM non-manufacturing. Only significant correlations (at a 5 per cent level) are shown.

Source: Author's calculations using labour force data from the ENOE (INEGI), the national urban poverty lines (CONEVAL), and WTO and Our World in Data (based on Feenstra, Inklaar and Timmer (2015)).

The trends described above could indicate the existence of some important relationships between trade and decent work (figure 5.2). For instance, *import tariffs* show a negative correlation with *working poverty* and *female management*, and reductions of these tariffs are associated with smaller sectoral differences for all three decent work variables (so that the corresponding manufacturing-to-non-manufacturing ratios increase). In contrast, *export tariffs* are positively correlated with *working poverty* and *female management*, and reductions of these tariffs are positively associated with larger sectoral differences in these two variables (so that the corresponding ratios decrease). Finally, *trade openness* shows similar results to *export tariffs*, but is associated with smaller sectoral differences (or larger ratios) in *excessive hours* and *female management* between the manufacturing and non-manufacturing sectors.

▶ 5.2   Data and preliminary distribution analysis

The data used in this study come from surveys of both establishments and workers conducted by INEGI: the 2003–08 EIA, the 2009–18 EAIM and the 2005–20 first quarters of the ENOE. The EIA and EAIM are annual panel-structured surveys that follow manufacturing establishments over time, classifying industries at the six-digit level under NAICS, and collecting information regarding: occupied personnel; remuneration; hours and days worked; costs, revenues and value of production; inventories; and fixed assets.[6] The ENOE is a quarterly rotating-panel labour market survey that follows households and individuals for five consecutive trimesters. It collects data on socio-demographic (such as kinship, sex, age, education, marital status, number of children and geographic location) and labour market characteristics (such as economic activity status, occupation, economic sector, size and location of employer, wages, working time, social security coverage and unemployment spells, among others) of the working-age population (aged 15 years and older).[7] Finally, 2003–17 data from the WTO are used to obtain measures of trade liberalization. The WTO's DATA and Tariff Download Facility provide information on MFN tariffs, bilateral imports, export perspectives for the top five markets, and NTM indicators. The MFN tariffs are the normal non-discriminatory duties that a WTO Member charges on imports that fall outside of any free trade or preferential agreement. In this sense, they represent an upper limit for actual trade taxes, as they apply between countries that do not have an agreement or to products that do not comply with the rules of origin agreed therein. MFN tariffs are binding for some important trade relationships, such as that with China (Mexico's

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6   The EIA covered 231 industries under the 2002 NAICS, followed 7,294 establishments and excluded export-oriented maquiladoras. In 2009, the EAIM substituted the EIA, added nine more industries under the 2007 NAICS, increased the number of establishments to 11,455 and included export-oriented assembly plants. In 2017, the EAIM was updated, adjusting the number of establishments in the sample to 10,447 and the industries covered to 239 under the 2013 NAICS. The design of these surveys is based on the International Recommendations for Industrial Statistics of the United Nations (UN 2008). For methodological details, see INEGI (2007, 2012, 2019). Due to data confidentiality and the social distancing measures implemented amid the COVID-19 pandemic, access to these surveys was possible only through a remote processing facility. This meant that the code files with the estimation routines had to be sent to INEGI's Microdata Lab, for them to be run on the establishment-level data.

7   The Mexican labour market surveys have always had the ILO as the basic conceptual reference. However, to ensure comparability with new recommendations and raise the information quality standards, they have also considered the conceptual frameworks of other international bodies, such as the OECD and the United Nations Statistics Division (INEGI 2020).

fourth-largest trade partner), with whom Mexico does not have a preferential or free trade agreement.

For this study, working poverty, working hours and female participation are measured using six variables. The first three variables are derived from the EIA and EAIM manufacturing sector data. Their selection and construction are subject to the limitations and scarcity of the workforce information collected by these establishment-level surveys, but they are included in the analysis so that the best possible use is made of the wages and employment data, including by gender, available from these sources. These three variables are as follows:

▶ Gross daily wages per employee (*wages*) – the average gross wage and benefits[8] paid per working day to each worker directly employed by the firm in substantive activities.

▶ Daily hours worked per employee (*hours*) – the average hours worked per day by each worker employed, either directly or indirectly, by the firm in substantive activities.

▶ Women's share of total employment (*women*) – the proportion of women among all workers employed, either directly or indirectly, by the firm in substantive activities.

An analysis of the relationship between trade and decent work based solely on workforce data obtained from establishment surveys would be somewhat limited (ILO 2021a, 63–65). For this reason, the more detailed ENOE national labour force data are used to construct worker-level indicators for the three labour market outcomes mentioned above (working poverty, working hours and female participation), following the recommendations of the ILO (2013, 2021b):

▶ *Working poverty* – an individual-level indicator for workers aged 15 or older who live in a household where the total monthly income is below the national poverty line.[9]

▶ *Excessive hours* – an individual-level indicator for workers aged 15 or older who work more than 48 hours per week.

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8   That is, the wage before taxes, social security and other legally mandated deductions, converted to US dollars using the annual average official exchange rate to pay for obligations denominated in foreign currency (FIX exchange rate for the settlement date) published by Banco de México. See https://www.banxico.org.mx/SieInternet/.

9   The poverty line here refers to the first-quarter average values of the income poverty line for urban areas, estimated by the National Council for Evaluation of Social Development Policy. See, for instance, CONEVAL (2020b).

▶ *Female management* – an individual-level indicator for women aged 15 or older who are in senior or middle management positions.

Figure 5.3 shows the overall distributional characteristics of the workforce and trade data extracted from the EIA and EAIM establishment-level surveys. It presents box plots for the four-digit NAICS annual means of *wages, hours* and *women*, and the ratio of the sum of imported inputs and exports to total production (*trade openness*). Each data point is weighted by the corresponding number of establishments in the sample, and data points are grouped by three-digit NAICS subsector for ease of presentation. The triangles mark the mean for each subsector, and the dashed lines indicate the mean for the full sample. The box plots suggest there is an important level of heterogeneity across manufacturing industries. Establishments in subsector 324,"Petroleum and Coal Products", pay the highest *wages* (figure 5.3a), have the lowest *hours* (figure 5.3b), have a relatively low share of *women* (figure 5.3c) and have the lowest level of *trade openness* (figure 5.3d). In contrast, subsector 334, "Computers and Electronics", exhibits average *wages,* relatively high *hours* and share of *women* and the highest level of *trade openness*. Although not reported here due to space limitations, a similar analysis of the worker-level data from the ENOE suggests that *working poverty*, *excessive hours* and *female management* also show important variability across regions, economic sectors and population groups, indicating that worker heterogeneity is also relevant.[10] For example, female management has the highest level of variability across economic sectors, registering the lowest participation rates in "Mining, Quarrying, and Oil and Gas Extraction", the highest in "Health Care and Social Assistance" and a difference of more than 60 percentage points between the mean values for these two sectors over the 2005–20 period.
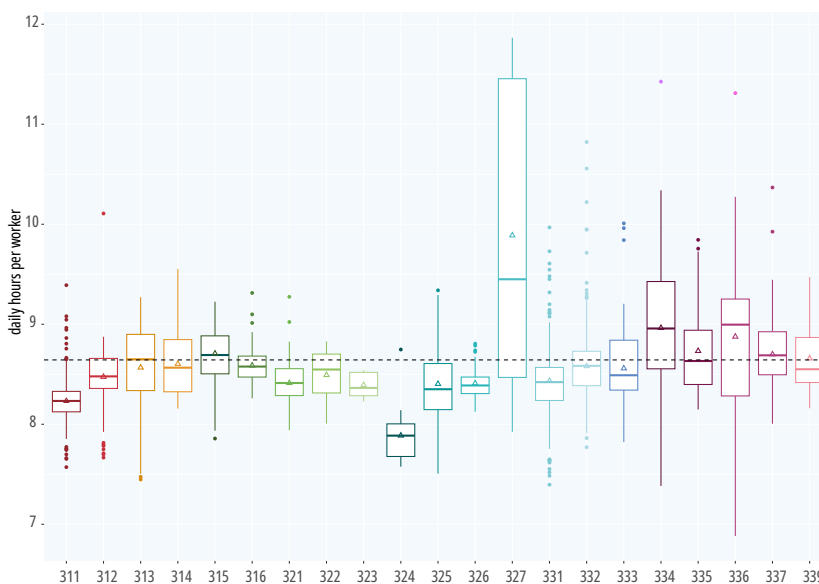

10　For the corresponding detailed analysis of working poverty, see Aleman-Castilla (2021).

▶ **Figure 5.3**   **Workforce and trade distribution using four-digit NAICS annual means, grouped by three-digit NAICS subsector**
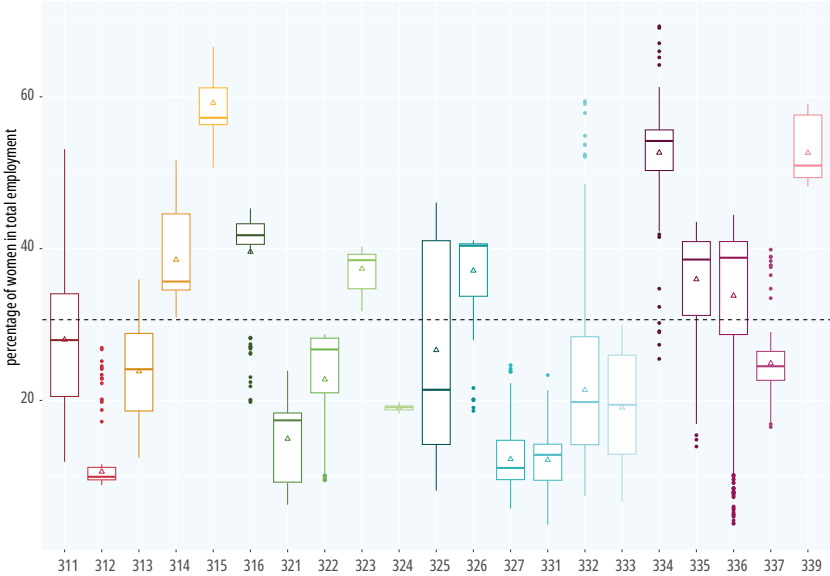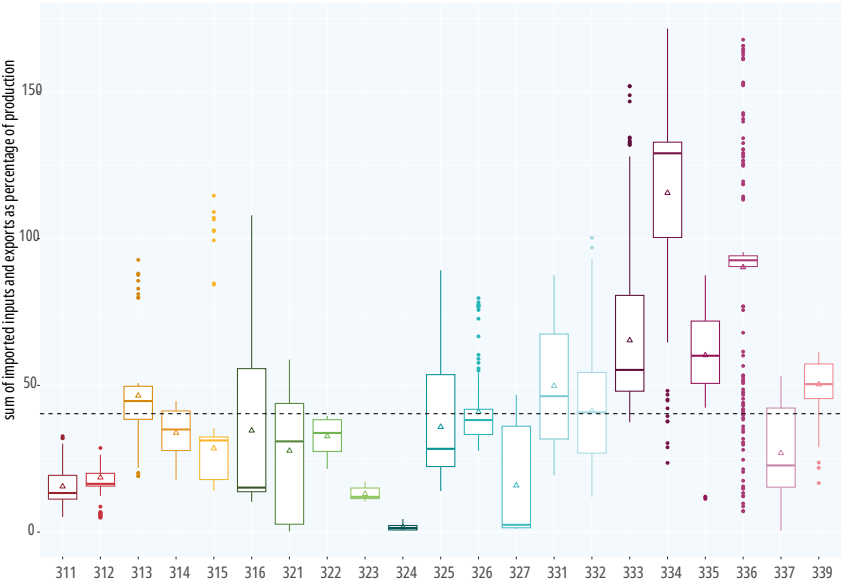
a. Gross daily wage per employee *(wages)*
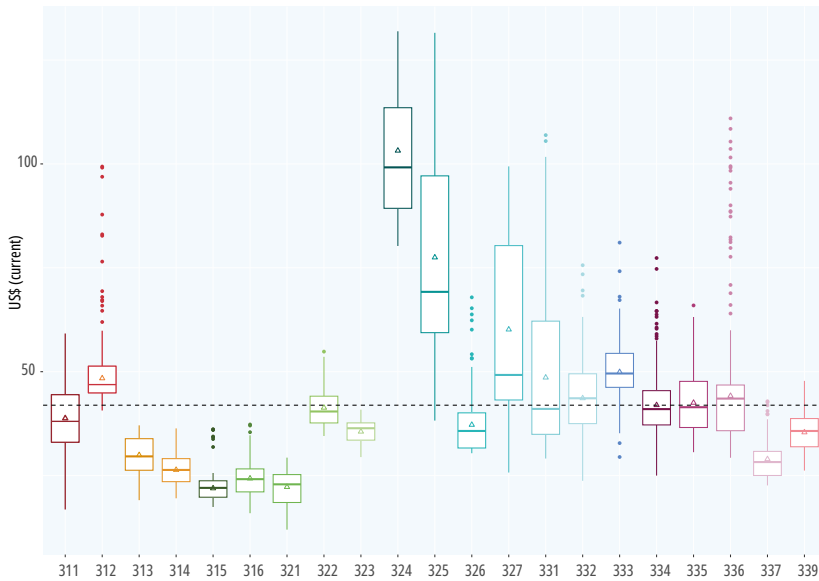
b. Daily hours worked per employee *(hours)*

c. Share of women in total employment *(women)*

d. Sum of imported inputs and exports as a share of total production *(trade openness)*

311	Food	321	Wood Products	331	Primary Metals
312	Beverages and Tobacco	322	Paper	332	Fabricated Metal Products
313	Textile Mills	323	Printing and Related Products	333	Machinery
314	Textile Products	324	Petroleum and Coal Products	334	Computers and Electronics
315	Apparel	325	Chemicals	335	Electrical Equipment, Appliances and Components
316	Leather and Allied Products	326	Plastics and Rubber Products	336	Transportation Equipment
		327	Non-metallic Mineral Products	337	Furniture and Related Products
				339	Miscellaneous

Note: Triangles represent weighted means for each three-digit NAICS subsector. The dashed lines indicate the weighted mean for the full sample.

Source: Author's calculations using establishment data from EIA-03, EAIM-09 and EAIM-13 (INEGI).

▶ 5.3 Econometric analysis

As in Aleman-Castilla (2021), the econometric analysis begins by using data from the EIA and EAIM manufacturing industry surveys to estimate fixed effects models for *wages*, *hours* and *women* in firms[11] i at time t on a matrix $\mathbb{G}it$ of the exposure-to-globalization variables trade openness and the share of income from maquila, sub-maquila and remanufacture services (maquila[12]), a matrix $\mathbb{X}it$ of firm characteristics (such as productivity, profitability, and revenue and cost structures), firm effects α_{it}, year effects δ_t and an error term ε_{it}:

$$y_{it} = \alpha_i + \beta\mathbb{G}_{it} + \gamma\mathbb{X}_{it} + \delta_t + \varepsilon_{it} \quad (1)$$

This approach allows for an initial estimation of the effects of trade after controlling for firms' observable and unobservable characteristics. The *trade openness* variable measures how much firms buy and sell internationally as a share of their total production, while *maquila* is a measure of their level of participation in GSCs (how much of their revenue comes from producing intermediate goods or assembling final goods for other national and foreign firms). The main results are reported in table 5.1.

These estimates were consistent under alternative specifications and robustness tests.[13] The variable *trade openness* has no significant effect on any of the three workforce indicators. However, *wages* are higher and *hours* lower in more productive firms and in those with larger shares of maquila; and hours are also higher in more profitable firms. The fact that neither trade openness nor maquila have a significant effect on *women* might seem at odds with the evidence from previous related empirical studies (for example, Ben Yahmed and Bombarda (2020)). However, this result becomes plausible when it is recalled that large trade-induced adjustments had already occurred in Mexico at the time of the country's accession to GATT, the WTO and NAFTA,

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11 Aggregation at the firm level is obtained by averaging the related establishment-level data.
12 A "maquiladora" is a plant at which inputs owned by another firm are assembled into final products; and "sub-maquiladoras" provide complementary manufacturing, transformation or repairing services to maquiladoras. The term "maquila" is also commonly used to refer to the offshoring activities of US companies in Mexico.
13 These included the estimation of equation (1) using the data aggregated at the four-digit NAICS industry level, and over different subsamples; comparison of fixed effects versus pooled and random effects (Gourieroux, Holly and Monfort 1982; Hausman 1978); inclusion of lags for trade openness and maquila; and estimation of lagged dependent variable models (Angrist and Pischke 2009, 243–247).

two decades prior to the period analysed here (Juhn, Gergely and Villegas-Sanchez 2013; Aguayo-Tellez et al. 2014).[14]

► Table 5.1   Fixed effects models for decent work-related indicators

	ln(wages)	Hours	Women
Trade openness	–0.000003 [0.0001]	–0.0001 [0.0003]	0.001 [0.005]
Maquila	0.003*** [0.0003]	–0.007*** [0.0013]	–0.004 [0.011]
Profit	0.0002 [0.0002]	0.0013* [0.0006]	–0.009 [0.006]
ln(productivity)	0.135*** [0.006]	–0.302*** [0.036]	–0.291 [0.151]
Industries	86	86	86
Firms	15 054	15 096	15 096
Years	1–13	1–13	1–13
Observations	91 947	92 082	92 082

Note: Significance codes: *** 0–0.001; ** 0.001–0.01; * 0.01–0.05. Profit = profit margin as a share of total income. Productivity = production per hour (in thousands of US dollars). Arellano (1987) robust standard errors clustered by firm are shown in square brackets.

Next, given that it is not possible here to match workers and firms, a three-stage least squares strategy is used to link the industry and labour force data at the four-digit NAICS level, after controlling separately for the observable characteristics of establishments and workers. This allows the analysis to be extended by estimating the effects of non-preferential trade liberalization (*import and export tariffs*) and exposure to globalization (*trade openness* and *maquila*) on *working poverty*, *excessive hours* and *female management*.

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14 In 2003, the share of female employment in subsector 334, "Computers and Electronics" (the subsector most open to trade, as shown in figure 5.2d) was already above 50 per cent.

The first stage consists of estimating linear probability models for worker i in industry j at time t on a vector H_{ijt} of worker characteristics,[15] a set C_{it} of indicators for city of residence, a set I_{ijt} of four-digit NAICS industry dummy variables, and an error term ϵ_{ijt}:

$$DW_{ijt} = H_{ijt}\,\beta_{Ht} + C_{it}\,\lambda_{jt} + I_{ijt}\,\delta_{jt} + \varepsilon_{ijt} \qquad (2)$$

where DW refers to each of the above-mentioned decent work indicators. Equation (2) is estimated using the ENOE data, with each year in the sample being estimated separately. In the case of *female management*, the dependent variable is an indicator for those workers aged 15 or over who are in a senior or middle management position, and all the independent variables are interacted with an indicator for women (as in equation (3) in Aleman-Castilla (2021)).

The second stage consists of estimating annual linear models of *trade openness* and *maquila* for establishment i in industry j at time t on a vector K_{ijt} of establishment characteristics,[16] a set I_{ijt} of four-digit NAICS industry dummy variables, and an error term ν_{ijt}, using the EIA and EAIM data:

$$z_{ijt} = K_{ijt}\beta_{Kt} + I_{itj}\gamma_{jt} + \nu_{ijt} \qquad (3)$$

The coefficients δ_{jt} in equation (2) and γ_{jt} in equation (3) capture the variation in the decent work indicators and exposure-to-globalization variables, respectively, that is attributable to industry affiliation.[17] In most of the cases, they are individually and jointly statistically significant. They are also somewhat correlated through time, which could be inversely related to their degree of sensitivity to changes in the economic environment, such as trade liberalization or exposure to globalization (Krueger and Summers 1988; Attanasio, Goldberg and Pavcnik 2004).

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15 These include: age; schooling or experience; marital status; and indicators for gender, informality, household leaders, employers, and whether the person lives in a state in which the export trade value is larger than the import trade value, based on data from the Mexican Ministry of Economy (https://datamexico.org/).

16 These include the workforce variables for: gross daily wage per employee, share of female workers in total employment and daily hours worked per employee; cost-structure characteristics, such as the shares of labour subcontracting, fuel, energy, advertising and freight expenditures in total costs; profit margin; production per hour worked; the share of machinery and equipment in total assets; and the annual percentage change in total assets.

17 For the case of female management in equation (2), the relevant coefficients are those of the interactions between the industry indicators and the dummy variable for women ($\mu\_(I{\times}f)jt$ in equation (3) of Aleman-Castilla (2021)), as they capture the part of the variation in the probability of holding a senior or middle management position that is attributable to being a woman in a given industry.

These industry-affiliation coefficients are then used in a third and final stage, to estimate a model of decent work δ_{jt} for industry j at time t on the vector T_{jt} of *import and export tariffs*, the vector γ_{jt} of *trade openness* and *maquila* industry differentials,[18] year effects Y_t, industry effects I_j, industry time trends I_j x tr_t, and an error term ω_{jt}:

$$\delta_{jt=}T_{jt}\alpha_T + \gamma_{jt}\beta_\gamma + Y_t\theta_Y + I_j\eta_j + (I_j \times tr_t)\phi_{(I\times tr)} + \omega_{jt} \qquad (4)$$

This type of econometric approach is familiar to the labour economics literature (for example, Krueger and Summers (1988)), and similar specifications have been used previously in the study of the impact of trade on different labour market outcomes (Attanasio, Goldberg and Pavcnik 2004; Goldberg and Pavcnik 2003; Aleman-Castilla 2006; Selwaness and Zaki 2013).

Table 5.2 presents the main results of the estimations using equation (4), which were generally consistent under alternative specifications and using different tests for robustness.[19] Column (a) indicates that *import tariffs* and *maquila* have significant effects on *working poverty*. Lower importation taxes among tradable industries and higher shares of income from supply chain participation among manufacturing industries are both associated with lower working poverty rates. The fact that non-preferential import tariff elimination contributes to more adequate earnings could indicate that the benefits from trade in intermediate inputs dominate over the possible negative effects of foreign competition on final products, as reported in Amiti and Davis (2011) for the Indonesian case.

The estimated impact of the share of income from supply chain participation, on the other hand, is consistent with the results of earlier studies, such as Aitken, Harrison and Lipsey (1996), who found that higher levels of investment by foreign-owned firms in Mexico and the Bolivarian Republic of Venezuela (such as export-oriented maquiladoras) are associated with higher wages; or Schröder (2018) and Alfaro-Urena, Manelici and Vásquez (2019), who found that exporters and foreign-owned export-oriented

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18 A value of zero is assigned to T_{jt} and γ_{jt} for non-tradable and non-manufacturing industries, respectively. In this way, these observations are not dropped from the sample, as they do not contribute to the estimation of α_T and β_γ, but they are useful in getting more precise estimates of the year effects θ_Y.

19 These included, among others: comparison between ordinary and weighted least squares in the estimation of equation (2), to account for the ENOE's sampling weights (Solon, Haider and Wooldridge 2015); excluding the industry time trends $I_j \times tr_t$ in the estimation of equation (4), to assess their relevance in the identification of the effects of trade and globalization (Besley and Burgess 2004); using lagged and lead values for T_{jt} and γ_{jt}, to explore the dynamics of the trade and decent work variables (Autor 2003); using different subsamples along the time (years) and group (industries) dimensions; and excluding unusual observations (both regression outliers and hat values).

multinational enterprises in Germany and Costa Rica pay higher wages and contribute to the improvement of labour market options for workers through spillover effects.

Column (e) shows that only *export tariffs* have a significant effect on *female management*. Higher exportation taxes are associated with higher shares of women in senior and middle management positions, which, along with empirical evidence on the gender pay gap (for example, Ben Yahmed (2017)), could be indicative of a higher demand for cheaper female labour, as the cost of access to foreign markets increases (UNCTAD 2014; ILO 2017, 75–119; van Staveren et al. 2007). Column (c) suggests that both non-preferential trade liberalization and exposure to globalization have no significant effect on *excessive hours*.

▶ Table 5.2   **Effect of non-preferential trade liberalization and exposure to globalization on decent work indicators**

	Working poverty		Excessive hours		Female management	
	(a)	**(b)**	**(c)**	**(d)**	**(e)**	**(f)**
Import tariffs	0.596*** [0.174]	0.910** [0.295]	0.137 [0.091]	0.362* [0.154]	–0.041 [0.030]	–0.073 [0.055]
Import tariffs × manufacturing		–1.035** [0.314]		–0.587** [0.195]		0.071 [0.070]
Export tariffs	0.288 [0.654]	2.260* [1.038]	0.737 [0.425]	1.795** [0.683]	0.222* [0.101]	0.485 [0.304]
Export tariffs × manufacturing		–2.128* [1.084]		–1.118 [0.722]		–0.403 [0.319]
Trade openness	–0.019 [0.079]	–0.093 [0.076]	0.068 [0.058]	0.026 [0.055]	0.005 [0.018]	0.007 [0.018]
Maquila	–0.503** [0.160]	–0.411** [0.137]	–0.063 [0.075]	0.019 [0.071]	0.047 [0.029]	0.038 [0.029]
Observations	2 156	2 156	2 156	2 156	2 014	2 014

Note: Significance codes: *** 0–0.001; ** 0.001–0.01; * 0.01–0.05. All regressions include year dummy variables, industry dummy variables and industry time trends. Newey–West standard errors with one lag are shown in square brackets.

Between 2009 and 2018, Mexico registered a 4.1 percentage point reduction in its weighted average MFN import tariff, a 0.7 percentage point increase in the corresponding tariff on exports to the country's top five trade partners, and a 0.5 percentage point decrease in the average share of income from supply chain participation. Taking this experience as the basis for gaining a better sense of the magnitude of the estimated effects, the coefficients in columns (a) and (e) imply that a representative manufacturing industry would have experienced a 2.2 percentage point fall in its working poverty rate and a 0.2 percentage point increase in its share of women in senior and middle management positions.

Columns (b), (d) and (f) explore the possibility that non-preferential trade liberalization may have different effects for manufacturing than for other tradable industries. This is done by including interactions of *import tariffs* and *export tariffs* with a dummy variable for manufacturing industries.[20] The estimates suggest that, while lower *import tariffs* may have been harmful for manufacturing industries in terms of higher *working poverty* and *excessive hours*, further reductions of *export tariffs* have been marginally beneficial. This is consistent with previous findings for other countries and labour market outcomes (Gaston and Trefler 1994; Scott 2005; Dutta 2007; Paz 2014), and it adds to the evidence on heterogeneous effects from trade liberalization on industries with different trade orientations (Amiti and Davis 2011). From an inbound perspective, while non-manufacturing tradable industries may benefit from cheaper imported inputs, manufacturing industries could be hurt by increased foreign competition. From an outbound perspective, although tradable industries benefit from lower exportation taxes, the gains are smaller for manufacturing industries, possibly because they have been exposed longer and more intensely to trade and globalization, and also because export tariffs were already relatively low. Finally, the interactions for *female management* were neither individually nor jointly statistically significant, meaning that the effect of trade liberalization on this indicator is no different for manufacturing than for other tradable industries.

To conclude this section, table 5.3 presents a summary of the main findings of the analysis. Because *trade openness* had no significant effect in either of the two econometric approaches used (i.e. fixed effects at the firm level, and three-stage least squares at the industry level after controlling for workers' and establishments' observable characteristics), this variable is not reported. Exposure to globalization, measured by the share of income

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20 The coefficients for import tariffs and export tariffs are now estimates of the baseline effects for all tradable industries, and the interactions coefficients are estimates of the differential effects for manufacturing industries. The overall effect of trade liberalization for the latter is therefore given by the sum of the baseline and the differential effects.

from supply chain participation *maquila*, has contributed to higher average wages, lower working poverty rates and shorter working hours. The impact of trade liberalization, on the other hand, has been heterogeneous. Lower *import tariffs* have contributed to reduced *working poverty* and fewer *excessive hours* in all tradable non-manufacturing industries, but not in manufacturing. Lower *export tariffs* have also reduced *working poverty* and *excessive hours* in all tradable industries, but their effect on the first of these two decent work indicators has been smaller for manufacturing industries. Last, the share of women in senior and middle management positions increases with *export tariffs*, which possibly act as a source of competitive advantage due to gender inequality, in response to higher trade costs.

▶ **Table 5.3   Summary of the estimated effects of trade on decent work**

		Working poverty	**Working hours**	**Female participation**
Trade liberalization	*Import tariffs*	Lower *import tariffs* reduce *working poverty* in non-manufacturing tradable industries but increase it in manufacturing	Lower *import tariffs* reduce the share of *excessive hours* in non-manufacturing tradable industries but increase it in manufacturing	No effect on *female management*
	Export tariffs	Lower *export tariffs* reduce *working poverty* in all tradable industries, but with a smaller effect in manufacturing	Lower *export tariffs* reduce the share of *excessive hours* in all tradable industries	Higher *export tariffs* increase *female management* in all tradable industries
Exposure to globalization	*Maquila*	Higher shares of income from supply chain participation reduce *working poverty* in manufacturing industries and increase wages at the firm level	Higher shares of income from supply chain participation reduce hours in manufacturing firms	No effect on *women* nor on *female management* in manufacturing

Note: import tariffs = trade-weighted average MFN import tariff; export tariffs = trade-weighted average MFN export tariff; maquila = share of income from maquila, sub-maquila and remanufacture services (supply chain participation); working poverty = working poverty rate of employed persons; excessive hours = share of employees in excessive working time; female management = share of women in senior and middle management positions; wages = average gross daily wage per employee at the manufacturing firm level; hours = daily hours worked per employee at the manufacturing firm level; women = share of women in the total workforce at the manufacturing firm level.

▶ 5.4 Conclusions

This chapter has investigated the effect of non-preferential trade liberalization and exposure to globalization on a group of variables that are related to adequate earnings, decent working time, and equal opportunity and treatment in employment – three of the ten substantive elements of the ILO's Decent Work Agenda – in the Mexican manufacturing industries between 2003 and 2018. During this period, as Mexico deepened its trade liberalization and globalization processes, the country saw its rate of working poverty among employed persons and share of women in senior and middle management positions increase by several percentage points, while its share of employees in excessive working time barely changed. And although manufacturing has normally fared better than other economic sectors in this respect, the differences with respect to non-manufacturing sectors have tended to shrink.

As these trends could give rise to doubts on whether trade liberalization and globalization have really contributed to better working conditions, the analysis developed here has aimed to provide additional clarifying evidence in this regard. Thus, panel data estimations using manufacturing establishment surveys indicate that wages are higher and fewer hours are worked in firms that have a higher share of income from maquila services, which implies that a higher level of participation in GSCs is associated with better working conditions. In contrast, exposure to trade and globalization does not seem to influence the share of women within the workforces of manufacturing firms, as most of the adjustments in this area may likely have taken place during previous stages of the Mexican trade integration process (although insufficiently, as gender equality in terms of wages and career opportunities is still a pending issue).

By relying exclusively on data from establishment-level surveys, the above-mentioned analysis is bounded by the scarce workforce information collected through such instruments and does not use data on the individual characteristics of workers. To overcome these potential limitations, a complementary three-stage least squares approach was also used to link the establishment-level data with more detailed worker-level data from the national labour force survey, and with MFN tariff data from the WTO at the four-digit NAICS industry level, to assess the impact of trade liberalization and exposure to globalization on the three labour market variables.

For all tradable industries, it was first found that reducing the non-preferential import tariffs contributes to decreasing working poverty, whereas reductions of non-preferential export tariffs (i.e. those charged by a country's trade partners) reduce the share of women in management positions. While the former effect might arise because of cheaper trade in imported intermediate goods (allowing firms to pay better wages to their employees), the latter could be a consequence of discrimination against women as the cost of accessing foreign markets decreases (or, conversely, a preference for cheaper female labour when such access costs increase).

The effect of trade liberalization was then disaggregated for the manufacturing sector relative to other tradable industries. It was found that reductions of non-preferential import tariffs may have contributed to increasing both working poverty and excessive working time rates in manufacturing. However, further lowering of non-preferential export tariffs by Mexico's top five trade partners has still been beneficial for both decent work measures.

Apart from confirming the heterogeneous nature of the effects of trade and globalization across economic sectors, these results provide additional evidence that trade policy intentions (i.e. whether they are meant to promote imports or exports) matter: further reductions of import tariffs benefit sectors that consume imported inputs, but they may harm manufacturing through increased foreign competition. Likewise, lower export tariffs benefit non-manufacturing tradable industries more than manufacturing ones, as the latter have been exposed to trade and globalization for longer and more intensively.

Finally, it was also found that a higher degree of supply chain participation, measured by the share of income from maquila services in the total income of establishments in manufacturing industries, has also contributed to a lower working poverty rate, confirming that globalization has helped to improve working conditions in this sector through more adequate wages.

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